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TRADITION AND CHANGE IN THE BUILT SPACE OF YEMEN

The description of a process as observed in the former Yemen Arab Republic between 1970 and 1990

ABSTRACT

Built space in Yemen is observed through the forms taken from the earliest phases of the process of building and dwelling in an agricultural territory to the increasingly complex expressions of settling and developing urban structures, before and after the Republican Revolution of 1962. The Revolution is seen as a turning point in building methods and attitudes; and the twenty years that followed the consolidation of the Republican regime in 1970 exuberantly illustrate the results of the country's consequent exposure to an industrial culture hitherto unknown.

The manifestations of pre-Revolution times and those taking shape in the subsequent twenty years are approached from parallel points of view. The later period, however, includes not only a study of built form but also the declared intentions for planning growth and conservation within the environment as a whole. Disruption appears as a consequence of cultural change and the mitigation of its effect as a government responsibility.

Consolidated forms of domestic architecture are studied and a basic distribution pattern of regional variations is proposed. New approaches in the process of building may be creating original idioms and radicalising economic and stylistic differences between the urban and the rural contexts. An attempt is made to identify meaningful trends.

TRADITION AND CHANGE IN THE BUILT SPACE OF YEMEN

The description of a process as observed in the former Yemen Arab Republic between 1970 and 1990

Fernando Varanda

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Submitted to the University of Durham
for the degree of Doctor of Philosophy

Department of Geography, 1994

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30 OCT 1995

Thesis
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Contents

Acknowledgements.....V
Foreword.....VI

INTRODUCTION
(Geography and history)

1- Location.....**10**

2-Comprehensive historic periods.....**11**
2.1-Pre-historic.....11
Paleolithic, Neolithic, Bronze Age
2.2-Pre-islamic.....14
The South Arabian Culture
2.3-Pre-industrial.....20
Yemen and Islam
Colonisations and Autonomy
2.4-Post-revolution.....30

3-Physical background.....**34**
3.1-Geology.....34
3.2-Physiographic regions.....35
3.3-Climate.....36
3.4-Hydrography.....36
3.5-Natural fauna and flora.....37
3.6-Environmental regions.....38

Part 1. TRADITION
(Built space in the Pre-industrial period)

Chapter 1: THE LAND.....**42**

Section 1- Building a territory.....**42**
1.1-Agriculture (generalities).....42
1.2-Terraces.....45
1.3-Irrigation.....47
Rainfed irrigation
Spate irrigation
Spring irrigation
Traditional lift irrigation
Motor pumps

Section 2 - Protecting the territory.....**51**
2.1-Tribes.....51
2.2-Land tenure and protection.....55

Chapter 2: - SHELTER AND SETTLEMENT **59**

Section 1-Elementary needs ***59***
1.1- Tent and Cave 59
1.2- Temporary Shelter 61
Isolated forms (*Saqif*)
Seasonal settlements
1.3-Permanent Dwelling 62
Elementary forms and passive mimesis

Section 2-Settling Strategies ***64***
2.1- Siting 64
2.2 -Containment 64
2.3 -Patterns of settlement 66
2.4-Places of prayer 69
Mosques
Madrasa
Baths
2.5-Places of trade 75
Markets: siting and organization
Rural and urban markets
Market, mosque and town
2.6-Networks 79
2.7-Places of polity 80
Administrative structure
Buildings

Section 3-Urban form ***83***
3.1-Street space 84
3.2-Neighbourhoods 85
3.3-Infrastructure services 86
Water supply
Waste disposal

Chapter 3: THE HOUSE **90**

Section 1-Generalities ***90***
1.1-Behaviour 90
1.2-Postures 91

Section 2 - Typologies ***93***
2.1-The Tihama 93
"Reed houses"," Brick houses" and "Red Sea Houses".
2.2-The Mountains 102
One storey houses , two storey houses and multi-storey houses
Variations: Suburban."Top court houses". "Jewish houses"

Section 3 - Space Utilization ***110***

Section 4 - Mimesis ***119***

Chapter 4: THE ART OF BUILDING **121**

Section 1- Attitudes and procedures ***121***

Section 2 - Materials and techniques ***123***
2.1-Regional styles 123
2.2-Foundations, roofs and floors 124
2.3-Arches and columns 125
2.4-Tie-beams and cantilevers 126
2.5-Earth Walls 127
Coursed clay (*zabur*)
Earth blocks: *libn* and *'ajur*
2.6-Stone walls 133
2.7-Inlays & painted walls 135
2.8-Finishes and rendering 137
2.9-Windows 140
Fenestrals and fanlights
2.10-Carpentry of windows and doors 146
Window grilles and shutters
Doors
Locks
2.11-Colour 150

Part 2. CHANGES
(Between Revolution and Unification)

Chapter 5: THE BUILDING TRADE **154**

Section 1 - Builders, contractors and designers ***154***
1.1-New professions 154
1.2-The changing role of the *'usta* 158

Section 2- Materials ***160***
2.1-Concrete 160
2.2-Stone 164
Quarrying
Construction
2.3-Earth 171
2.4-Summary of trends 174

Section 3- New Typologies ***175***
3.1-Institutional buildings 175
3.2-Houses 176
New types
Space utilization

Section 4-Formal components ***182***
4.1-Openings 182
Proportion and size
Fanlights
Carpentry of windows and doors
4.2-Interiors 186
4.3-Composite forms 187
4.4-Signs of distinction. Whimsicalities 189

Chapter 6- URBANIZATION **193**

Section 1: Expansion 193
1.1-Deconfinement 193
1.2-Farmland 194

Section 2: Urban image & urban problems ***195***
2.1-Urban image 195
Dispersion
Beautification
2.2-Urban problems 198
Rate of growth
Water supply
Sewage
Waste: recycling and disposal
2.3-General environment 203

Section 3: Planning ***204***
3.1-First Steps 204
3.2-The UNDP Town Planning Programme 204
Master Plan of Sana'a
3.3-The Berger/Kamsax Master Plans 210
3.4-Implementation 211
3.5-Secondary Cities 212
3.6-Bureaucratic framework and municipal participation 213
Building permits
Controls & Regulations

Section 4 - Mass actions ***218***
4.1-Standardised Housing 218
4.2-Earthquake reconstruction 221

Chapter 7 - CONSERVATION **226**

1 . Early efforts ***226***
2 . The conservation of the Old City of Sana'a ***227***
3 . Conservation and Tourism ***232***

CONCLUSION **234**

BIBLIOGRAPHY **242**

GLOSSARY OF TECHNICAL TERMS **250**

ACKNOWLEDGEMENTS

When, in 1973, I first worked in Yemen, a line from a popular song, then well known by the culture of my generation, came frequently to my mind: "yes, I get by with a little help of my friends." To have things done with a little help of one's friends seemed to be the way in Yemen at that time, and was certainly the way for me to have the research done that originated my first publication on Yemen and ultimately the present work.

So, it is to my friends of Yemen and elsewhere that I am indebted, in the first place. Among these I would particularly like to refer Muhammad Ma'sab, Dhirar Abd al Daim, Husayn al Quladhi, Husayn 'Alawi, Muhammad al 'Amari, Abdul Malik al Thawr, Salah 'Aziz, Etienne Renaud, Sarkis Garabedian, David Van Hammen and Phyllis Crowell. Kai Bird, Sylvia Kennedy, Jerry Erbach and Gary Simantel graciously offered graphic information filling in the lacunae of my own surveys. In Portugal, among others, Jaime Lebre, once again, helped me with his drawings from my sketches; José Luís Varanda printed some particularly difficult negatives; Jorge Varanda did the final computer graphic processing and printing; and my daughter Paula put together and typed the bibliography.

I am also grateful for the support given by various institutions and their staff: in Portugal, the Secretary of State of Culture (SEC) whose grant allowed the 1990 survey; in Yemen, the American Institute of Yemeni Studies and his director in Sana'a, Scott Rolson; the Yemen Institute for Research and Studies and his director, Dr. Abdul Aziz Al Maqalah; the Planning Office of the Ministry of the Municipalities, particularly Abdul Rahman Ghalid, Badiullah Sana'i, Dr. Bernard Muller and Peter Reinhardt; the Environmental Planning Office and his director Abdul Rahman al Mu'asib; the Office for the Old Town of Sana'a and in special to Dr. Abdul Rahman al Haddad, Ahmad al Ibbi and Lutfi al Hujayri; at the Survey Authority, Ism'ail Humran; and, at the Department of Architecture, Faculty of Engineering, of the University of Sana'a, Hatim al Sabahi and his colleagues

Last but not least, I would like to express my appreciation for the encouragement and guidance given by my supervisor at the University of Durham, Mr. Roy Gazzard, whose assistance in the correction of my text was instrumental for the production of this work in its present form.

FOREWORD

The following presentation is concerned with tradition and change in the built environment as exemplified in North Yemen, that part of present day Yemen Republic which was known as the Yemen Arab Republic between 1962 and 1990.

"Tradition" and "change" are words used here in their most common sense. The writer is aware of the range of the meanings and interpretations they imply[1] but in North Yemen distinctions have been made very clear by factors such as the introduction of new energy sources in a context where work had been produced only by muscular effort to the exclusion of even wind power. The implements that resulted from and depended on those factors have a clear temporal reference in the Republican Revolution (1962). The consequent adoption of building materials and methods which were as new as the new political ideas and social structures it introduced has consolidated characteristic expressions between the mid 'seventies and the mid 'eighties. "Traditional", thus, will designate what existed, or was directly rooted on what existed, before this event.

Strictly speaking, the period covered by this study is from "reconciliation" between Royalists and Republicans in North Yemen(1970) and "unification" of the North and South Yemens (22 May 1990). Direct observation began early in 1973 and was supplemented by that of others who had had personal experience of the period around the Civil War. Unification coincided with the final stages of the writer's field work and he was, therefore, able to have first-hand experience of the momentous changes in prospect, not only for North Yemen, but for the whole unified country. It seemed therefore an appropriate landmark to define temporal limits in the restricted field of study.

---

[1] Rapoport, Amos. "On the Attributes of Tradition", page 77 -105, in Jean Paul Bourdier and Nezar Alsayyad (ed), *Dwellings, Settlements and Tradition: Cross-cultural perspectives*, University Press of America, Lanham, M.D,1989

The linked association of farmers /warriors /architects characterizing the culture of the people was, for the writer, particularly fascinating and he is not sure of how this may have let subjectivity permeate his presentation. The graphic information provided with the text attempts to compensate for the deficiencies or exaggerations of verbal description.
Much information was provided by people formally or informally interviewed during the course of extended visits to Yemen (1973 to 1976; 1983; 1985; 1990), ranging from farmers to professional builders and government officials. The writer cannot adequately express his gratitude for the consideration shown to him and the care taken in providing the answers to his questions. Unfortunately the last stay in Yemen, rich as it was in events, was not the ideal time to confirm the information that needed to be checked against current official data. It was also unfortunate that most of the early work produced in the Planning Department of the Ministry of the Municipalities in the seventies, was lost, apparently in consequence of successive moves. The same applies to the United Nations Development Plan (UNDP) records of the Planning Projects of that period, which could no longer be found in their new Sana'a headquarters. The graphic information pertaining to that time is part of the writer's personal archives and is regretfully of limited extent.

Except where otherwise indicated the illustrations in this work came from the writer's surveys and have not been published before, although a few examples , collected between 1973 and 1976 and mostly presented in Part 1, are from prints only slightly different from material already shown by the writer in publications or slide presentations. Some aerial photos are not identified because they were provided to the writer on this condition for alleged security reasons. Recent town and house plans have in some cases been copied from the original documents provided both by government officials and private owners.

The source of some illustrations is referred as "writer's notebooks" indicating drawings and schemes made during field surveys in an "impressionistic" way, this is, with no measurements or subsequent confirmation. They are presented when more rigorous information lacks and because it was felt that points might, in this way, be made more clear.

A particular photograph should be especially mentioned which was given to the writer by an Iraqi photographer whom he briefly met in Bahrain in 1984 or 85 and whose name was deplorably forgotten. It is the image, presented at the end of chapter 5, of a camel in a "plastic bag field" in the Tihama, an image that was found to illustrate a situation so well that it was irresistible to include it, no matter how difficult to identify its source at this time.

The Introduction, covering the historical and geographical background of the country, results from basic reading of commonly available sources. Here, as in other fields where the writer is not a specialist, little more was done than summarising or paraphrasing this material. Therefore footnotes are reduced to a minimum and, whenever this is applicable, sources for both text and illustrations are indicated at the end of each chapter. Sincere apologies are offered to any author who might feel that he was not correctly quoted.

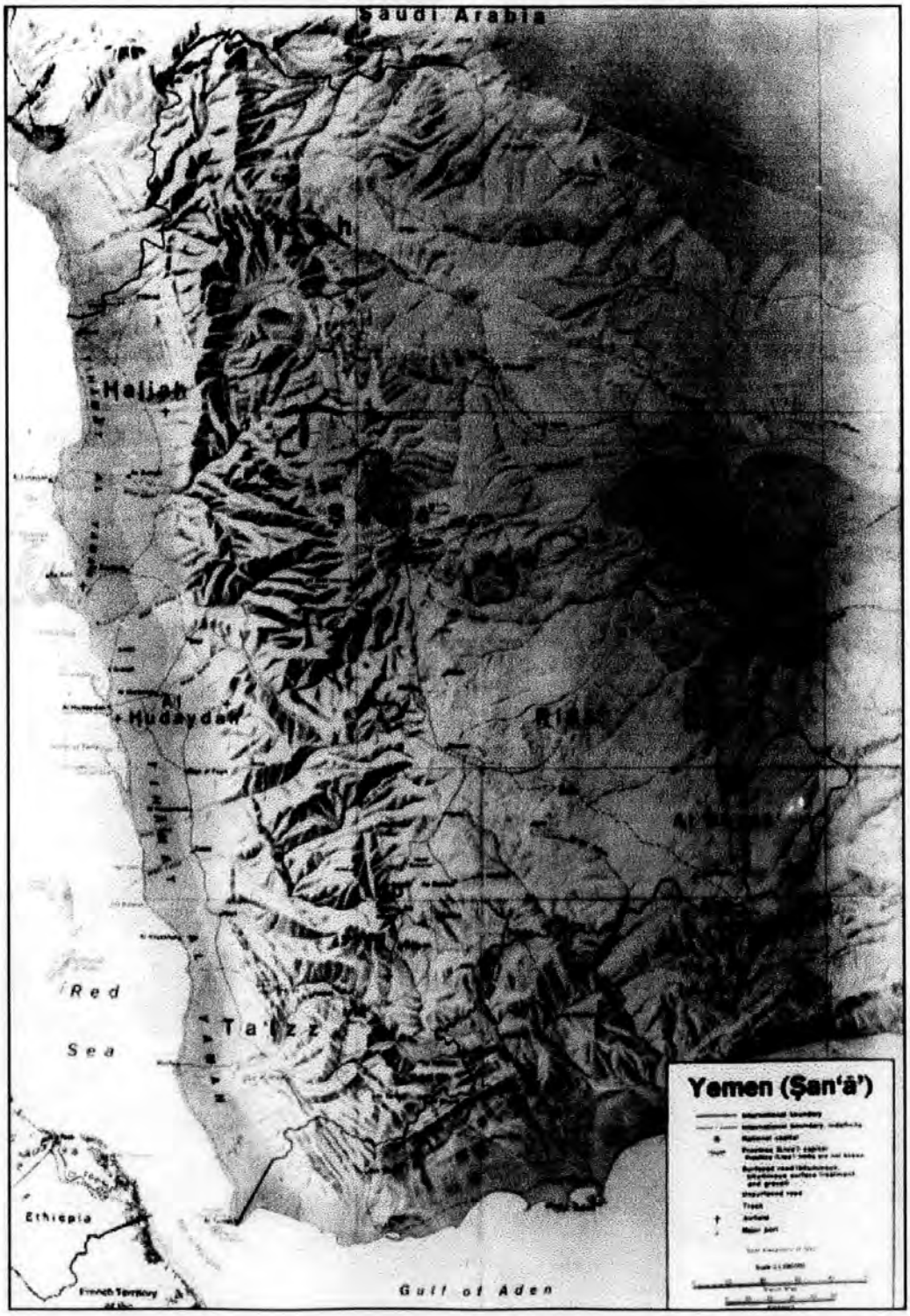
The initials C.E. (Common Era) rather than A.D. (Anno Domini) are used for dates refering to the Gregorian Calendar and occur particularly where ambiguities may arise with dates BC. The Gregorian Calendar is invariably adopted and Hijra dates appear in parentheses whenever they are found to have local significance.

Transliteration of Arabic words has been made according to the usage in Yemen or in publications concerning Yemen, in a simplified version, without diacritics. The names of unmapped places have been transcribed from the sounds as heard by the writer and in this way he joins a number of those that made theirs the justification presented by T.E. Lawrence in his preface to "The Seven Pillars of Wisdom".

"ARABIA FELIX"; XVII th century map by the portuguese cartographer João Albernoas II

INTRODUCTION
(History and geography)

Top: Yemen and neighbours in 1990; *bottom*: 1973 "CIA map" of North Yemen



1- LOCATION

The major mountain chain of the Arabian Peninsula runs along the Red Sea and Indian Ocean coasts, framing the great Arabian deserts. The highest peaks are concentrated in the Southwest corner of the Peninsula, an area known in Arabian antiquity as *Al Yaman*[1] and by the Romans and later European explorers as *Arabia Felix*. The country currently forming this region is the Yemen Republic, bounded in the north by Saudi Arabia, along a mountain ridge that runs for 300 kms inland from the Red Sea, and in the east by Oman; between these points, the boundary with Saudi Arabia, across the Ramlat Al Sabatayn section of the Rub Al-Khali desert, is unsurveyed.

Until May 1990 the Yemen Republic (approx. 490,000 km2, variously estimated population 11 million) was politically divided into two countries, the Yemen Arab Republic, along the Red Sea coastline (200,000 km2), and the People's Democratic Republic of Yemen (approx. 290,000 km2) facing the Indian Ocean. Notwithstanding historical and geographical generalities common to the whole of Southern Arabia, the study area of this work is confined within the political boundaries of the former Yemen Arab Republic, having a resident population of approximately eight million people,[2] situated between latitude 12° 30' and 18° North, and longitude 41° 20' and 49° East.
The designation **North Yemen** will be used for the former Yemen Arab Republic and **South Yemen** for the former P.D.R.Y..

---

[1] As opposed to Al Sham, the Northern part, centred in Syria.
[2] YARSYB:88.

Graffiti and cave at Al Masna', north of Sa'da.

2- COMPREHENSIVE HISTORIC PERIODS

2.1 - Pre-historic

Paleolithic, Neolithic and Bronze Age

Early human occupation of the country has been revealed particularly in recent years which have seen intensified archaeological research[3] evaluating and refining the pioneering work of the first half of the 20th century.

Paleolithic evidence was first reported in South Yemen in 1939 (Caton - Tompson and Gardner) and in North Yemen in 1969, when Garbini presented evidence of paleolithic industries near Bayt Na'am, 20 kms west of Sana'a. In the years that follow sites were identified in Sana'a itself, Marib and Khawlan. In 1983[4] further evidence of factories appeared in the same general area, leading to the conclusion that Middle Paleolithic industries were present in Khawlan in the entire stretch from Wadi Yana'im in the North to Wadi Hababid in the South.

Lower Paleolithic remains were found in the same year (1983) in the plains of Dhamar, south of Mabar. Of particular interest was the discovery of the first bifacial tools in North Yemen, which, by analogy with those recorded by Doe in South Yemen, could be assigned an age of 400,000 - 200,000 years.

In 1985 a survey was made in four major wadis in the Tihama foothills and lithic tools were found in the quaternary deposits of the water-beds. Further research may clarify many aspects but there is already enough evidence to confirm that, for hundreds of millennia, paleolithic man lived in the central mountain ridges, the eastern slopes and along the thalwegs of the wadis abutting the Tihama.

The Neolithic period - between c. 20,000 and 2,000 BC - is still obscure. No evidence has yet been found as to how the transition was made between the end of Paleolithic hunting and collecting and Neolithic food production. Since 1980, however, indications of the existence of neolithic settlements lead to subsequent research.

According to Francesco Fedele[5] the identification of a neolithic age in Yemen rests on two factors: the occurrence of chip stone scatters without pottery in surface conditions and their apparent association with simple

---

[3] In 1990 there were Italian, French, German and Canadian teams working in the Eastern and Southern mountains and in the Tihama (Zabid).

[4] Yemeni-Italian Archaeological Mission.

[5] Fedele:88.

stone structures, consisting of "enclosure" alignments and ovoid or elliptical "huts". The lack of pottery and other artifacts such as polished stone and bone tools may constitute an important characteristic feature of the Neolithic in Yemen and south-central Arabia.

Neolithic sites identified so far predominate in the Eastern Plateau and in the Wadi Tayylah, in Khawlan. Preliminary surveys point to neolithic occupations in the easternmost foothills and in the plains south of Mabar.

Comparing these with findings in the rest of the Arabian Peninsula, the Italian team made a preliminary identification of two neolithic aspects possibly applicable to the whole of Yemen and Asir. One aspect, called Qutran or Al Hada, appears to be related to the tradition of Central Arabia and the desert; the other, refered to as Tayylah or Khawlan, may be a specific and probably later adaptation of the mountainous zone. The differences between the two aspects lie in the quantity and type of tools, so that Qutran Neolithic interacts with almost identical discoveries of the same period from the northeastern coast of the Peninsula, prior to the Ubaid pottery culture of the fifth millennium BC, suggesting "incipient pastoralism" in the mountains. Tayylah, on the other hand, may be a derived form of the Arabian tradition, increasingly adapted to life on the plateau. Fedele suggests that it be viewed as part of an "Upland Neolithic Tradition" and that its chipped-stone component may be at the origin of the Bronze Age lithic industry.

Between 1981 and 1985 Bronze Age remains were found for the first time in South Arabia and also in Khawlan. Along the A'rus/Urqub fault some 25 sites were discovered with characteristic, locally produced, pottery and stone tools, evincing a proto-historic culture that covers the entire second millennium B.C..

The alluvial sediments were the determinants supporting the high population densities of those times. Settlements, invariably found above the ancient sedimentary level, are situated high in the valley, either directly on the hill side itself or higher up, on the crest of a lateral watershed or at the beginning of short secondary valleys. The structures found on these sites are contemporary with the sedimentary level producing most of the agricultural activity.

De Maigret[6] indicates three reasons for the siting of settlements around these ecological units: 1-Need to control a given area of farmland; 2-Ready availability of building materials; 3-Defensibility of the position.

---

[6]De Maigret:88.

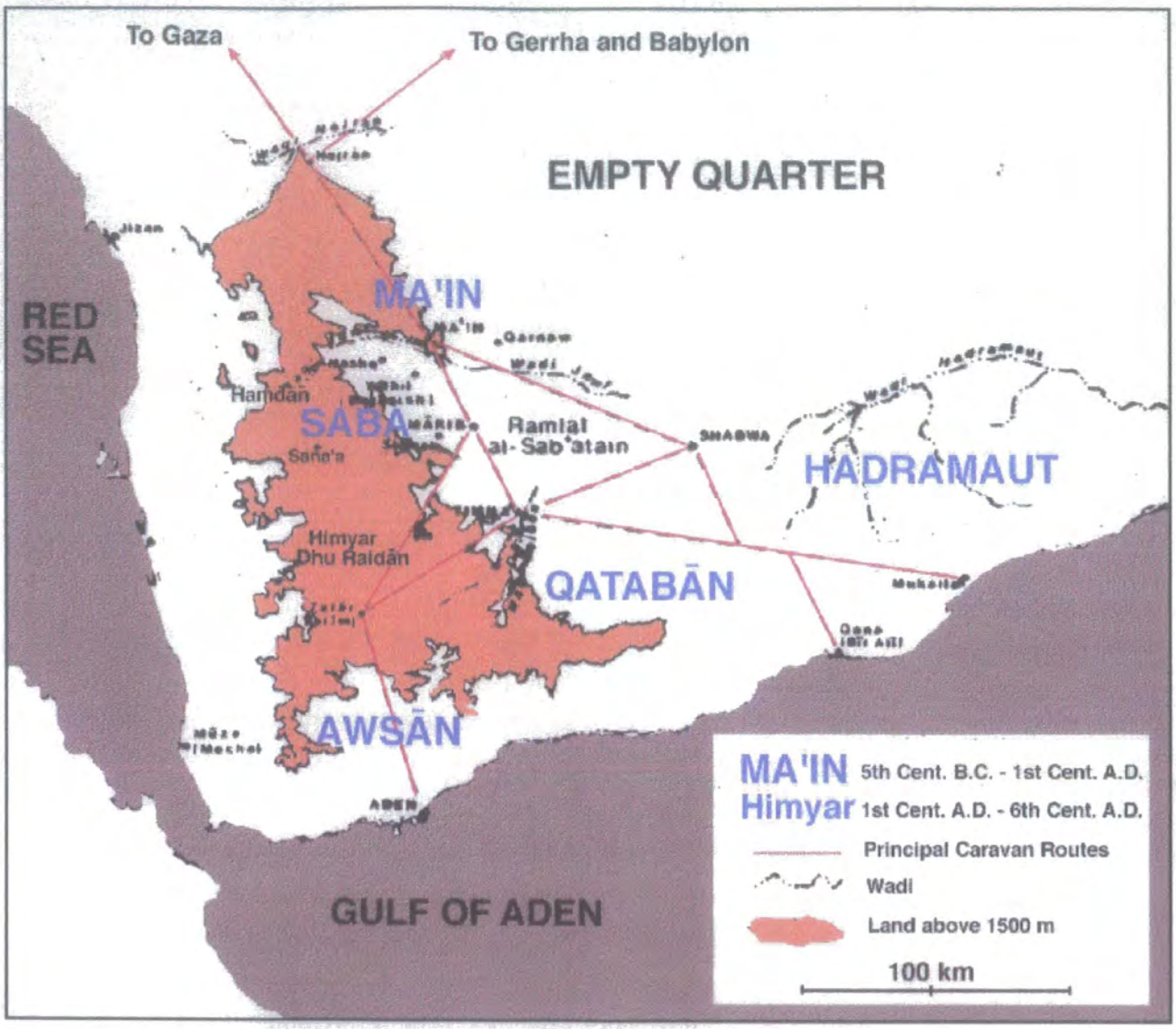
Wadi Yana'im - Drawing after photograph (in Maigret:88) of excavated Bronze Age dwelling with a living area consisting of two oval rooms

He distinguishes two groups of sites: **small**, less than 1000 m2 in area; and **large**, more than 10,000 m2. The latter are located at well spaced regular intervals along the valleys dominating clearly defined territories over which the former are scattered. In the majority of cases the settlements are sited on slopes surmounted by dykes or built up against the step formed by the head of a sedimentary layer. Thus the three requisites are fulfilled: control of the farm land by organized siting, availability of material, since it can be easily quarried and rolled down the slope, and defensibility, because by building against the ledge formed in the process of quarrying, the rear of the settlement can be protected.

The smaller settlements consist of a free circular or ovoid area with a perimeter delimited by a row of loosely connected rooms; the large settlements are formed by grouping several arrangements of this kind together. Often the simple units appear only juxtaposed, whereas in other cases the ground plan reveals a greater degree of integration and the beginning of complex clusters representing the transition from exclusively farming villages to multi-purpose nuclei.

Domestic buildings consist of two adjoining oval or sub-rectangular rooms, both facing onto a public space, one being used as a dwelling and the other for storage and the processing of goods. The lower courses of the buildings are rough squared granite blocks; smaller stones, and perhaps earth, were used to complete the walls. Roofs were thatched and supported by double central pillars of which the monolithic bases are still visible. The beaten earth floors were around 30 cms lower than the natural ground level, suggesting that the site for the buildings was excavated until the rock bed was reached. The weight of the external soil was retained by the lower, thicker part of the wall.

In the centre of more extensive settlements, isolated buildings, constructed from longer stone blocks, indicate the public nature of some activities. Buildings for communal religious practices may explain why small villages, presumably representing separate family groups, came together in the same place.



Trade routes and South Arabian states between the 9th century BC and the 1st century AD

2.2 - Pre-Islamic

The South Arabian culture

The oldest known references to a South Arabian culture are in the annals of Sargon II (715 BC) and Senacherib (685 BC) in which two Sabaean rulers are acknowledged for a tribute or good will gift to the Assyrian kings. The Bible (I Kings, 10) gives an account of the visit made by the legendary queen of Saba to Solomon (10th century BC). Schmidt [7] considers it likely that the South Arabian culture and its "architectonic archetypes" were originated, as far back as the third millenium B.C., in the high valleys and interior mountains of Yemen and away from the towns that later developed in the eastern mountain fringes of the desert.

Trade - particularly the incense trade - seems to account for the development of South Arabian societies from the first millennium BC . By the third millennium BC the cultures of the Mediterranean and Fertile Crescent had discovered South Arabia as a producer of incense and myrrh and, for almost 2000 years, they controlled this trade. By the beginning of the second millennium, descendants of Peninsula immigrants in the Fertile Crescent, attracted by the reports of wealth in SW Arabia, migrated back, in two waves: circa 1400 BC and 1200 BC. They brought with them the experience of prolonged exposure to urban life, the technology of metals and ceramics, artistic expression and a complex religion, overwhelming the local society of collectors, hunters and herdsmen .

The incense tree grew in what is today the Omani province of Dhofar, in Socotora and in Somalia. The earliest rulers known to control the incense trade were those of Hadhramawt who had it shipped to the port of Qana and then carried overland to their capital, Shabwa. From there northwards the incense road was defined by two natural barriers - the desert, to the east, and the Sarat mountain chain, to the west. Thus it was in the irrigated gentler slopes facing the desert that the South Arabian states settled and competed for the control of trade .

Other products diversified this trade: myrrh and aromatics grown locally, together with imports such as ivory and ostrich feathers from Africa, textiles, sandal wood and precious stones from India and raw silk from China. Monsoon winds facilitated maritime traffic between South Arabia and Africa and the Indian subcontinent. But the South Arabians never mastered sailing in the Red Sea and preferred overland routes which the domestication of the camel made possible.[8]

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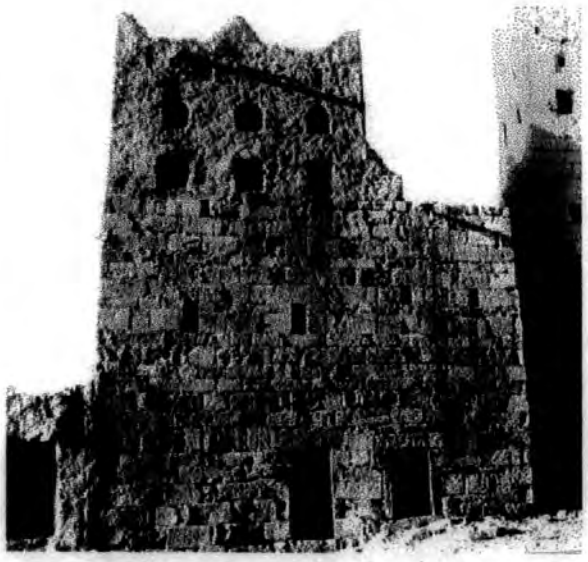
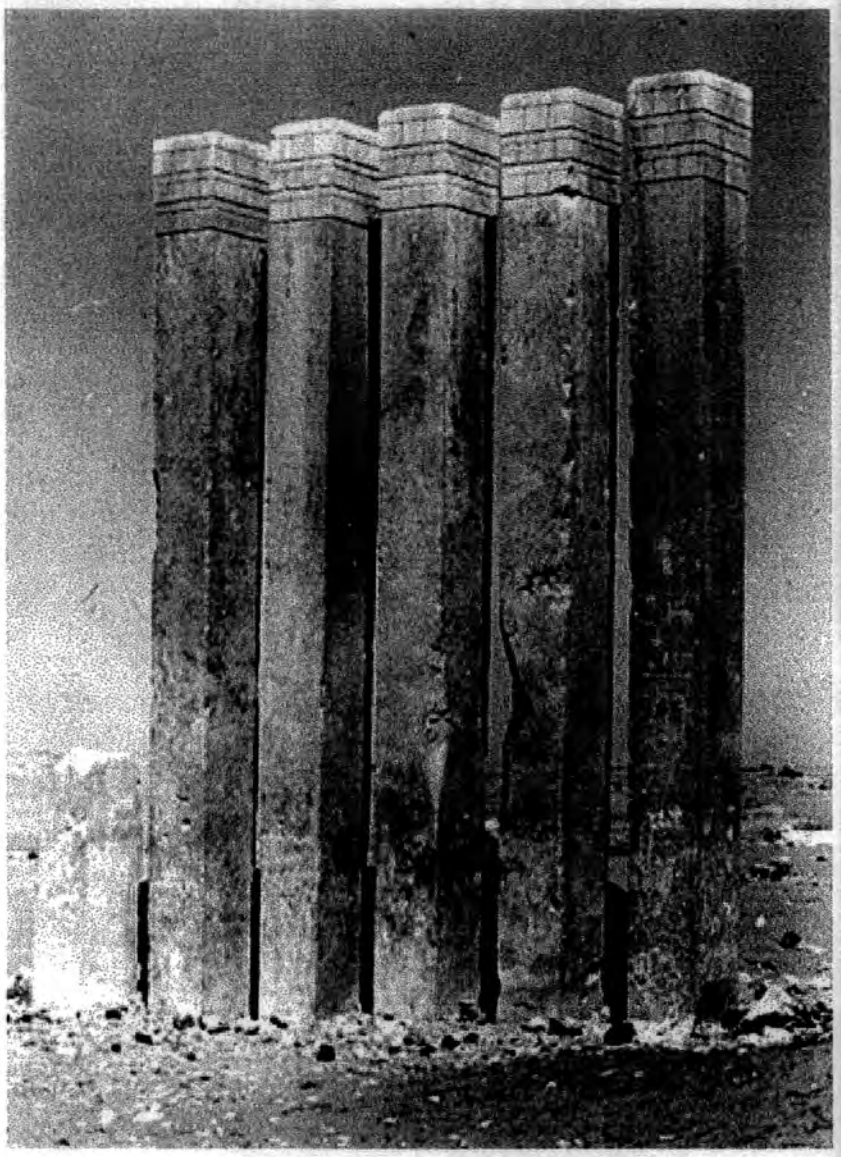
[7] Schmidt:88.
[8] Regular caravans were in use before the first millennium BC.





Top right -Remains of Almaqah temple at Sirwa (Marib); *centre* - Contemporary building in Marib, incorporating stone from pre-Islamic constructions; *bottom* - Marib in 1974

Divergent time scales, especially for the earlier periods, and the problema of areas remaining to be researched make it difficult to offer precise dates. However, archaeological research done in the 1980s points to the sixth century BC as one of great change from which a fully developed civilization emerged.

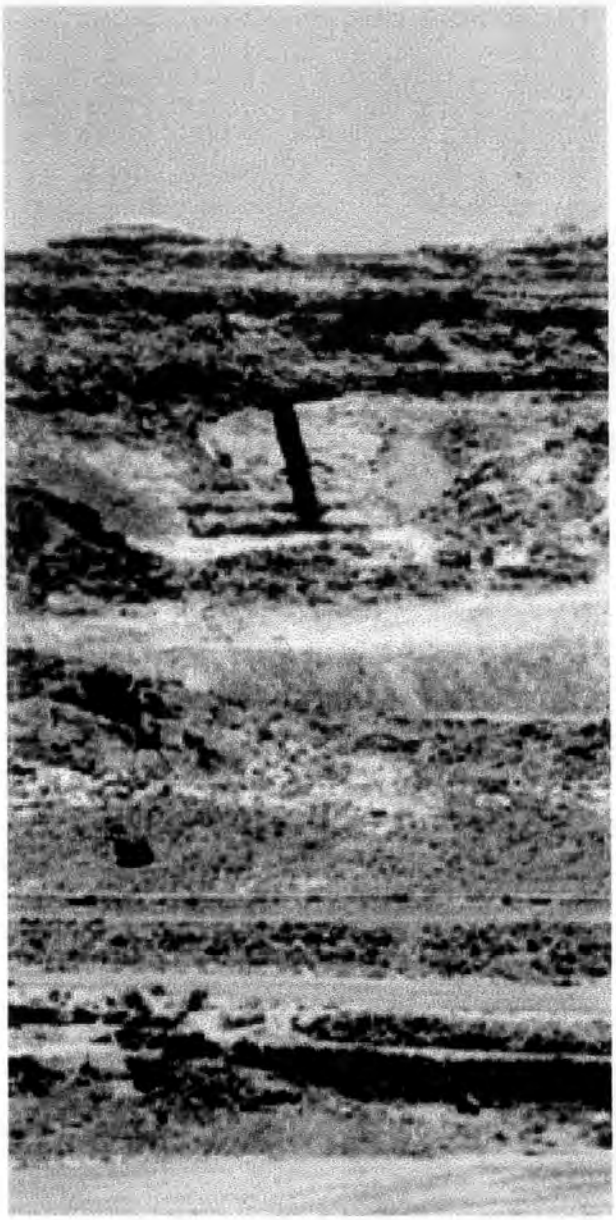
The earliest reported kingdom is that of Saba, at the delta of Wadi Adhana, with Marib as the capital and Sirwah as another important town. By the fifth century BC Saba was ruling a federation that comprised the neighbouring states of Ma 'in, Awsan, Qataban and Hadhramawt. In Stokey's opinion, these states belonged to a linguistic group different from that of Saba and its neighbours, the Hamdan, which was closer to that of Northern Arabia.[9] Their social organizations, however, were similarly based on the tribal unit with animistic and ancestral cults. Larger tribal associations came to be identified with political units and shared beliefs of supreme deities associated with the Sun, the Moon and the planet Venus.

In Saba, according to the earliest known inscriptions, authority was ascribed to a trinity formed by the king, with administrative functions; the tribal council, having legislative functions; and the god Almaqah, whose priests administered the revenues from the taxation of trade.

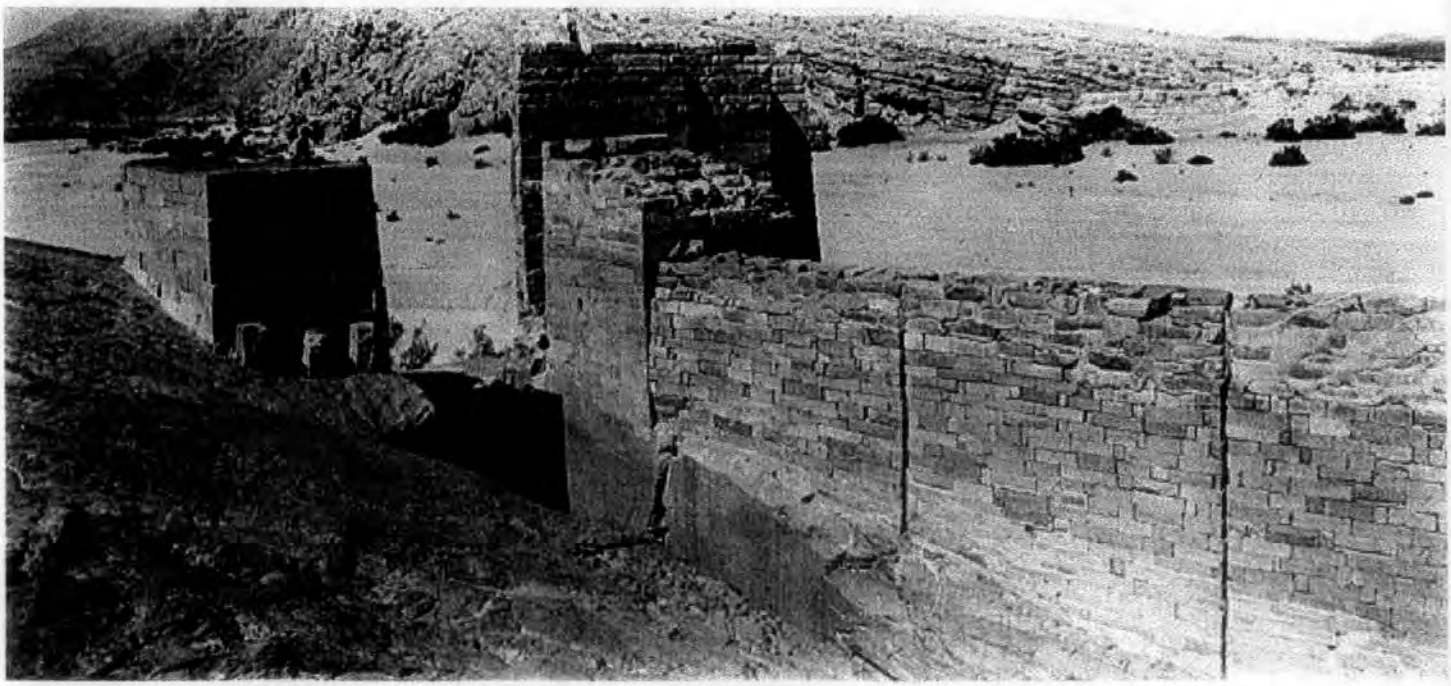
The importance of religion is well expressed in the remains of great temples and in the recorded obligation of the subjugated peoples to build to the gods of their conquerors. In fact, the relationship of the hegemonic state with its neighbours was of two kinds. In the first, an alliance was established, sometimes with some form of tribute paid to the dominating state. Rulers were autonomous and local gods were worshipped. In the second, the annihilation of the vanquished state was symbolised by the destruction of the king's palace and the effacement of inscriptions in temples and palaces. The dominated state was required to worship the gods of the conqueror and its population was reduced to total submission.

The most obvious expression of the development verified from the sixth century onwards is, according to Audouin, Breton & Robin, the change in building materials. *"From about that time onward the more prominent buildings were constructed of dressed stone, while up to that point only unfired bricks had been used ".* [10] *"Most of the earlier buildings (in the Marib area) were constructed of unburnt bricks, the later ones of stone. The use of*

[9] Stookey:78.
[10] Robin:88.



Pre-Islamic irrigation works. *Top, left and right* - Bainun, Al Hada: canal tunnelling the hill; *bottom* - The Marib Dam



wood increased; new types of buildings emerged with stone foundations, wooden beams in the upper storeys and sanctuaries with majestic gateways" .[11]

The solid agricultural base of both Saba and its neighbours is inextricably linked to the development of various aspects of stone technology and the ability to construct the large sluices and reservoirs needed to control the periodical floods and divert water to irrigation systems for the large valleys opening out into the desert. Sediments found in the Marib oasis show that irrigation in this region started as early as the third millennium BC. with "massive dams and sluices"[12] built in the second and third millennium . Indeed, the symbol of the Sabaean high level of technological and administrative skills is the Marib Dam, built around the year 500 BC, and which for a whole millennium, irrigated an area large enough to have supported a population of 300,000 people .

Towards the end of the fifth century BC Karib'il Watar, son of Dhamar Ali and the first known expansionist monarch of Saba, ruled over his neighbours, dominated Awsan and extended his influence as far as Najran, in the Northwest. He took the title of *mukarrib* , meaning the "covenant maker", which appears to denote the unifying and holding together of numerous peoples, a title transmitted to his successors and eventually transfered to those who defeated and replaced Saba in the hegemony of South Arabia.

Two generations later Yada'il Darih consolidated Saba's power and was credited with the building of great temples. The most important were those to the god Almaqah (the moon): the temples of Awwan (also known as Mahram Bilqis) outside Marib together with Sirwah and Ma'rabun/Al Masjid. His successors saw the construction of the Marib Dam, the expansion of a commercial network across the Red Sea, and the creation of permanent colonies in Ethiopia.

In the year 323 BC, an exploratory voyage around the Peninsula, ordered by Alexander the Great, reported Sabaean supremacy , with the wealth from international trade deposited for taxing at the Awwan temple in Marib. No other independent states were mentioned.

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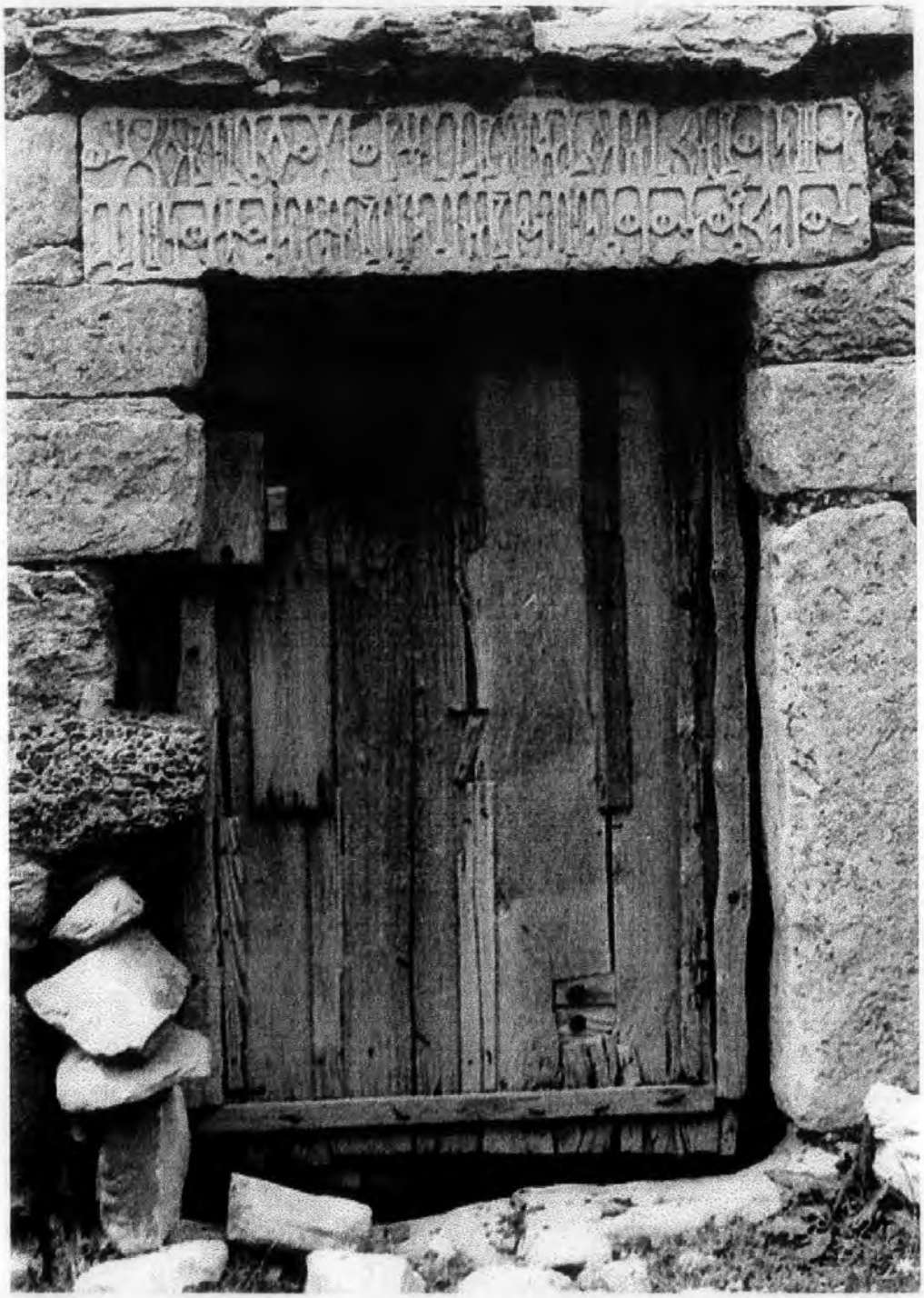
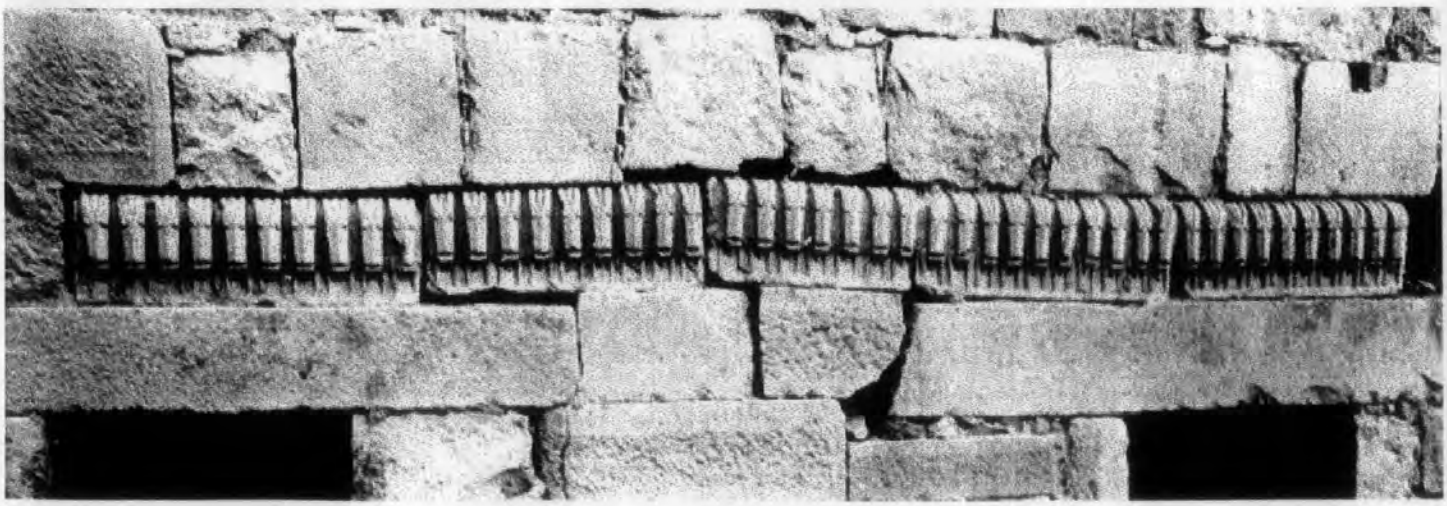
[11] Breton:88.

[12] Schmidt:88.

Kawkaban (*top*) and Marib (*bottom*) - pre-Islamic inscription, frieze and other stones reassembled in the construction of later buildings.





North of Saba, in the Wadi Jawf, the state of Ma'in coexisted with Saba for several centuries, first as part of its territory, then as a tributary and, finally, from the end of the third century to the first century BC, as an independent and prosperous kingdom. As such it controlled the northern part of the trade route along the Hijaz to the caravan terminal at Gaza. Evidence of trade from Ma'in has been found from Ur, in Mesopotamia, down to the Mediterranean. The largest towns were the capital, Qarnaw (also known as Ma'in), Nashq and Yathil, where the impressive remains are known as Baraqish.

Ma'in was organized as a society of fairly autonomous city-states and nomad herdsmen. The population, except for slaves, was part of the same tribe - Ma'in - and paid cult to the god Athar (the planet Venus). The state had theocratic characteristics with the king ruling by divine authority, although without priestly functions. A consultative council consisted of members of the landed aristocracy, providing officials and magistrates, and a bureaucratic class of priests who collected and administered the temple revenues obtained from the taxation of trade. A similar pattern governed the towns where elected mayors deliberated with a council of elders.

Unlike Saba, public works - such as fortifications - are not usually identified with the king; but with clans who built them in lieu of taxes.[13] Some are dedicated to the god Almaqah , indicating submission or tribute to Saba.

The lack of a strong concentrated authority may explain the fluctuations of its fortunes and the reason why Ma'in was never a military power. At any rate, in the second century BC, Ma'in was a vassal to Qataban and remained so until it was re-absorbed into the Sabaean state, during the Himyarite expansion in the first century BC.

Qataban, whose capital, Timna, was also on the incense road, was the state which, like Hadhramawt, maintained a long-standing form of alliance with Saba, eventually challenging its supremacy. Thus, in the third century BC, the title of *mukarrib* passed from the kings of Saba to the kings of Qataban. Throughout this and the following century, Qataban extended southwards as far as the Indian Ocean and, in the north, threatened Marib enough to force it to build fortifications.

The decline of Qataban started in the second century BC. At the beginning of the first century CE its capital was destroyed by

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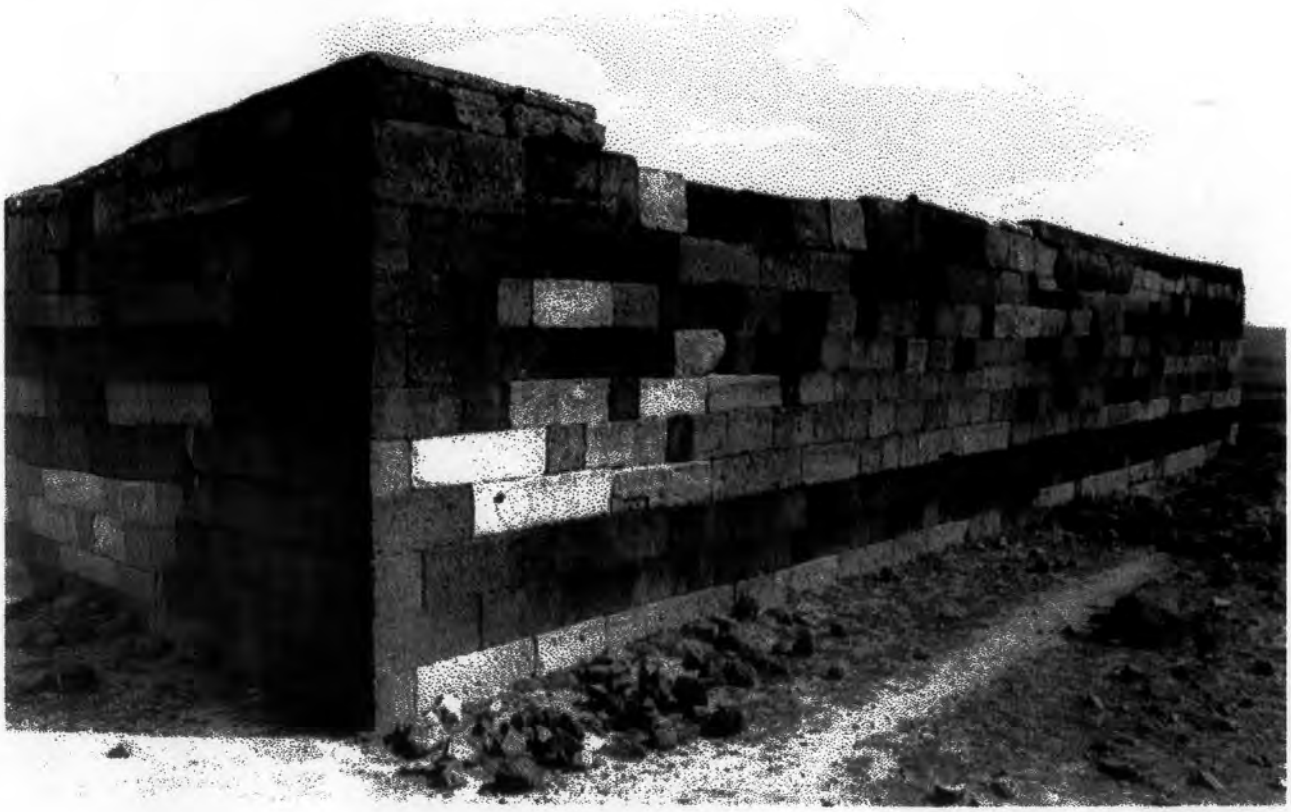
[13]Stookey:78.

'Ali mosque, Al Bishar, Al Hada, incorporating pre-Islamic columns and walls



Hadhramawt and the kingdom became divided between Hadhramawt and Saba. By the end of the second century CE it was completely absorbed by Hadhramawt.

The Hadhramawt, whose capital Shabwa was " *a march of 8 days away from the incense producing region of Sariba*" (Pliny) is referred to by Greek historians from the fourth century BC. At that time it was an ally or vassal of Saba but in the third century BC, like Ma'in and Qataban, it was fully independent and of ascending economic importance due to its possession of the incense producing territory of Dhofar.

In 25 BC the Romans invaded Southern Arabia through Ma'in and laid siege to Marib, but they departed defeated by the impregnability of the site and the harshness of the environment. This was the only major interruption in the political status of Southern Arabia until half a century later when Hadhramawt took Qataban.

With the first century CE a new force emerged. The Himyarites, a warrior branch of the greater Sabaen tribe, having conquered parts of Saba and Qataban territory, established a capital in Dhofar, near Yarim, in North Yemen, and by the end of the second century CE Himyar ranked in power with Saba and Hadhramawt.

At about this time, the discovery by Greek seamen of the NW/SE monsoon and the establishment of a regular sea route between Egypt and India transfered the importance of the overland routes to the shipping lanes of the Indian Ocean and the Red Sea. In South Arabia trade routes moved to the Western mountains and the coast; but were never again equal to their importance in the past.

Towards the end of the second century CE , Abyssinians and Axumites took over most of the Tihama. The kingdom of Saba returned to campaign against the coastal Abyssinians, the desert tribes of central Arabia, and Hadhramawt whose capital, Shabwa, they destroyed. By the mid third century the whole of Yemen was under Sabaean rule. Soon afterwards Saba was assimilated with Himyar who thereby shared South Arabia with Hadhramawt whose control stretched between Qataban and Dhofar. By 295 CE the Himyarite Shammar Yuhar'is was the sole ruler with the title of "King of Saba and Dhu Raidan and Hadhramawt and Yamanat" .[14]

In the fourth century CE Hadhramawt was subjected to Himyaritic rule;

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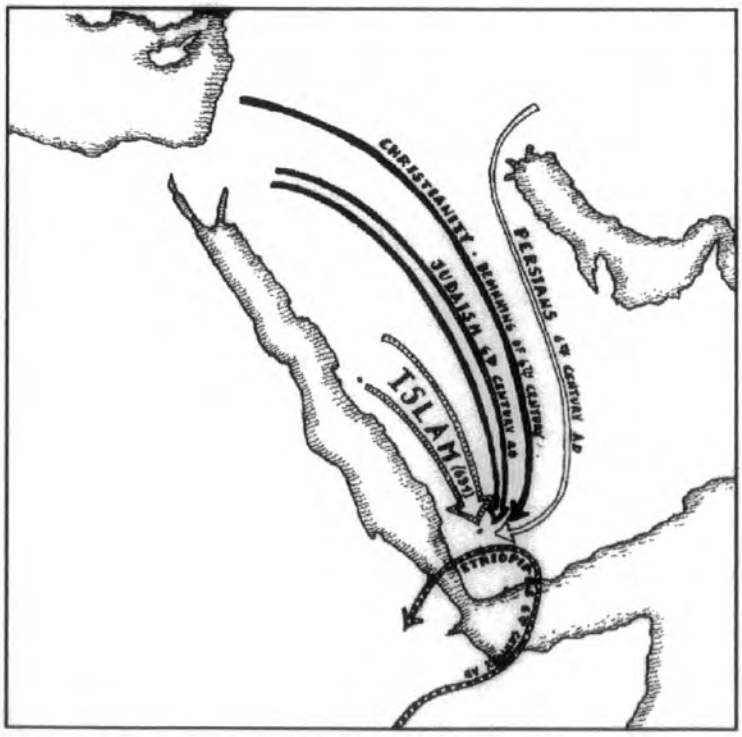
[14]Müller:88.



Top- Sirha, Yarim. Carved "*himyari*" stones around mosque door; *bottom left-* 'Ali mosque, Al Bishar; *right* - Religious and military penetrations in the 6th and 7th centuries CE

the first breach of the Marib dam was recorded; the dedications to the god Almaqah, in the Awwam temple, ceased; the cult of astral deities declined and the first mention was made of "Rahmanan, Lord of Heavens and Earth", indicating the adoption by the Himyarite state of a supreme, if not sole, deity. Christianity then made its appearance, with a missionary, Theophilus , sent by the Roman Emperor Constantius II to the Himyarite court, and communities settled in Dhofar and the Roman emporium of Aden. Jews, whose presence in Yemen is legendarily associated with the visit of the Queen of Saba to Solomon, were first mentioned at the end of the fourth century CE and Judaism was adopted two centuries later by some monarchs.

The Sabaean-Himyarite hegemony reaches its peak in the first quarter of the fifth century CE, with the king taking the title of "King of Saba and Dhu Raidan and Hadhramawt and Yamanat and his Arabs in the Highlands and on the Coast".[15] But by the middle of the century the Marib dam was breached again, repaired and damaged once more. Meanwhile a Christian community flourished in Najran and the Ethiopian presence and influence expanded.

In 517 CE the last Himyarite ruler, a Jewish convert, Yusuf As'ar Yat'ar, (better known as Dhu Nawas) came to power. He expelled the Ethiopians and fought the Christians culminating in the siege and massacre of Najran (518) which ultimately caused his downfall. Retaliation came in 523 by way of an Abyssinian invasion supported by a Byzantine fleet. Dhu Nawas was killed and Southern Arabia became a vassal of Ethiopia.

In 542, the Marib dam was breached yet again. The Ethiopian governor, Abraha, styled himself king five years later and, at the end of his reign, embarked on a disastrous expedition to Mecca. The last inscription dating the Himyarite era is from 554 CE and marks the collapse of the South Arabian civilization, undermined by internal strife, incapable of maintaining the irrigation systems and impotent in the face of the declining overland incense trade.

In the last quarter of the sixth century the Persians sent an army of 800 convicts to help the Himyarites drive the Abyssinians out of Yemen - and in consequence the century ended with Yemen as a Sassanid satrapy. The Marib dam was by then finally ruined for ever and the oases it irrigated began reverting to desert.

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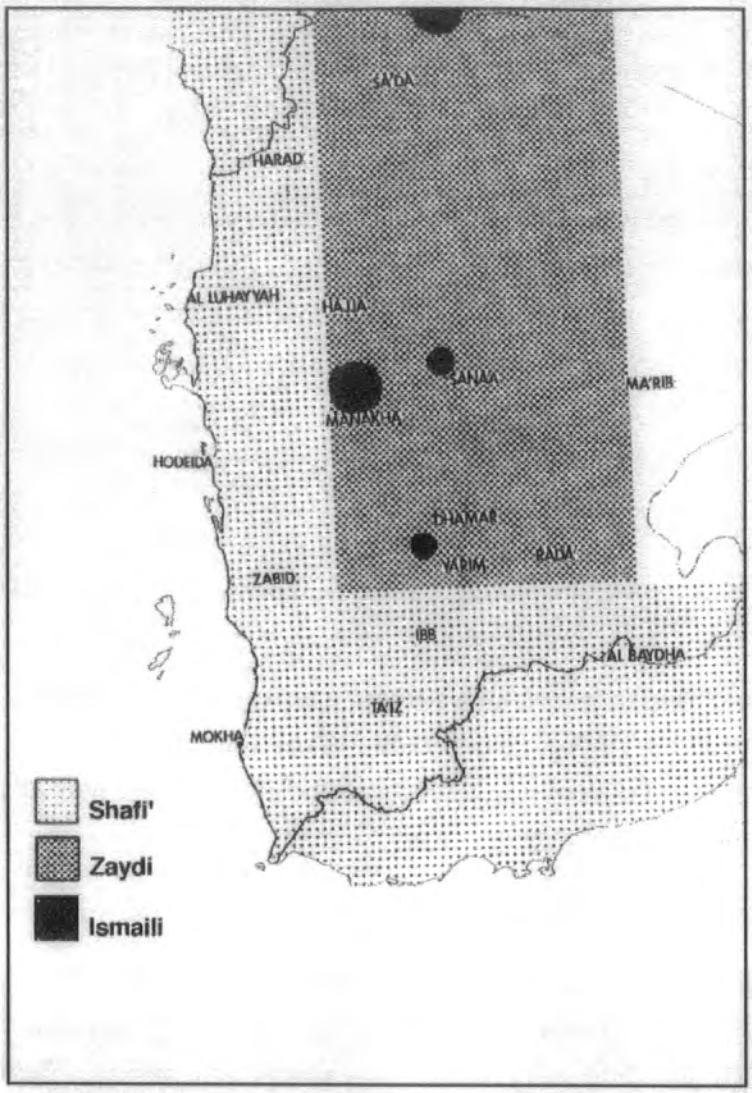
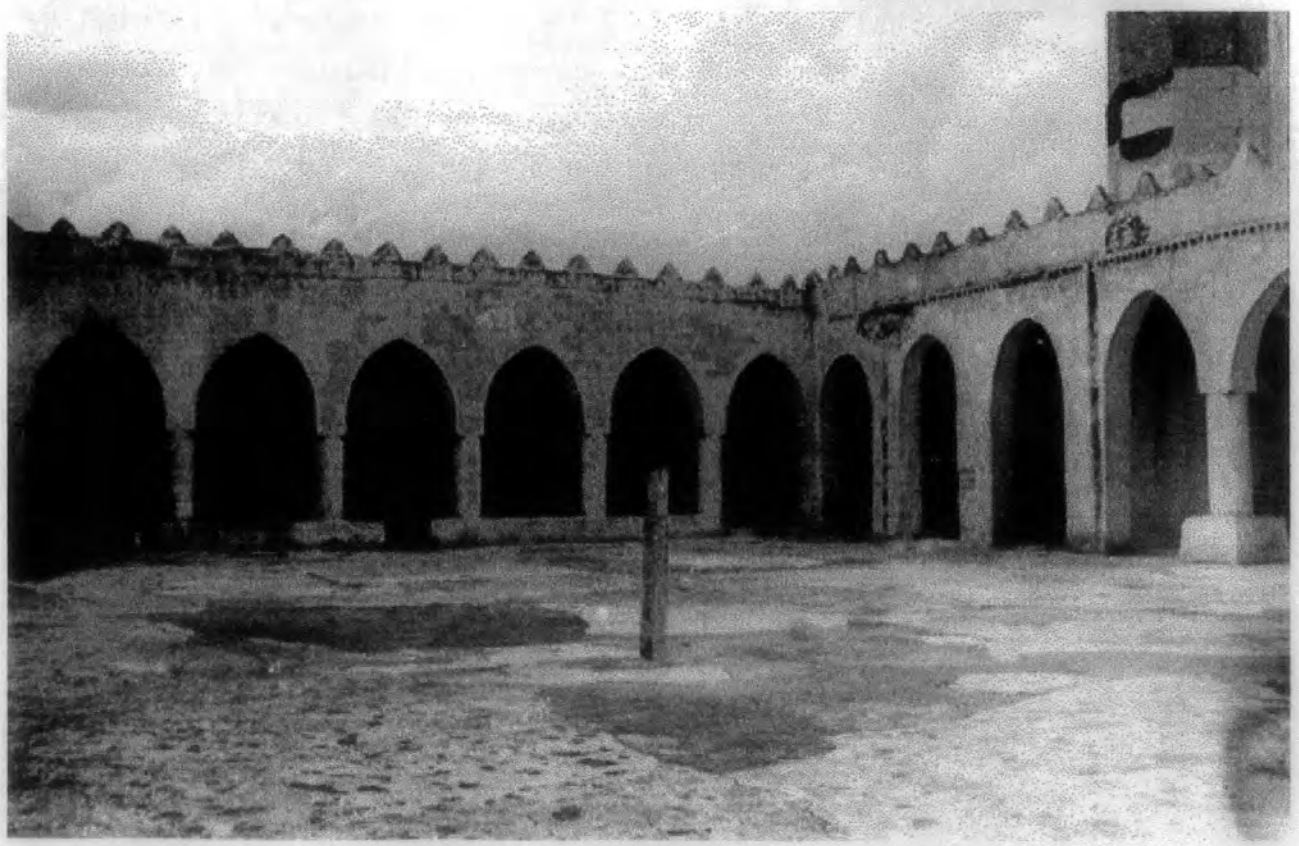
[15]Müller:88.



Top, left - Approximate distributrion of Zaydi, Shafi' and Isma'ili in the early seventies; *right and bottom* - Al Janad mosque, before restoration, in 1973



2.3 - Pre-industrial

Yemen and Islam

In 628 CE, six years after the Hijra, the satrap Badhan converted to Islam. At about the same time a clan from the Tihama joined the Prophet in Madina. Two years later, mosques were erected at Al Janad and in Sana'a, by envoys of Muhammad. Despite a period of revolt against both Persians and Hijazis, aimed at local political and religious autonomy, the process of Islamisation was irreversible. A generation later, under the first Caliph, Abu Bakr, the consolidation of Islam in Yemen was complete.

Yemen began by being divided into two religious provinces, centered on Sana'a and Al Janad, followed by Aden and Zabid. Until the early Abbasids (mid eight century) governors were appointed by the Caliph and posted in Sana'a, Al Janad and the Hadhramawt. However, as the caliphate moved northwards, central control became increasingly ineffectual. Yemen, with its rugged geography and turbulent tribes, was a fertile ground for the development of separatist dynasties, both colonial and indigenous as well as of sectarian versions of both the Sunni and the Shiite adoptions.

After the early centuries of Islamic rule, Sunnism in Yemen took the form of the Shafi' school, being introduced to the country early in the10th century CE. Notwithstanding territorial occupation by other factions, the Shafi' school was fully vigorous from the 11th century onwards, particularly in the southern half of the country and later in the Tihama.

Shiism, whose main branch did not persist for long, took two predominant forms. One was Zaydism, whose first imam in Yemen arrived at Sa'da towards the end of the ninth century (897) to found a rule that was to last continuously through extreme variations of power and territory, until 1962. The other was Ismailism whose missionaries reached Yemen at about the same time and eventually created the conditions for the emergence of the local Fatimid dynasties. The Fatimids gained importance during the 11th century but after the end of the 12th century they were decimated by both Sha'fis and Zaydis and reduced to the small pockets that remain today, in the mountains of Haraz and Manakha.

Thus Zaydi and Shafi' survived as the major sects, associated geographically with the political and social distinctions between "North" and "South".[16]

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[16]Golvin:84 estimates the proportion of Zaydi, Shafi' and Isma'ili in the early 'eighties at 55%, 45% and 5% of the population.

Top - Zabid; *bottom left* - Shibam al Aqyan; *right* - Sana'a Great Mosque

Colonisations and Autonomy

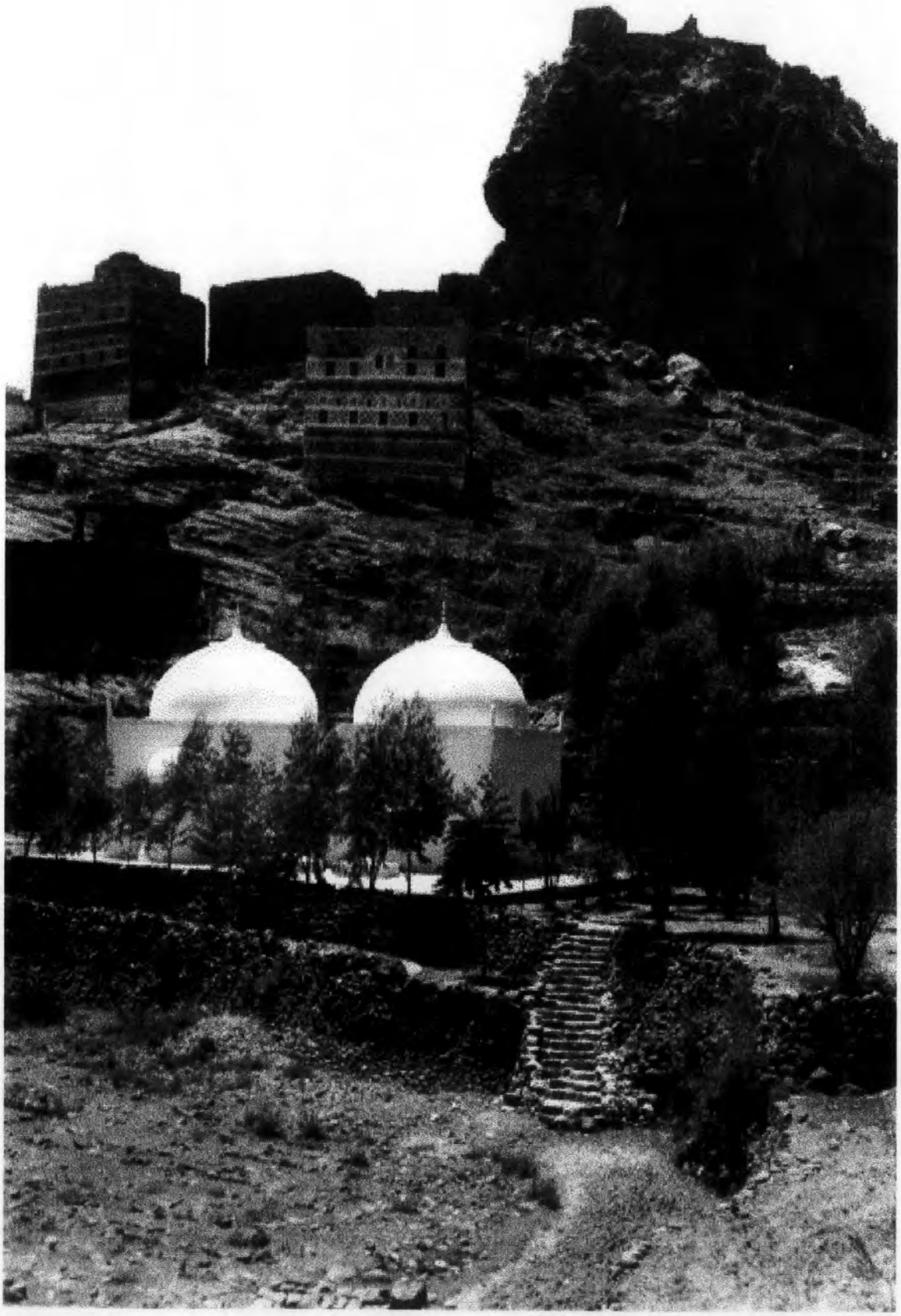
The earliest separatist moves in Islamic Yemen can be traced to the years 822 , when a state with the capital in the coast and led by a colonial ruler was formed; and 847 which saw the creation of a highland state under an indigenous leader.

Earlier in 818 the caliph in Baghdad had sent an army under the command of Muhammad b. Ziyad to supress a revolt in the Tihama and create an Abbasid stronghold to sustain that in Sana'a. Ibn Ziyad founded the city of Zabid; but ceased to pay more than nominal allegiance to the caliph and instead proceeded to carve a realm for himself and his descendants which briefly held most of Southern Arabia. At the turn of the millennium, the Zyadi dynasty eventually controlled only the Tihama and the foothills. Thereafter for almost two centuries this area was occupied by locally developed dynasties, first the Najahids, and then the Sulaymanis in Northern Tihama and the Mahdis in Southern Tihama.

In 847, a family from nearby Shibam (Kawkaban), led by Yufir b. Abd Al Rahman Al Hiwali, overthrew the Abbasid governor in Sana'a thus ending what was but nominal foreign rule in Yemen. The Yufirids fought the Banu Ziyad and at times dominated much of the mountain territory, from Sa'da to Al Janad. The 150 year span of their history was constantly troubled, first by internecine fighting and later by the pressures of emerging neighbouring powers: the Zaydis, from the North and the Isma'ilis from the South.

The Northern tribes of Najran and Sa'da had always repelled any external interference in their frequent and long lasting quarrels. Finally, in 897, they called in an outside mediator. The choice fell on Yahya b. Husayn Al Hadi ila'l Haqq. He was originally a shariff from Madina, descended from 'Ali and Fatima's son, Husayn, through his grandson, Zayd b. Ali, considered to be the first imam of the Shiite sect that bears his name. Al Hadi, as he is commonly known, settled in Sa'da and founded a Zaydi imammate.

From time to time his rule was extended from Najran to Sana'a, which he disputed with both Yufirids and Isma'ilis. Later, Zaydism became firmly rooted in the Upper Yemen, north of Dhamar, from where, for short periods, it ruled most of Southern Arabia, consolidating, eleven centuries later, on the territory that became the Yemen Arab Republic.



Isma'ili shrine in Al Khuthayb, Haraz

One of the constitutional problems of Zaydism derived from the fact that the imamate was not necessarily a hereditary position but could be claimed by any male descendant of Ali and Fatima, so long as he fullfilled the requisites of superior religious knowledge, soundness of limb and readiness to wage *jihad* (holy war). Problems of succession were therefore frequent, either because candidates entered into self defeating competition or because none appeared, leaving the power void to be filled by a tribal leader.

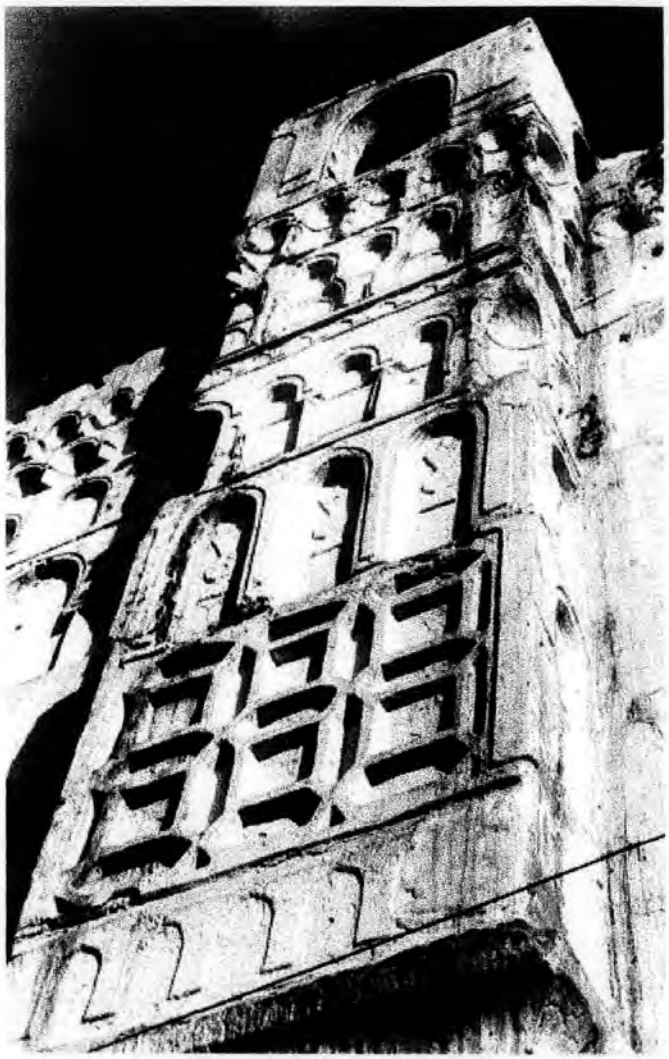
In 881 two Ismaili missionaries arrived in Yemen from Iraq, in search of territory for the establishment of a Fatimid state. One, Ibn Hawshab, later called "Mansur Al Yemen", found quarters in the Miswar mountains, west of Sana'a; and the other, Ali b. Al Fadhl Al Jayshani - a Yemeni convert - went southeast, to Yafi country. They soon rallied support and dominated enough territory to threaten the ruling dynasties, particularly the Yufirids whose control of Sana'a they challenged at various times. Although Mansur Al Yemen continued loyal to the Fatimid imam, Ali Al Fadhl set himself up independently, after 20 years of conquest.

After the death of both men, their followers were defeated and dispersed; but in the early 11th century, another missionary befriended and endoctrinated Ali b. Muhammad Al Sulayhi, the son of an orthodox judge in Haraz. Al Sulahy rose to arms and soon dominated the Northern half of the country, including Sana'a, which he made his capital. He reigned over most of Yemen, but acknowledged vassalage to the Fatimid caliph in Cairo. His son later succeded him but soon abdicated in favour of his wife, Queen Arwa bint Ahmad. In about 1087 she transfered the capital to Dhu Jibla which had recently been established in the southern mountains, near Ibb. Queen Arwa became one of the legendary figures of Yemeni political folklore , having her name associated with major works such as the Friday mosque at Jibla. She had no descendants and the Sulayhid dynasty, died with her, in 1138.

The end of the Fatimids in the Southern Highlands was accelerated by the intense proselytising of the Shafi', whose doctrinal structure was more acceptable to the peasants than either Isma'ilism or Zaydism. The Fatimids continued in the Zurayid dynasty in Aden, which came to power at the same time as Queen Arwa, and ended with the arrival of the Ayyubids, less than a century later.

Part of Sulahyd territory went to the hands of Hatim b. Al Ghashim a leader of the Hamdan tribes north of Sana'a, said to have Fatimid sympathies. After the death of Queen Arwa's representative in Sana'a, he

Rasulid mosques. *Top left* - Detail of qibla, Al Sharafyia, Taiz; *right and bottom* -Northern Tihama: "Al Minara", the fragment of a very large minaret from a legendary 200 (?) dome mosque in the former town of Al Mahjam



took the city and styled himself sultan. The Hamdani or Hatim sultans secured part of North Yemen for most of the 12th century remaining in permanent dispute with the Zaydi imam, until the Ayybid invasion.

Thus, in the last quarter of the 12th century, the situation in Yemen could be described as an unstable patchwork of petty states fighting against each other for territory and the imposition of their individual doctrinal principles .

Then, in 1173, a large Ayyubid army, mainly composed of Kurds and Turks and commanded by Saladin's brother, Turanshah, came from Egypt and invaded Yemen. With the initial support of the Sulaymani they proceeded to defeat the Mahdis in the Tihama, then the Zurahids of Aden, and finally ocupied all the former Fatimid territory as far as Dhamar where they met strong resistance from the north. The control of Sana'a continued to be disputed not only between Zaydis and Hamdanis but now also by Ayyubids.

In the century and a half that followed, the strong administration of the Ayyubids managed to unify and rule a territory extending from the Tihama to the southern half of the country which was also the area where Sunnism had prevailed under the adopted Shafi' school. Only the northern mountains including the area of influence around Sana'a, were dominated by Zaydism and its solid ly supportive tribes. The way was thereby paved for the development of a "golden age", the first in more than a millennium since pre-islamic times.

In the first quarter of the 13th century the Ayybid ruler in Yemen appointed a Rasulid emir, Nur Al Din 'Umar, as his deputy and left for Egypt, dying on his way there. In a few years Nur Al Din was ruling independently of the Cairo Ayybids, thus originating the dynasty known as the Rasulids.

The Rasulids set up their capital in Taiz and extended their control for a time to Sana'a, but not for long, and never farther north. Instead, their unified rule developped eastwards through Hadhramawt to Dhofar and contributed to a large extent to the country's polarisation later described by such terminologies as "Upper Yemen" and "Lower Yemen".[17]

It could also be said that they were favoured by the world political climate. The forces that had intervened in the area, from Baghdad and Egypt were now too busy fighting the Crusaders and then the Mongols.

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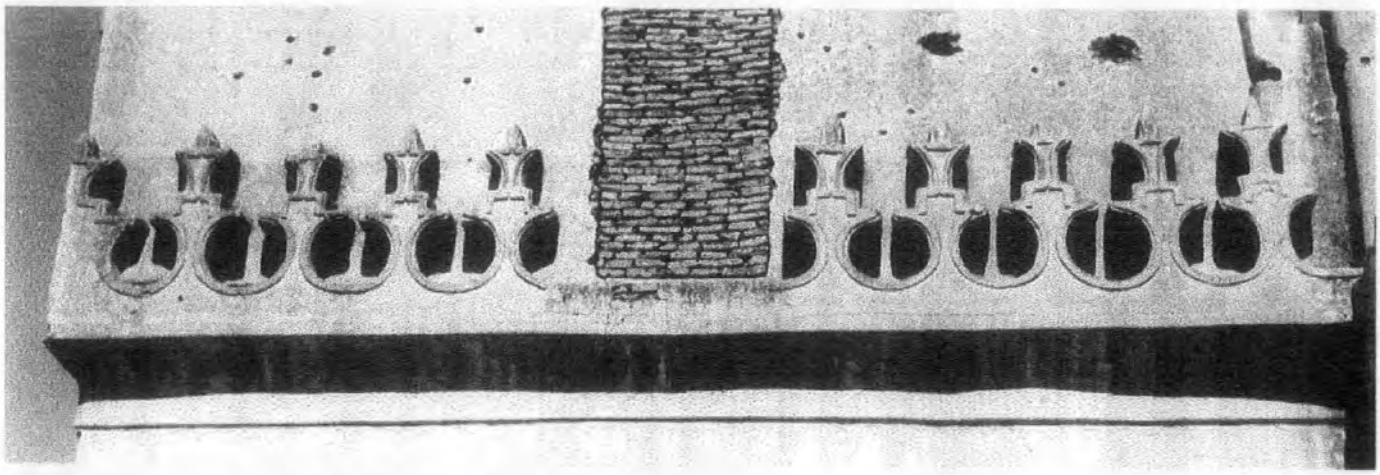
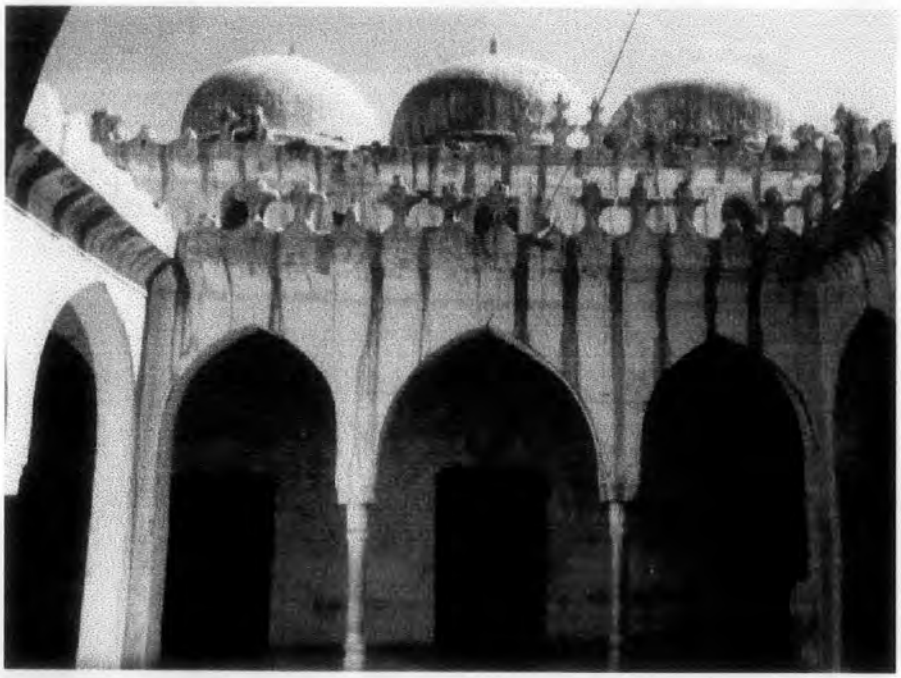
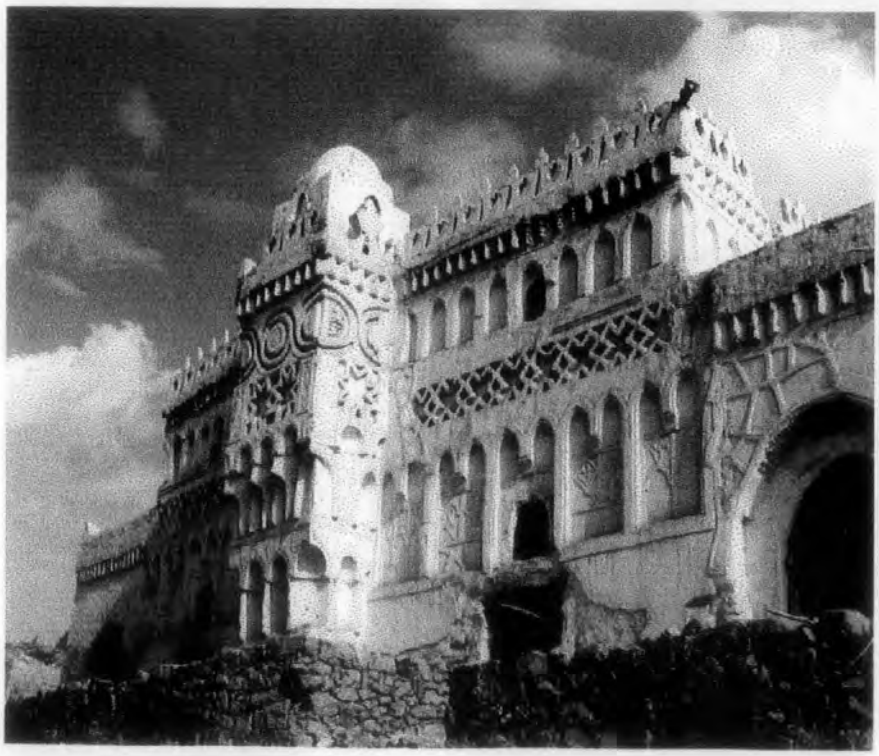
[17]Stookey:74.







Top and centre - 'Amiryia *madrasa* and mosque in Rada'; *bottom* - Back elevation of the great mosque of Jubban

Those that would appear later - the Portuguese and the Turks - were still in formation, and their arrival was to be well past the end of the Rasulid state.

Under Rasulid rule, trade revived and agriculture improved but taxes on the peasants were heavy. The Rasulid house is identified with prosperity and cultural brilliance, and, for the first time in Islamic Yemen, significant buildings appear systematically associated with the name of the rulers. Although much has been destroyed, what remains offers eloquent testimony to the quality of their achievements, the mosques in Taiz being a typical example.

The decline of the Rasulids follows a familiar pattern: restless Zaydis, revolting Mamluks, internal power struggles and plague. Their end came formally in 1454 when the emir in Aden surrendered to the Tahirids.

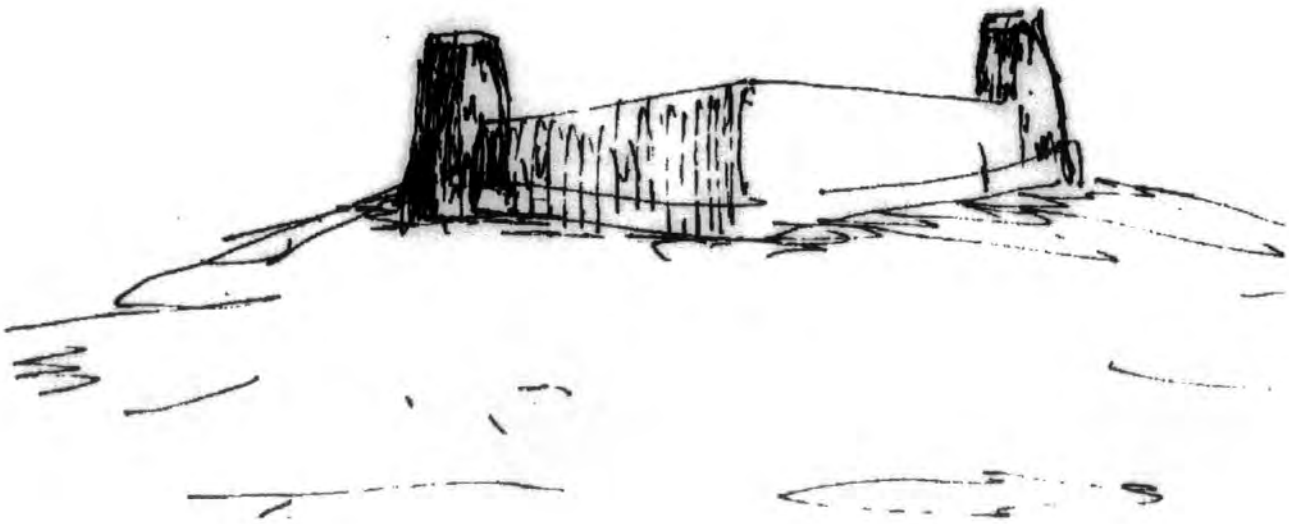
The Tahirids were originally tribesmen from the area of Juban and Al Miqranah, south of Rada', of the Shafi' school of Sunnism. They took over the territory left by the Rasulids with whom they had previously been in tutelage and continued similar policies, apparently being more interested in consolidating their positions in the Tihama and the South than in confronting the Zaydis. Their capital was seasonally in Rada' and Zabid. They are also associated with the development of agriculture and of major constructions in Rada' and Juban.

The end of Tahirid rule was due to the arrival of the Portuguese in the Indian Ocean, and the pretext it provided for the Circassian Mamluks to invade from the North through the Hijaz and create an operational base in Yemen. It is generally agreed that the refusal of the last Tahirid ruler to supply the Mamluk fleet which arrived at Kamaran in 1515 precipitated his downfall. Supplied instead by the Zaydi in the North, the Mamluks defeated the Tahirids in Zabid with a combined force that included Ottoman soldiers with muskets and cannons, It was the first time that firearms were used in Yemen. The Mamluks followed the Tahirid sultan through Taiz and Al Miqranah, taking each in their sweep and eventually conquering Sana'a where he was captured and killed.

The Zaydis, however, once the Tahirids were defeated, turned against the Mamluks who now threatened in closer ground.The following twenty years saw the Zaydi Immamate consolidating in the north and expanding in the Sunni south, where no leadership existed.

The Ottoman Turks who, meanwhile, had defeated the Mamluks of Egypt

Fortifications in Masar, Western Uplands (*top*) and Al Darayhimi, Tihama(*bottom*) attributed to the Turks (writer's notebooks)



and proclaimed themselves inheritors of the Islamic Caliphate, sent a fleet against the Portuguese which arrived at Kamaran in 1538. In the ensuing decade it captured the eastern and southeastern coast of the Peninsula, Aden, Taiz and Sana'a. The Zaydis were unable to oppose their advance, entangled as they were in the usual succession problems.

The Ottoman rule has been described as brutal and harsh and it eventually created sufficient motivation to unite Zaydis and Sha'fis in common cause. The resistance began in 1590 led by Al Mansur Billah Al Qasim, who, seven years later was to be elected imam. In 1608 Qassim installed himself in Sana'a - the first imam to make the city his capital - and from it he waged the war against the Ottomans, continued by Muayyad, his son and successor.

In 1636, the Ottoman Turks, afflicted also by attacks in the Balkans and the Mediterranean, withdrew from Yemen and in twenty years Muayyad was able to extend his sovereignity to virtually all the former Himyarite territory, as far east as Dhofar.

However, in the century that followed, the imams again lost control of theTihama - which had fallen into the hands of the shariff of Abu Arish - and the eastern regions including Lahij and Aden which declared themselves independent .

The British, who had first visited the area in Imam Qassim's days, (1608), had, throughout the 18th century established trading posts on the coast along with the Dutch, and by the last quarter of the 18th century were in firm control of the coffee trade.[18]

After the arrival of Napoleon in Egypt and his victory over the Mamluk sultans, the British occupied the Perim island in the Bab Al Mandab and installed themselves in Aden, at the invitation of its sultan to prevent the French reaching the Indian Ocean. Treaties of friendship and commerce were thereafter made with the sultan of Aden for the following 40 years. The Zaydi imam also supported the British in Mocha, where they were permitted to build a hospital.

At the beginning of the 19th century a new force emerged. The Wahhabis, led by the Saud family, swept through North and Central Arabia and entered Yemen from Northern Tihama. Supported by the Abu Arish shariffs and the Hashid and Bakil tribes, they took Hodeida and marched on Sana'a which they successfully attacked.

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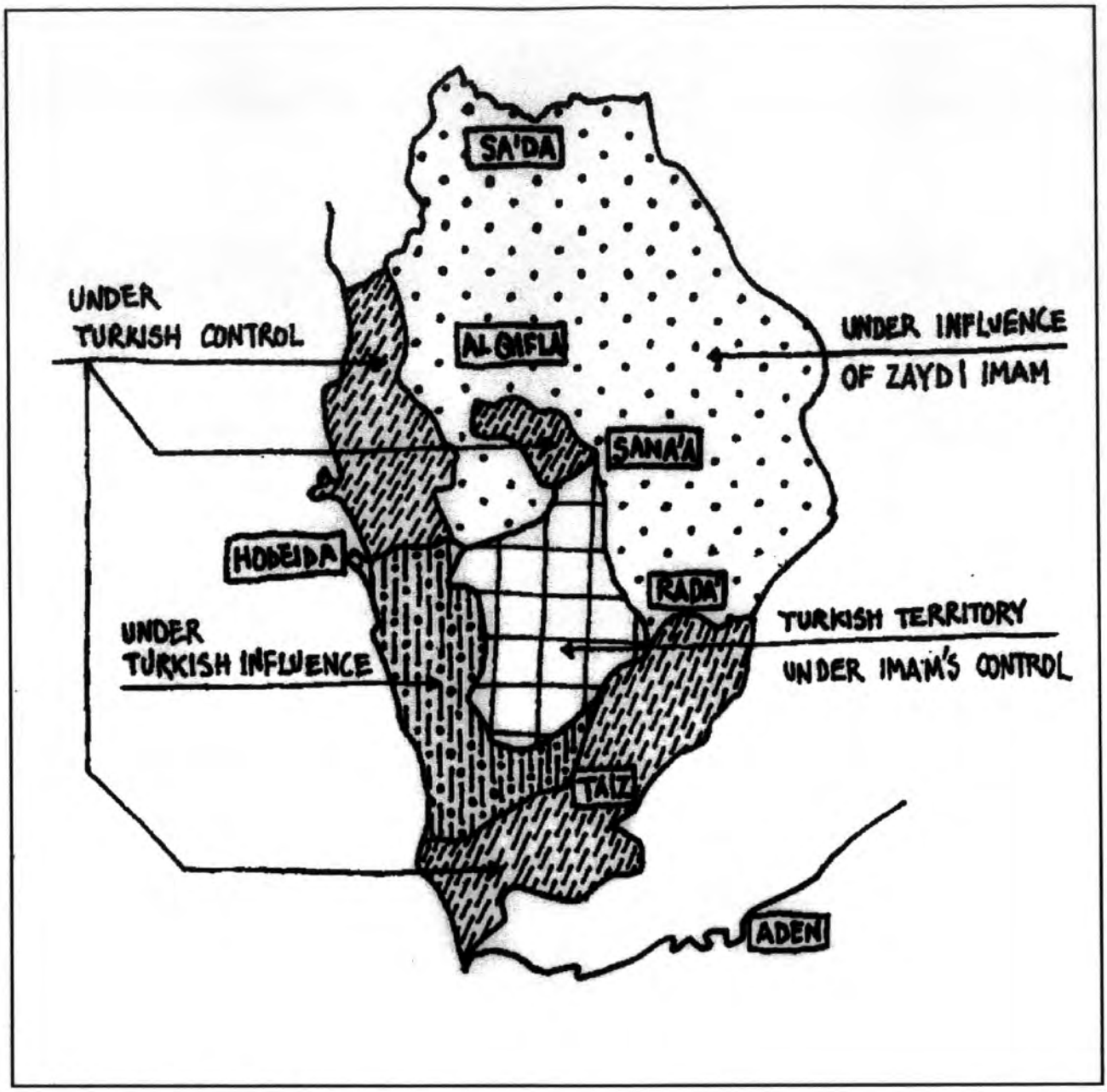
[18]The Turks initiated comsumption of coffee outside of Yemen and as a social beverage. By 1554 coffee shops were already in existence in Istanbul; a century later they appeared in Europe.



Political situation in 1908 (after Stookey:78)

The Wahhabi threat resulted in the sending of an expedition by Muhammad Ali, the viceroy of the Ottomans in Egypt, under the command of his son, Ibrahim Pasha (1818). In the course of the following 15 years the Wahhabis were defeated, Mocha was taken. and the Imam was restored to power under promise of tribute.

In 1839 the British, pressured by the need to install a steamship coaling station and unable to negotiate to this effect with the sultan, took over Aden and began their political control of the area.

By the middle of the century the situation in the interior was utterly chaotic. Ibrahim Pasha's troops left Yemen in 1840, tribal leaders fought for independence and the Imam fought with the shariff of Abu Arish for the Tihama, asking in vain for help from the British.

In 1849 the Turks re-entered the scene. They expelled the Abu Arish, re-installed the Imam to rule as their vassal over the highlands and remained, for seventy years, in shared control of South Arabia with the British.

The Turks laid the rudiments of a civil and military administration but they were just as unpopular this time as before and soon they had to deal with rebellious tribes. In the south, these were allied with the British; in the north, the imam Muhammad b. Yahya Hamid Ad Din, elected in 1891 with the name of Mansur Al Yemen, started an uprising that, once again, united Zaydis and coastal Shafis in common cause. Nevertheless, between 1902 and 1904 the Turks and the British defined territories, establishing a boundary that remained for nearly ninety years as evidence of political separation based on foreign interests.

In 1904, Yahya, son of Mansur Al Yemen and married to the sister of the powerful shaykh of the Hashid tribes, defeated internal opposition, became Imam and continued to fight the Turks until peace was made in the 1913 Treaty of Da'an. The agreement was that the Imam ruled freely over Zaydi areas, the Ottomans retained control of the Tihama, and an intermediate area remained under shared administration.

This treaty legitimized the Zaydi claim to rule after the Ottomans left in 1919, but it also ratified the division of the country in two and emphasised what were mostly nominal differences between Zaydis and Sha'fis thus undoing the unifying results of the shared liberation struggle.[19] Yet the Imam's efforts to unify the country represented not only the proclamation of the Imamate but the foundation of a nation, the first fully independent country among the modern Arab states.

[19] See Stookey:78 and Nyrop:86.

During the first World War the confrontation between the Turks and the British resulted in the former's invasion of the areas of Lahij and Aden. In reaction to the Yemenis' support of the Turks, the British assisted the Idrisi in the capture of Asir and the possession of Hodeida.After the war the British accord with the sultan of Aden was renewed and continued until 1954.

Between 1920 and 1930 Yahya fought to extend his borders into territory occupied by the British and the Saudi. By 1930 he had managed to secure his position in the Tihama against rebellious local tribes and the Idrisi shaykhs who were now suppported by the Saudis.His efforts to expand southwards were however checked by the British with whom he eventually signied the 1934 Treaty of Sana'a . In the same year he lost the war against the Saudis for the possession of Asir and Najran to which he laid claim as part of the first Imam's realm, and .was forced to sign the Treaty of Taif, according to which those territories would continue under Saudi control for the next 40 years.

These two treaties curtailed the imam's pretension to control the whole of South Arabia and established the borders of the nation that entered the modern international scene, notwithstanding his own conviction that historical injustice had been done.[20]

Yahya relied on a system of hostages to ensure the support of the tribes; and imposed Zaydi officials on the Shafi' areas. But as much as he could he ruled without foreign influence and help. Unlike the other countries of Arabia, which, before the discovery of oil, had to rely on British support, Yemen was self sufficient. Yahya was suspicious of the price to be paid, in terms of his country 's independence, for the assistance of the major powers.[21] He did, nevertheless, sign pacts and treaties with both western and Arab countries (Yemen was a founding member of the League of the Arab States in 1945 and joined the UN in 1947). In doing so he was seeking mainly military help and training to secure his tenuous hold on his own territory, now compressed between the growing power of the Saudis in the North and the British in the South.

Towards the end of his rule, he faced opposition both from Yemenis educated abroad who voiced their desire for modernisation and the conservative Zaydis who reacted to his declared intention of securing

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[20] Wenner :67 reports that a 1940 Yemeni school textbook divided Yemen into three areas: Independent Yemen; Asir (under Saudi occupation); and Hadhramawt and Oman (under British occupation).

[21] Burrowes:87 quotes Yahya´s legendary statement that he'd "rather eat straw" than compromise Yemen´s independence.

Shahara: Effects of air raids during the Civil War of 1962-68. Shahara was one of the Imam's strongholds, impregnable until aeroplanes were introduced into warfare.

succession through his son, Ahmad, rather than by the operation of traditional electoral procedures.

Yahya was murdered in 1948 following a blundered coup led by the Free Yemenis, a group of the Zaydi and Shafi' elites, exiled in Aden, who, although not radical revolutionaries, wanted a more liberal form of government.

Ahmad, Yahya's son was warned , left Taiz, where he was governor, and went to the family stronghold, Hajja, from where he rallied the support of the tribes. The coup was crushed, Sana'a was sacked and Ahmad became the Imam, setting up his capital in Taiz.

Ahmad had better relations with the Shafi' than had his father. He appointed some to high positions and even led prayers in the Shafi' way. In other respects he insulated himself from his subjects even more than Yahya had done but, on the other hand, he was more open to contacts with the foreign world. Machinery and technical assistance were imported (the Soviets built the harbour in Hodeida and the Chinese the Hodeida-Sana'a road), and more students were sent abroad. The consequences of these timid overtures were those that both he and his father feared, namely growing dissatisfaction with the regime and attempts at radical change. In 1955 there was a tentative coup, supported by his brothers and led by his chief of staff whose failure mirrored that of his own father's time. The swift help of his son, Muhammad Al Badr, determined the outcome and confirmed Ahmad's decision to make Al Badr his successor. However the Zaydi conservative faction considered that he was not qualified and remained averse to the notion of hereditary rather than elected leadership.

In 1962 Ahmad died and, for a week, Al Badr succeeded him. On 26 September, general Abd Allah Al Sallal, who had been trained in Iraq in Yahya's time, led a coup and proclaimed the Republic. Al Badr managed to escape and organize resistance based on the northern tribes and the support of Saudi Arabia. The republicans were supported by Egypt. In this way a civil war began that lasted until 1970 and made Yemen the battle ground for wider interests elsewhere in the modern Arab world.

The Republican Revolution in Yemen affected events south of the border. The British had been consolidating their position there since the 1930s in the expectation of governing by some form of local power under their protection and control. Their efforts to impose an administrative system

Tank left from the Civil War

over the fragile, but functional, local structure, were, according to some commentators,[22] responsible, together with the expectations brought by the development of trade and communications, for the social and political unrest that occurred during the fifties. In the interior regions, British efforts to make a federation of the various local rulers met with resistance openly supported by Imam Ahmad in North Yemen, who continued his old claim on a territory governed by the Imams two centuries earlier, and by Egypt and the Arab League who did not favour a possible increase of British influence in the region.

In Aden the fifties were years of strikes and industrial unrest. By then, a labouring class had been formed, based on workers at the harbour and the refinery. Two major anti-British groups appeared - the South Arabian League and the Trades Union Congress (TUC) with a political wing in the People's Socialist Party.

Coincidentally, on the day of the Republican Revolution in North Yemen the British made the agreement to have Aden join the Federation of South Arabia, but the situation in the North changed the possible outcome of these plans. On 14 October 1963, the National Liberation Front (NLF), which had been working underground, moved into the open declaring their intention of expelling the British by force.

Violence increased both in Aden and in the interior, as the negotiations for independence were made conditional on a defence agreement securing British bases in Aden. The intensification of political assassination and the strenghtening of the position of the NLF forced the British to let the Federation collapse and they left without finalising any agreements on 29 November 1967 . At midnight the People's Republic of South Yemen was declared by the Marxist/Leninist National Front.

In North Yemen, the Egyptians had left a month earlier, in the aftermath of the June 1967 War with Israel, demoralized by a fight where losses seemed to outweight gains .

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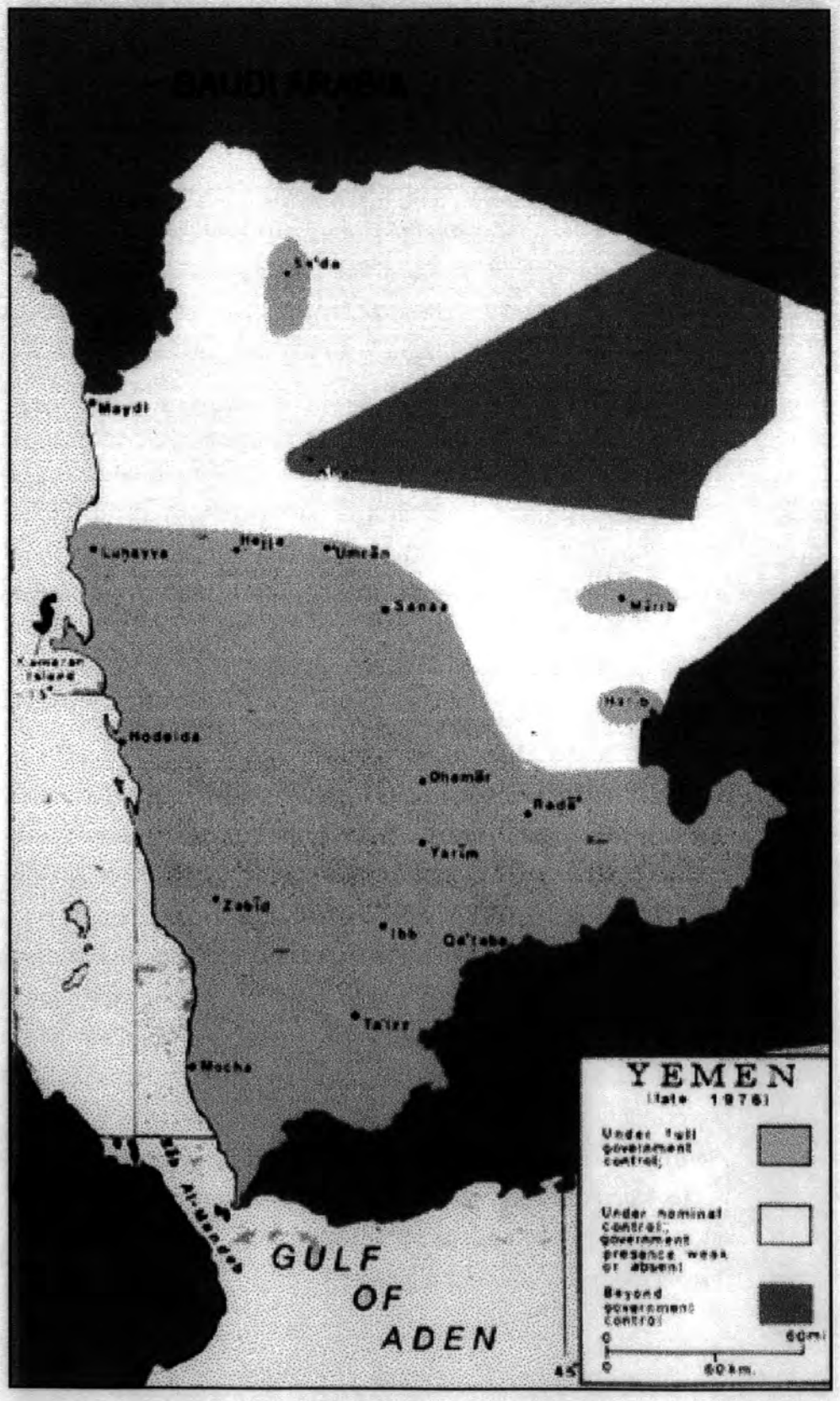
[22] Stookey:78 and Nyrop:86.



The control of North Yemen's territory in 1976 (Source Stookey:78)

2.4 - Post Revolution

The year 1970 was a milestone for both North and South Yemen. In the South, the National Front government adopted a radical stance promulgating a new constitution and changing the name of the country to the "People's Democratic Republic of Yemen." In the North, the Civil War was ended by the terms of a "Reconciliation" upon which Royalists and Republicans formed a government and issued a Constitution for the Yemen Arab Republic.

In the Y.A.R. government control of the territory was both partial and precarious for a few years, due, in the north, to pockets of tribal resistance to the Republican Government and, in the south, to continuous disputes along the southern border, involving the governments and dissidents of both countries thereby opening the way for profound changes.

Referring to the period before the Revolution, one commentator reported *" The lack of a school system meant that there were few literate people and almost none with a secular, modern education. A government and public administration in the usual sense did not exist. There was no local currency or banking system, almost no health facilities, electricity, potable water & sewage systems, as modern communications. Transportation was largely on the backs of people and animals; many parts of the country were isolated from the rest ".*[23]

The first indications of western techology had appeared just a few years before the Revolution. In 1955 there was a limited number of official radio posts; a public electricity supply had begun in Taiz two years after being installed in the Imam's palace; but the number of motor vehicles totalled three jeeps left by the Turks and owned by the Imam.[24] There were practicaly no roads except what remained of the Turkish military network. In 1960 the first electricity bills appeared in Sana'a; the Sana'a-Hodeida road., built by the Chinese, opened in 1961. At the outbreak of the Civil War the situation was not very different. In 1962 two additional electricity generators had been installed in Sana'a and by 1963 Taiz had piped water.

The Egyptians were the agents for the widespread introduction of,

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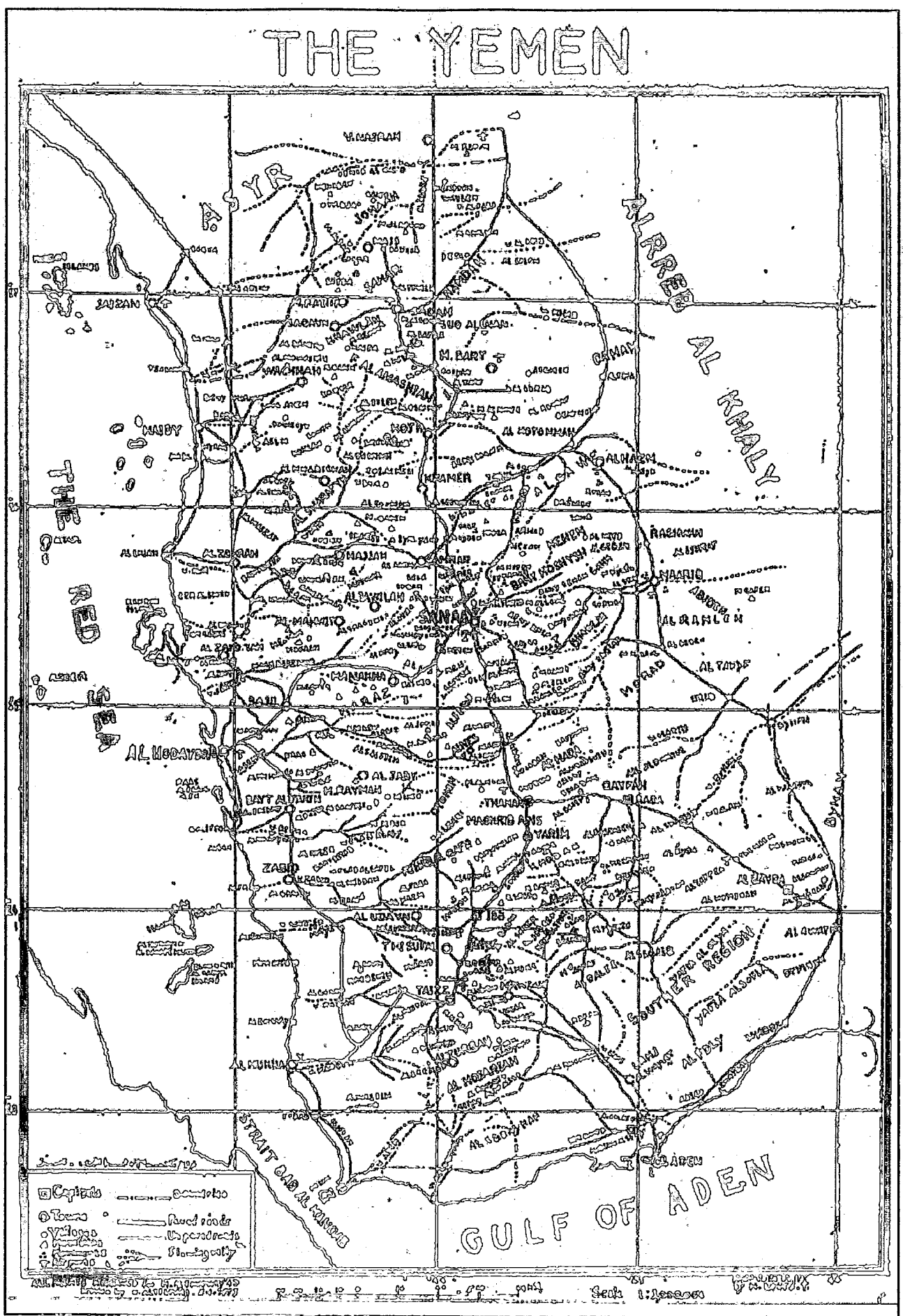
[23] Nyrop:86, pg 128.

[24] Etienne Renaud direct information.



The road map of North Yemen available in the mid 'seventies

among other things, radios, cars and reinforced concrete construction - particularly in the Hodeida/ Taiz/ Sana'a triangle. In other spheres they contributed to the organisation of the government into ministries and prepared the first physical planning layouts and public works projects.

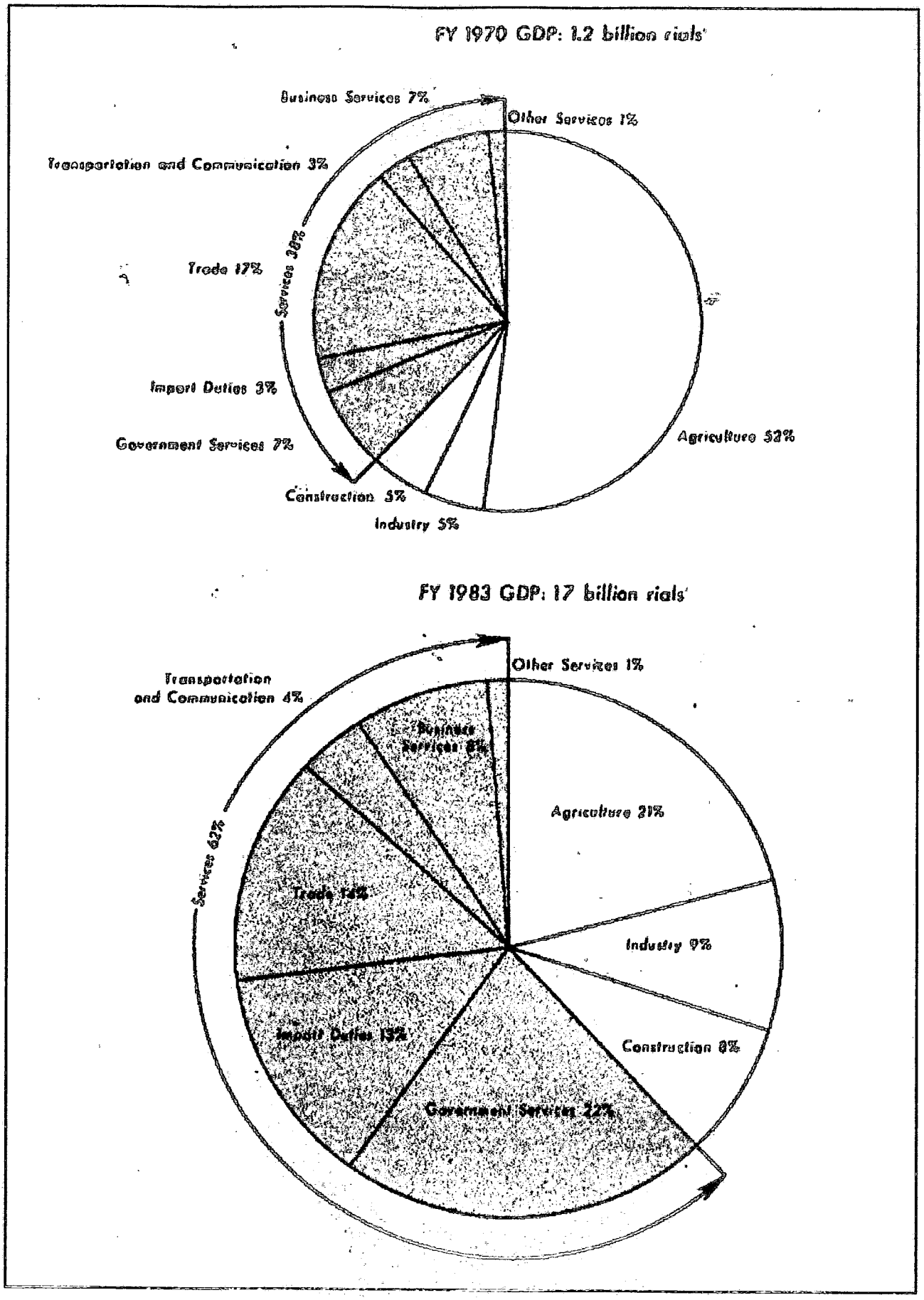
Even during the troubled times of the Civil War the measures taken by the Republican Government gradually opened the way for the changes that followed the Reconciliation particularly after the mid seventies. In 1964 a national currency (the Yemeni Ryial) was introduced to replace the old Maria Theresa thaler and the first National Budget was set. In 1966 the Central Planning Organization was created as a national planning agency and in 1968 the first textile factory was opened by the Chinese in Sana'a. In 1970 the University of Sana'a was officially inaugurated; 1973 saw the opening of the Russian built cement factory in Bajil and the begining of the construction of Sana'a International Airport. Between 1971 and 1986 the generation of electricity increased from 19 MW, and limited to the three main cities, to a 435 MW nominal nationwide coverage.[25] A thermal generating plant began production in Hodeida in 1981 and, three years later, in Mocha. At the end of the eighties electricity was being exported to South Yemen.

The increase in motor vehicles is indicated by the annual number of licence plates issued for private cars:[26] from 736 plates in 1971, to nearly 5000 new plates in 1976, peaking in 1986 with 20,300 plates of which more than 9000 were in Sana'a alone.

The road network expanded accordingly. In 1961 the only motor road was the asphalted Sana'a - Hodeida road (226 kms). In 1973, there were 1016 kms of roads 430 of which asphalted; in 1988 the figures were 3900 km and 2370 km, respectively. Furthermore, many tracks were opened by local initiative giving motorized access to most villages.
Other indicators could be quoted, such as the use of telephones (800 subscribers in 1962; 3,810 in 1971; 87,500 in 1988; and 120,000 estimated in 1993) and television (experimental broadcasts limited to Sana'a began in 1976; countrywide colour coverage, ten years later). The evolution of the economic profile,expressed in terms of contributions to the GDP evinces the radical shift from a society solely based on agriculture to one where, more than manufacturing , it was service industry that achieved the most representative growth.

Foreign aid, whether in terms of money, expertise or labour was

[25] See YARSYBs.
[26] See YARSYBs.



Gross Domestic Product by Sector in 1970 and 1983 (Source Nyrop:86)

conspicuous in this process. The Chinese and the Eastern block had a pionneer role but were immediately followed by a multitude of bilateral aid programmes from Western European countries, the U.N., World Bank and the Arab neighbours - particularly the Saudis and Kuwaitis who played a major role .

In June 1974 a bloodless coup - popularly known as the "Correction Coup" - took place, and its leader, Colonel Ibrahim Al Hamdi became President of a new government introducing a form of "correction" from the heavy dependence on Saudi Arabia favoured by the previous government.[27]

Al Hamdi soon became a popular figure. He appeared as a skillful dealer both with domestic forces and the pressures of Yemen's neighbours. His image was that of a leader genuinely interested in national independence without isolation. He also encouraged issues such as development planning and the strenghening of the economy, and contributed to the notion of Central Government being associated with the intention of producing some social benefit rather than being merely an instrument for taxation and military mobilization. He was also credited with the impetus given to the Local Development Associations, which were instrumental for infrastructural development in the countryside.

In 1977, the day before he was to leave for talks with the government of South Yemen, Al Hamdi was killed in mysterious circumstances. His successor, Ahmad Al Ghashmi, whom many suspected of being involved in the murder plot and who sympathised with Saudi Arabia, was also assassinated, less than a year later, by a letterbomb, allegedly of South Yemeni origin. The next president, Ali Abdallah Salih, a protege of Al Ghashmi's, started his mandate in 1978 in very unfavourable terms.

Yet, according to early indicators, the decade or more that followed proved to be the most constructive period since the Civil War. The government promoted public works and public services. Salih survived plots and managed to balance conflicting internal forces and external pressures and create some kind of national conscience, from the traditional contradictory influences.

The rest of Arabia had gained greater wealth due to the mid 'seventies increase in oil prices. This meant increased Yemeni migrant labour so that the receipts from emigrants grew considerably and became an accountable national resource. The discovery of oil was officially

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[27] See Nyrop:86 and Burrowes:87.

announced in 1984, the first refinery started in 1986, with a pipeline to the coast two years later. Although modest by its neighbours standards, the production of oil in Yemen was sufficient to promise a radical shift towards the future prosperity of the country.

At the international level, contacts were being diversified and the 'eighties ended with Yemen joined to Iraq, Jordan and Egypt in an economic and defence alliance, The Arab Cooperation Council.[28]

The negotiations with South Yemen were resumed and North Yemen acted as a mediator in the aftermath of the internecine struggle that had affected that country since1986. Finally, the USSR having withdrawn from South Yemen following perestroika, the way was clear for the Unification of North with South Yemen wich was formalised on 22 May 1990. This culminated the resolution of a political problem wich many observers considered difficult if not impossible. Salih became the president and Ali Salim Al Baydh, the president of South Yemen, the vice-president of the Yemen Republic. Sana'a remained the capital, with Aden the main port. In June 1991 a referendum on the new constitution of the Yemen Republic was passed by an overwhelming majority. Elections were scheduled for November 1992 but took place only in April 1993 apparently due to need of preparation in polling procedures. The elections, considered exemplary notwithstanding isolated incidents, voted a multi-party democracy where the current presidential leadership was confirmed although balanced by a significant representation of the opposition parties involved.[29] Subsequent events, however, contradicted the optimistic outlook of this time and, one year later, violent confrontations between adepts of Sa'lih and Al Baydh brought another civil war to the country.[30]

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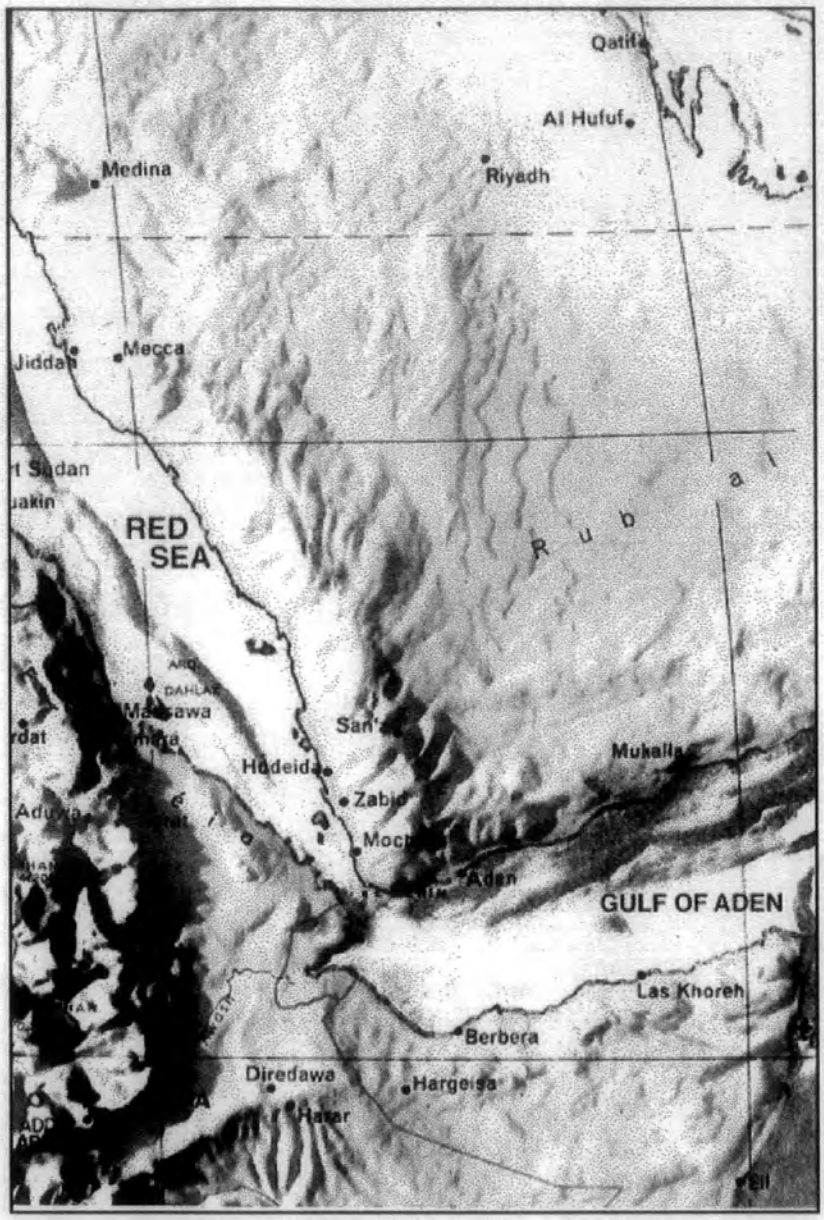
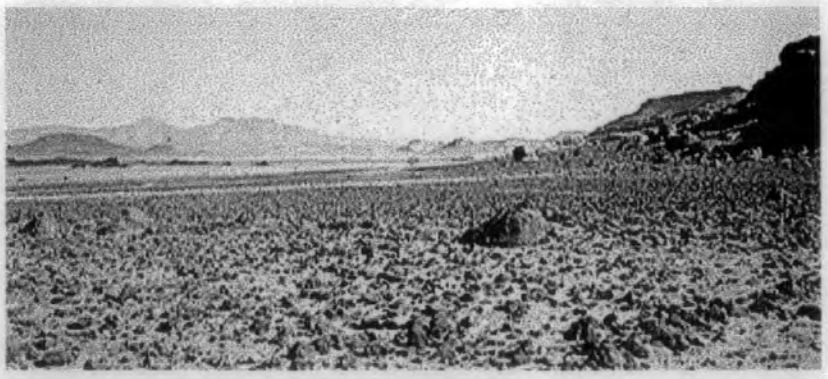
[28] Yemen maintained the alliance with Iraq throughout the 1990 Gulf War. It has in consequence been heavily penalized by retaliation measures such as the forced - and sometimes dramatic - return of the Yemeni labour from Saudi-Arabia. The economic situation suffered accordingly and the process of growth expected early in 1990 has seriously been curlailed.

[29] See Yemen Update, # 33, Summer /Fall 1993.

[30] The state of Civil War "officially" started on the 5th of May of 1994 but violent clashes had already taken place. Early in June, Al Baydh unilaterally declared South Yemen independent with the immediate recognition of the five Arab Gulf states, but heavy fighting continued, particularly around Aden. The war was over in July, when Al Baydh was defeated and fled the country.



Top -Relief on the African and Arabian shores of the Red Sea and Gulf of Aden; *bottom* - Volcanism in the Sana'a Valley



3- PHYSICAL BACKGROUND

3.1- Geology

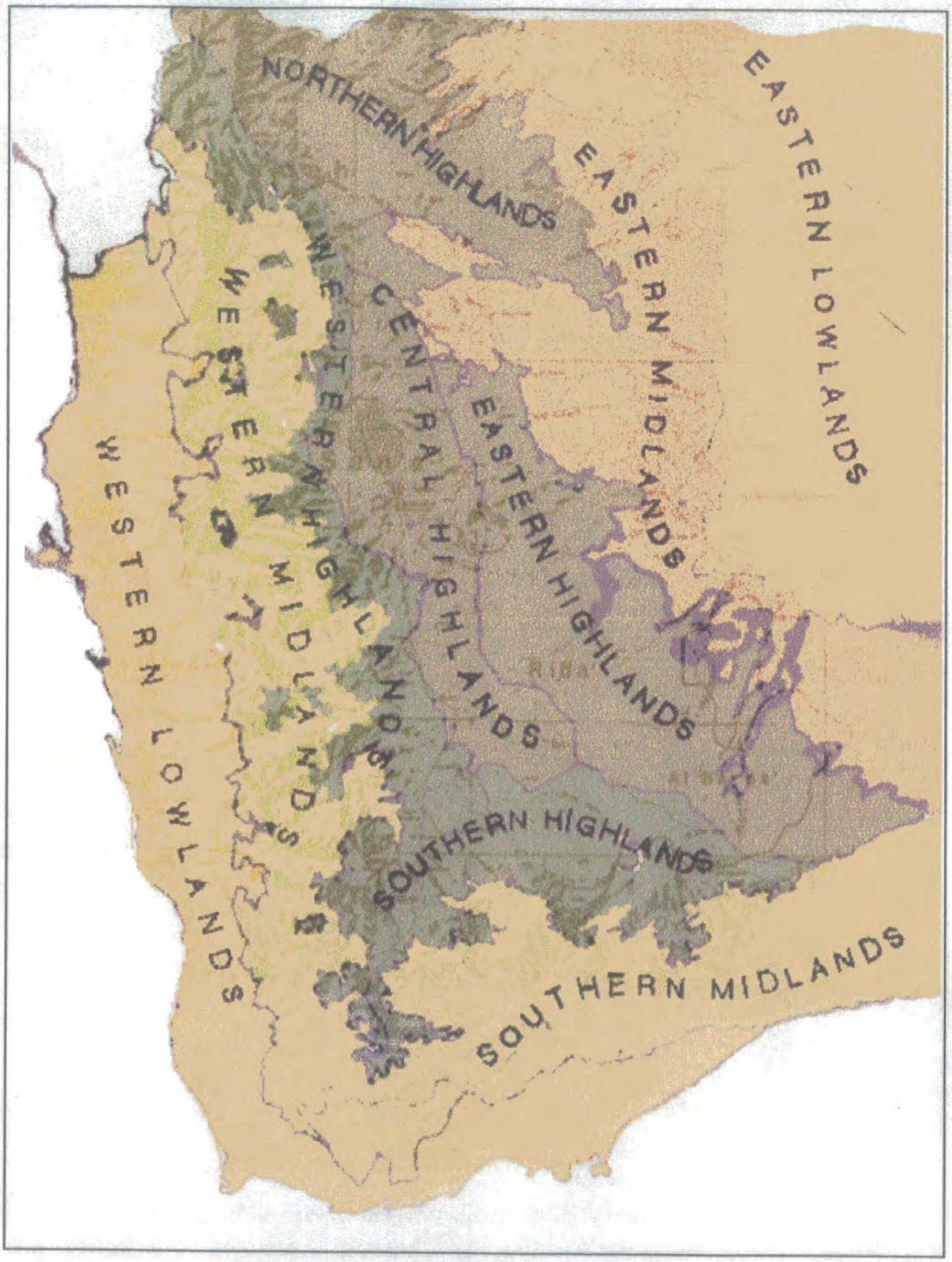
At the end of the Cretaceous and the beginning of the Tertiary Ages, the western part of the Arabian Peninsula and the East African coast were pressed upwards and began to break into separate blocks. The Red Sea was formed by the intrusion of the ocean into the oblique opening so created, resulting in a rift more than 200 kms long and from 150 to more than 300 km wide, fringed by active coral reefs, igneous and metamorphic mountains and sedimentary rocks.

The western and southern edges of the Arabian plate, where the Triassic and Jurassic layers were thrust upwards, are evinced by major mountain ranges running along the Red Sea (the Hijaz, Asir, and Sarat chain) and the Indian Ocean (Hadhramawt/Dhofar). The great central deserts of Nafud, Dahna and Rub Al- Khali are enclosed by these two formations. Between the mountains and the coastline, the flat sedimented plain of the Tihama ,30 to 60 kms wide on the Red Sea side, runs from Asir in the north and turns eastwards along the Gulf of Aden where it narrows down and ends.

As streaming lava erupted along the geological fissures, the Precambrian base and its Mesozoic sediments were covered by layers of volcanic rocks of various kinds. In Yemen these layers were up to 1,500 metres thick and occupied more than a quarter of the area of the country. In the intervals between eruptions fresh water and aeolian or alluvial deposits were accumulated.

Relief is determined by the tectonic displacement and the geological stratification, offering different degrees of resistance to weathering and erosion which accentuates the orographic variations. The highest peaks (Jabal Nabi Shu'ayb at 3760 m) and steepest gradients are reached along the Sarat chain, in Yemen. Indications of recent volcanism are particularly visible in the southern half of the the central plateaux - between 'Amran and Sana'a, Dhamar, Yarim and Damt -and along the southern coast (e.g., the extinct crater in Aden). They are still manifest in numerous hot springs and fumaroles and, more dramatically, in the occurrence of earthquakes. In the last 1200 years, about 25 earthquakes are estimated to have occurred.[31]The most recent was in December 1982, registering 5.7 on the Richter scale and affected the whole Dhamar

[31]Viscount Buckmaster, quoted by Nyrop:86.



Physiographic regions (after Steffen: 78)

valley, with much human and material loss. The shock was felt as far away as Sana'a.

Steffen [32]distinguishes four major geological zones for North Yemen:

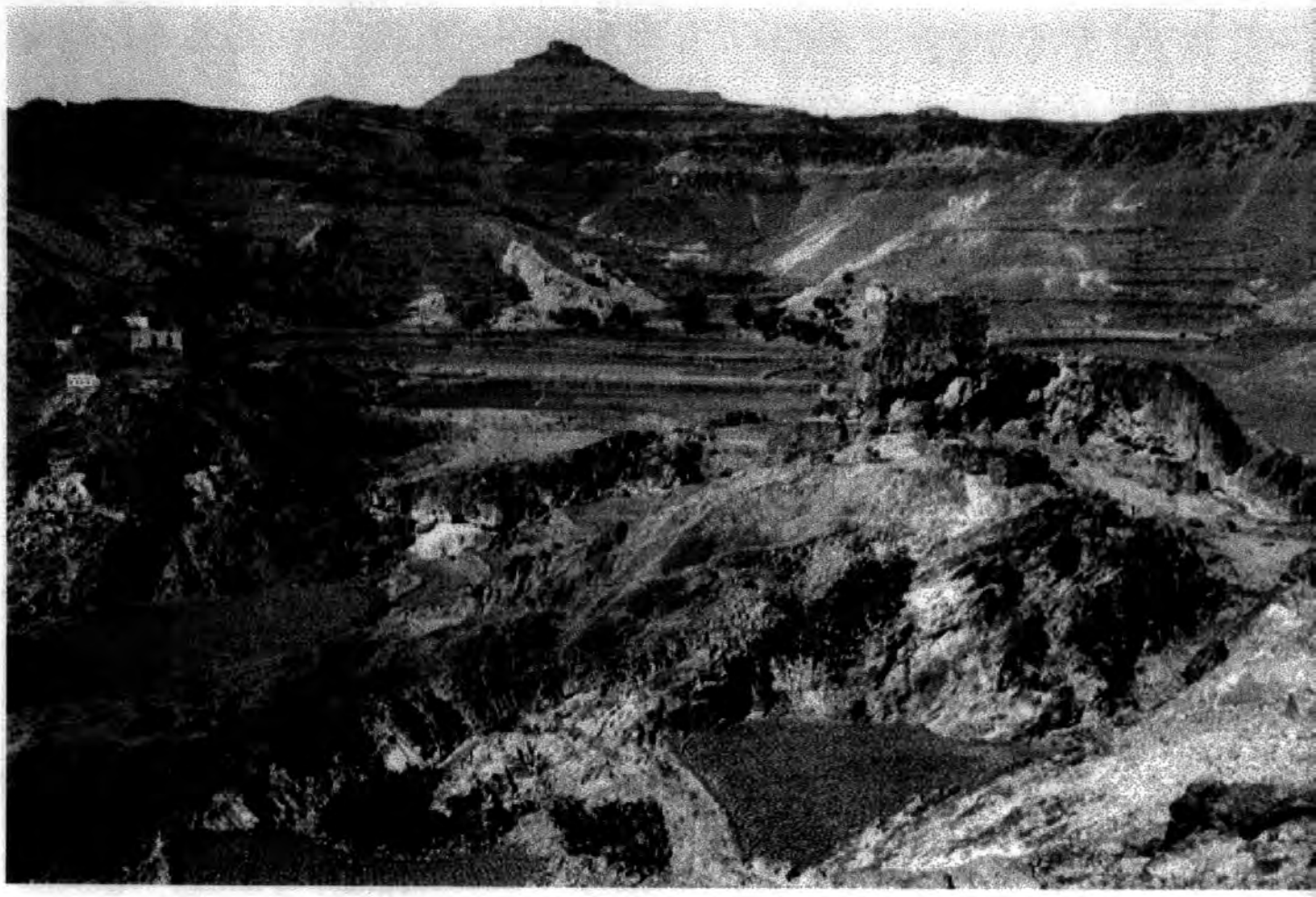
1- YEMEN VOLCANICS (designation given by Grolier, 1976, to Tertiary Volcanic Series) - covering the Central and Southern Plateaux and Mountains (From Sana'a to Taiz and to the Tihama foothills).
2- JURASSIC AND CRETACEOUS SERIES AND SEDIMENTS (Tawila, 'Amran and Kohlan Series: sandstones, limestones, marls, shales and conglomeritic layers) - covering the Central, Northern and Eastern Plateaux (from 'Amran to Sa'da, to the Jawf and Marib).
3- GRANITES AND GNEISSES OF THE PRECAMBRIAN AGE - Covering the Central/Western Mountains (Hajja); the Northeasthern Highlands (Barat, Kitaf); the Southeast (Khawlan, Al Baydha[33]). The Precambrian basement, underlaying the Yemen Volcanics and the Mesozoic Sediments, outcrops at the scarps of numerous faultblocks.
4 - QUATERNARY ALLUVIAL AND AEOLIAN DEPOSITS - covers the Coastal Plain (Tihama), Eastern Lowlands (Wadi Jawf), Plains of the Central Highlands (Sa'da, 'Amran, Sana'a, Dhamar, Yarim, Rada.

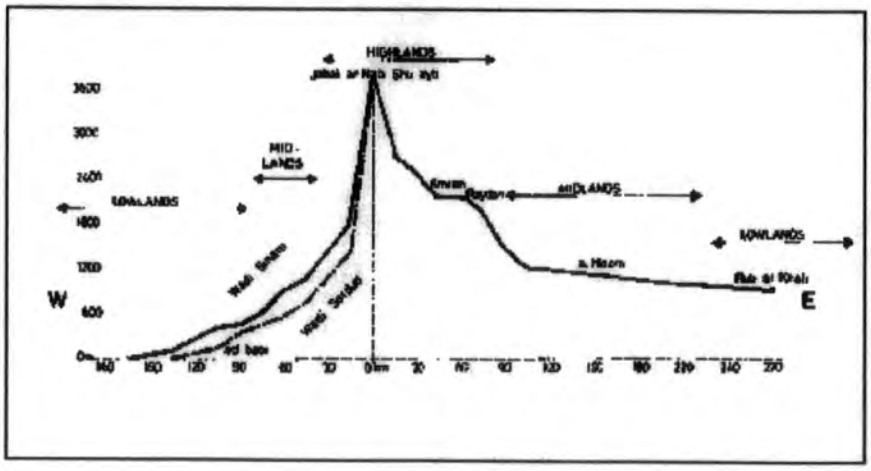
3.2- Physiographic Regions

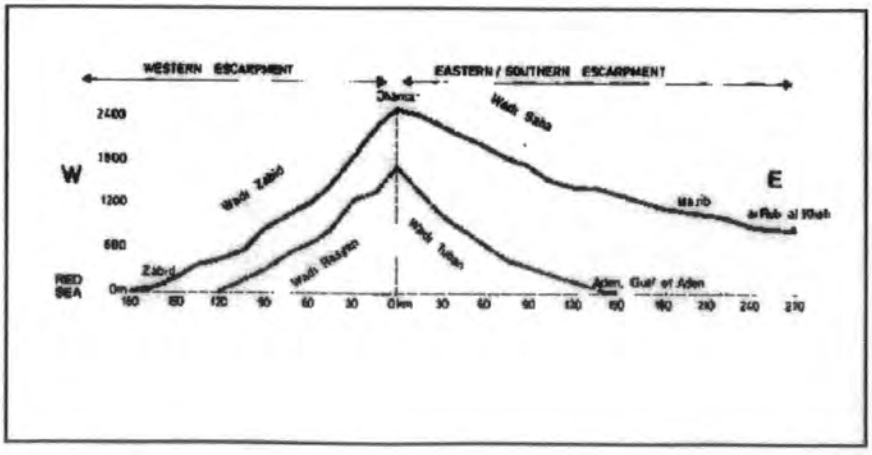
Steffen presents a convenient classification of natural regions, based on the orientation and characteristics of the three major escarpments of the country's mountainous system . The Western Escarpment slopes towards the Red Sea; the Eastern, towards the Desert; and the Southern, towards the Indian Ocean. They condition climate and form specific drainage systems . Each escarpment is further subdivided, according to altitude and with imprecise border zones, into Lowlands (0 to 500-1000 m), Midlands (up to 1500 - 1700 m) and Highlands (up to 3760 m). The western and part of the southern Lowlands are known as the Tihama, a Sabaean word meaning "low-lying country". The eastern Lowlands encompass part of the desert. Together with the eastern Midlands this area is commonly known as Al Mashriq (literally east of) or Eastern Plateau. The southern Midlands are mostly in South Yemen where another distinct region, the Hadhramawt, needs to be considered. The central spine of the Highlands is marked by a string of alluvium filled

[32]Steffen:78.

[33]Ancients granites covered by limestones and sands compose the soutern end in South Yemen..







Top - Khubban in the Central Highlands; *bottom* - Schematic cross sections of the country (after Steffen:78)

valleys, the most important being , from north to south, Sa'da, Harf, Huth, 'Amran, Sana'a, Ma'bar, Dhamar, Rada' and Yarim .

3.3- Climate

The situation of Yemen on the borders of a tropical zone explains its cycle of dry and humid seasons, subject to very heavy downpours and long periods of drought. Relief affects the main climatic factors of the wider area: the monsoon, and the Central Asian anticyclone. The former, flowing from the Southwest against the western highlands, causes heavy precipitation on the upper slopes between March and September. The anticyclone establishes clear and rainless weather from October to February.

Air masses circulate regularly ascending from the coast, through valleys and gorges, into the highlands. Here they suffer accentuated night cooling and return to the lower lands to warm up and repeat the cycle.

The climate changes from tropical humid in the coastal plain, western foothills and midlands, with mean temperatures from 25° to 38° C, to subtropical, being humid in the western and southern highlands , dry in the eastern and southeastern slopes, and even drier as the desert is approached, with temperatures of 18° to 25° C. At the higher altitudes the climate is temperate with mean temperatures of 15° to 22° C. Precipitation varies, from very low (80 mm or less) along the coast and the desert to a high of 1800 mm average at the Ibb in the Southern Highlands, decreasing again away from this area.

3.4- Hydrography

The hydrographic system of Yemen consists of rain fed watercourses (wadis)[34] occasionally flooding but usually dry, draining from the main watershed along the three major escarpments. In the rugged slopes of the Western escarpment seven major wadis[35] run toward the Red Sea, which they sometimes reach during periods of heavy rain. In the southern slopes the wadis of Tuba and Bana run, through a similar but less

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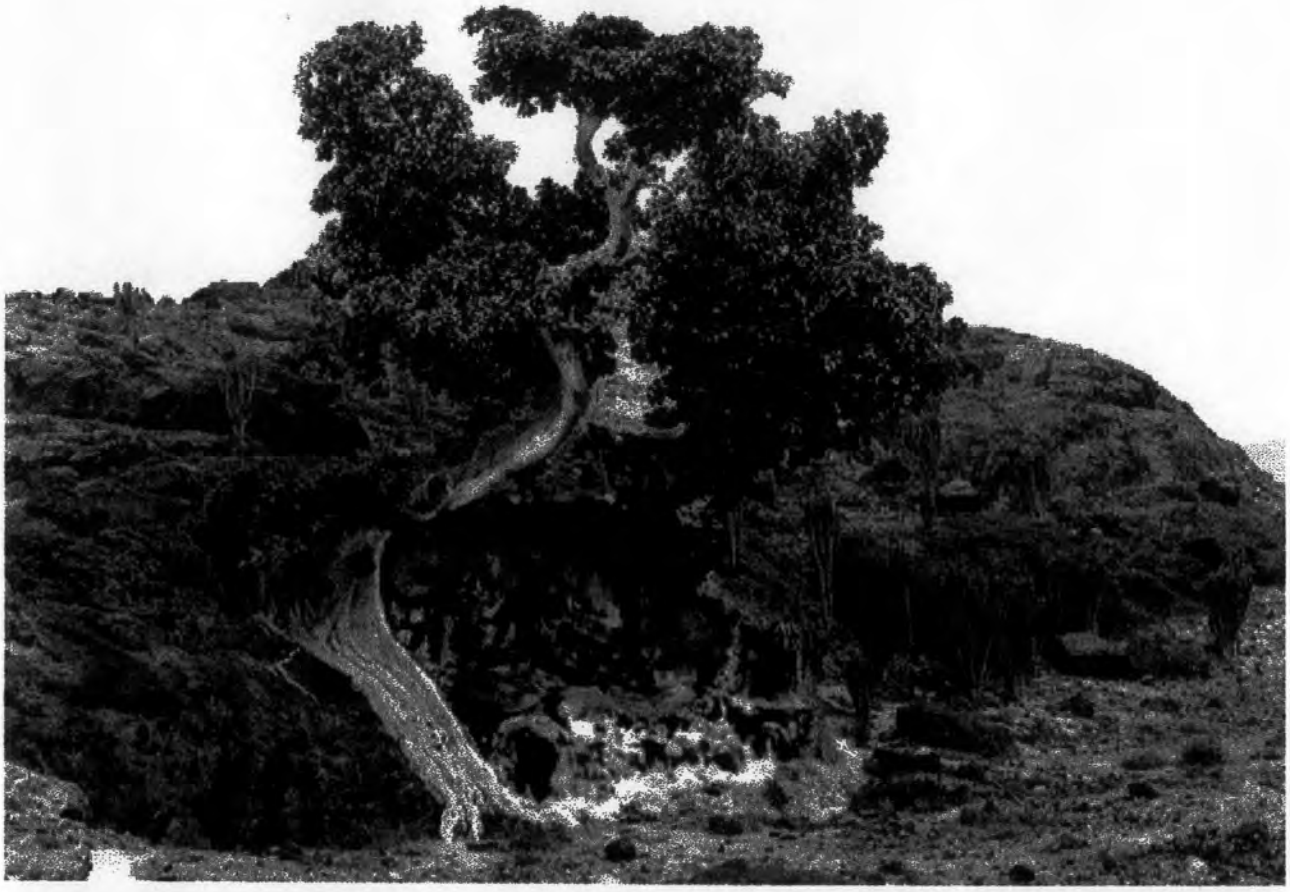
[34]The word "wadi" is used in Yemen to mean the temporary water stream itself and the dry bed on which it runs as well as the area affected by its irrigation. See Steffen:78.

[35]From north to south: Haradh, Mawr, Surdud, Siham, Rima, Zabid, Rasyian, Mawza.



Top - Dhawran, Western Uplands; *bottom* - Al Rahida, Southern Uplands

precipitous course, to the Gulf of Aden.[36] The nine wadis running eastwards[37] follow a different regime. Their flow is smoother, because of lower gradients, and more irregular, due to less dependable rainfall. The effect is episodic flooding along the fringes of the Rub Al Khali. This is the area of the dams and large irrigation works of the pre-Islamic past.

3.5- Natural flora and fauna

The natural green coverage of the mostly arid tropical coastal plains consists of clumps of palms, acacias, dwarf shrubs and drought tolerant species which bloom with rain. Natural animal species are limited; domestic animals are mainly goats and camels.

In the Western slopes there is a higher proportion of scrub, bushes and trees - *euphorbiacia, acacia negrii, ziziphus spina-christi, cordia abyssinica* and local varieties of hardwood. Natural vegetation is evident only in the most inaccessible areas since this region is intensively farmed. Although baboons, foxes and mountain lions have been referred to as pests, large wild animal life is nearly extinct. Animal husbandry consists of cattle, goats and sheep.

At higher altitudes trees become scarce; and natural vegetation diminishes towards the east, to be reduced to seasonal appearances of grass at the edges of the Rub Al Khali. Along the main watershed, in the central highlands, agriculture has been developed in the fertile alluvium filled basins.

There are no large forests, as might be expected from similar conditions in Northeast Africa. Steffen mentions that once there were *"rich areal forests of Acacia, Juniper, Tamarisk trees, etc, (...) probably destroyed by the indigenous inhabitants"* for necessities such as construction timber and domestic fuel. In consequence the steep deforested slopes are subject to intensive erosion and, after heavy rains, the water flows freely resulting in destructive floods.

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[36]Other wadis, already in South Yemen, are Al Maqatera, Maifa'a, Hajar, Masaila, Jiz and Hadhramawt.

[37]From north to south: Amla; Khabb; Awban; Jawf; Adhana; Harib; Bayhan.

Landscape and people of the Tihama

3.6- Environmental Regions

Yemen's environmental diversity allows for regional divisions, resulting from the combination of relief, climate, hydrography and human occupation. Different classifications have been proposed by specialists and governmental agencies,[38] but they coincide in the essentials.

The Tihama [39] is the mostly arid coastal plain and the foothills bordering the steep drop of the western slopes. The population has a significal black African component, being the descendants of slaves brought in since at the least the 9th century together with traces of Ethiopian and Indian races. Littoral settlements are fishing villages and harbour towns, such as the once important ports of Mocha, Hodeida and Al Luhayya. Agriculture developed on the lower basins of the wadis draining from the western mountains, irrigated by shallow wells and simple methods of damming and diverting periodical flooding. Millet, maize, sugar cane, water melon, tobacco and cotton are the major crops; livestock consists of sheep, cattle, donkeys, goats and the largest concentration of camels in the country. A few handcraft centres are concentrated along the axis of the region in towns with important markets such as Zaydyia, Zabid, Bayt Al Faqih, Hays, Al Mansuryia or Al Dharayhimi. Tribal affiliation may be claimed but tribal organization is weak.

The Western Uplands - midlands and highlands - rise abruptly from the Tihama reaching the highest peaks through rugged wadis. Rainfall is moderate and occasionally heavy. In the midlands, summary methods of spate irrigation are used for agriculture, but the highlands are characterized by extensive terraced slopes, cultivated with millet,

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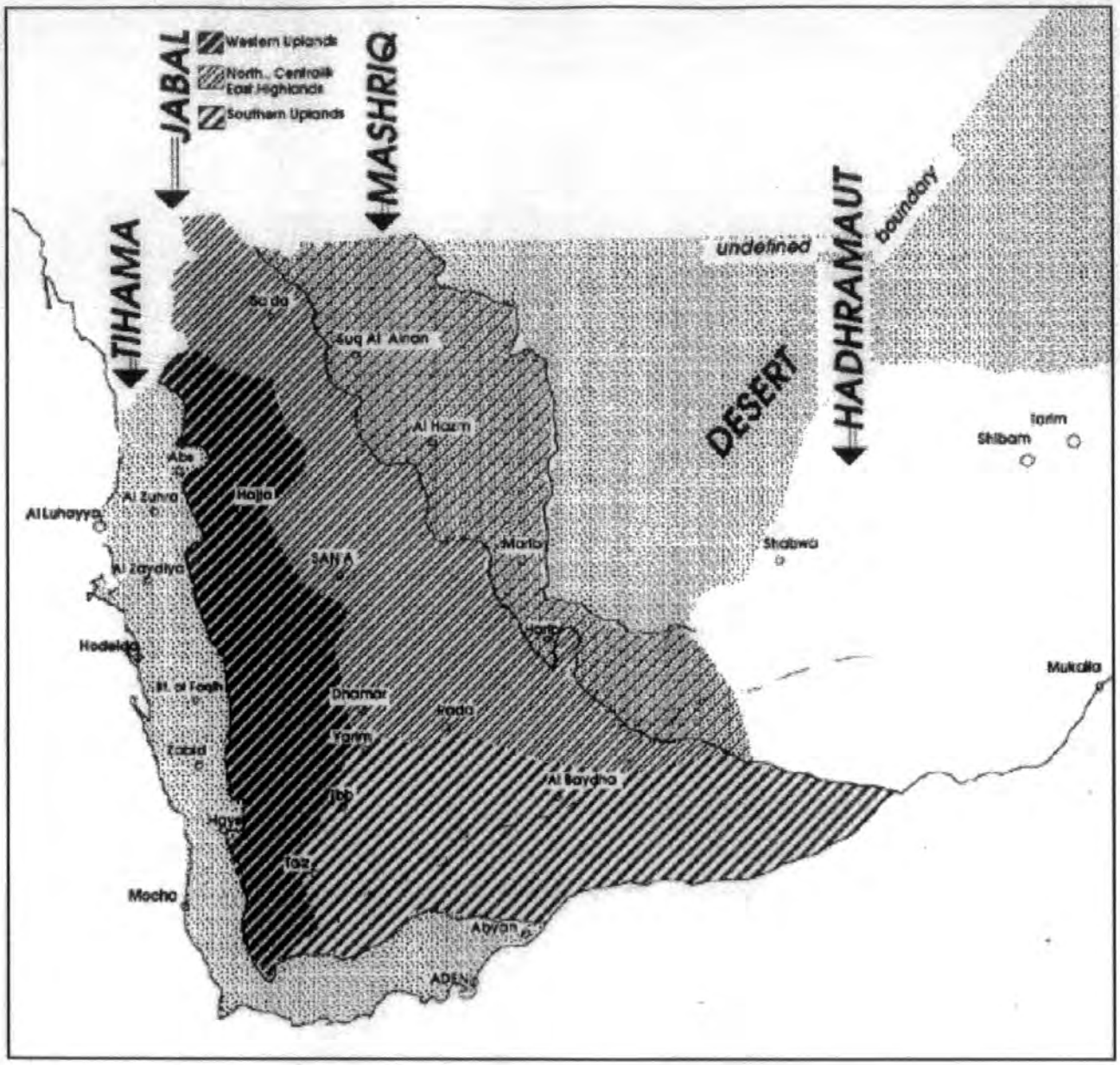
[38] Gochenour:84 distinguishes five ecological zones in medieval Yemen : Tihama, Western Mountains, Northern Highlands, Southern Highlands and Eastern Slope. He points out that they are defined "*as much by landscape and topography as they are by factors such as soil fertility, average annual rainfall and its distribution, or the length of growing seasons*". Obermeyer:82 speaks of five areas of political ecology which generally coincide with Gourchenour's ecological zones (Obermeyer separates the Northern from the Southern Highlands at the Sumara pass, south of Yarim; Gochenour, further north, at the Yaslah pass between Sana'a and Ma'bar). The categories presented by other specialists - Dostal, Varisco, Revri, etc - and official departments do not vary much from these.The government has established a division of the country into agricultural regions with specific characteristics relating to the kind of crops, means of production and forms of irrigation. These are: The *Tihama,* the *Western Midlands*, the *Southern Uplands* (i.e., Southern Midlands and Highlands, beginning with the Yarim valley), the *Central Plains* (i.e., Western, Central and Northern Highlands) and the *Eastern Plateau* (Eastern Midlands and Highlands). See YARMAF:89.

[39] For Geukins:66,p. b2, "*the TIHAMA , the 30 to 40 kms wide maritime plain , is the sediment filled part of the Red Sea graben; it is longitudinally divided in two parts, with unprecise, fluid, difficult to trace, limits, one, adjacent to the Red Sea, consisting of tertiary and quaternary marine formations covered by recent aeolian deposits; the other, at the mouth of the wadis, close to the foothills, of thick deltaic deposits; the two parts are separated by a line of fresh water springs*".



Environmental regions

wheat, barley, qat, grapes, coffee, tobacco, fruit trees and vegetables. Livestock comprise cattle, donkeys, goats and sheep. The major settlements (e.g. Mahabisha, Hajja) are located on the peaks in the northern part of the region.

The Central Highlands, occupy the north-south watershed at altitudes of between 1800 and 2500 m. With the more temperate climate, rainfall is irregular, becoming scanty towards the north. Agriculture, mostly rainfed
but relying also on wells, has crops similar to those of the Western Uplands, except for coffee or tobacco. It occurs mainly in the alluvial plains of the central plateaux where major towns, such as Sa'da in the north and Sana'a, the capital, are situated. The region as a whole has long been the stronghold of the mountain tribes and Zaydism.

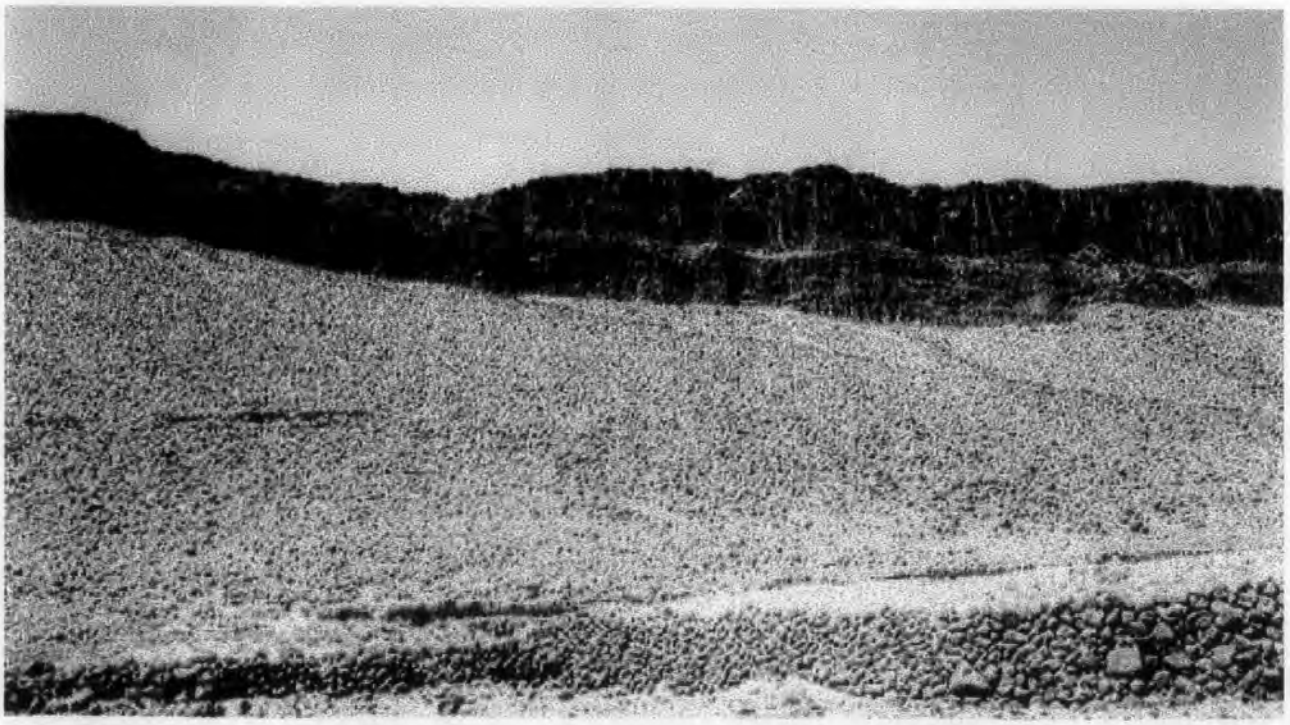
The Southern Uplands are the natural continuation of the previous two regions with a similar agriculture and the major towns (Ibb, Taizz) located in the highlands. The climate is subtropical and the highlands have abundant rainfall, decreasing with altitude as temperature and humidity increase. The lower southern and southeasthern slopes are semi-desert. Tribal organization is weak and Sh'afi Sunnism predominant.

These three regions together are also locally known by the common designation of *Al Jabal* (the Mountain).

The Eastern Plateau or *Mashriq*, at altitudes below 1700 m, is characterised by softer mostly barren slopes with wadis flooding with the occasionally heavy although infrequent rainfall. Small oases of date palms appear along the fringes of the desert. Farming supported by wells and simple spate irrigation is all that remains of the areas formerly irrigated by the large scale flood control techniques of pre-Islamic times. A large part of the population consists of nomads and semi-nomads (beduins) whose livelihood is guaranteed by small herds of goats and camels, the collecting and marketing firewood and the provision of caravanning services. Tribes, both sedentary and nomad, constitute the strong basis of social organization. Present day towns, such as Hazm and Marib, are small, although Marib has noticeably grown since the 1980s due to the discovery of oil nearby.

Another current division of North Yemen into Tihama, Upper Yemen and Lower Yemen is sustained by tribal constitution and the predominance of either the Zaydi or Shafi' religious schools.

Top -Khubban, Central Highlands; *centre* - Hujjaryia, Southern Uplands; *bottom* - Al Hada, Eastern Highlands



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Part 1. TRADITION
(Built space in the pre-industrial period)

Highland farmer in 1974

CHAPTER 1: THE LAND

Section 1- Building a territory

1.1- Agriculture: generalities

> *The Yemeni farmer spares no effort to gain maximum profit from the scanty rainfall for the cultivation of his crops on the most difficult terrain ... Ploughing, levelling, manuring, breaking clods of soil with a wooden hammer, removing crop residues, sowing, conducting additional irrigation water to the fields, harvesting, repairing the retaining walls of the terraces, transporting mould from the fields of the lowest terraces to those laying in the upper part, etc, are some of the operations which are carried out by the farmers by hand, using only simple tools and domestic animals.*
>
> H. Steffen, 1978

Expressions like "labour-intensive", "subsistence farming", "effort & ingenuity", have been variously applied when describing agriculture in Yemen. They are adequate: with simple concepts and elementary tools, Yemen developed "*an extremely effective farming technology closely adapted to the ecological conditions of the area* ".[1] In the process of building an agricultural landscape, Yemenis set the frame of a system that is reflected in the form and construction of their more elaborate buildings and settlements.

Yet only a small proportion of Yemen is suitable for agriculture. Official figures and estimates on land use made since 1970 [2] show some variations, but even approximate values are significant enough: 17% of the country is arable land (7% cultivated), 8% bush and forest land and 75% grazing land, rocky and mostly arid.

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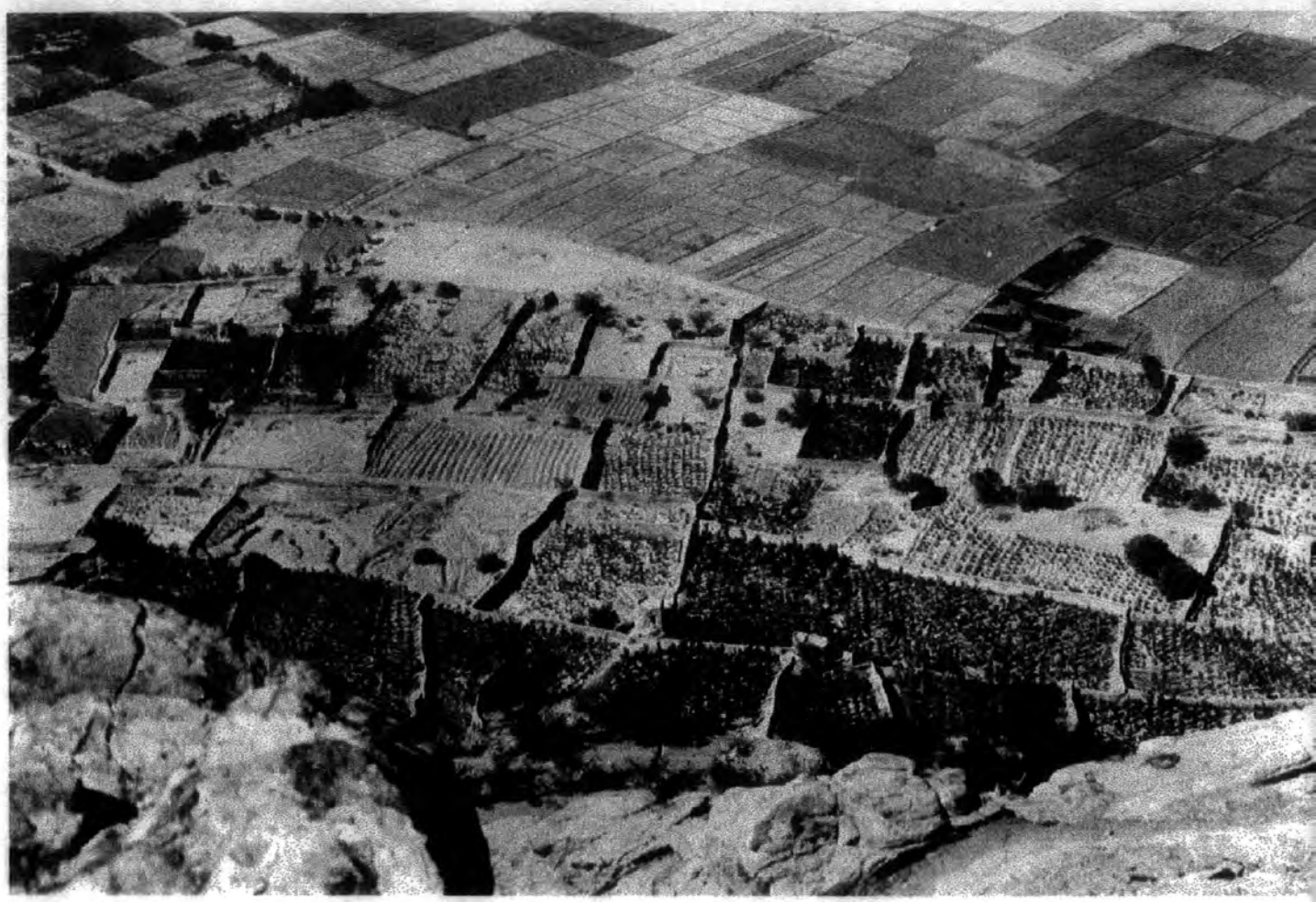
[1]Kopp:88, p. 368.

[2]The first Statistical Year Book (1970/71) indicates that 26.3% of the country is arable land, of which 10.5% are cultivated and the remainder uncultivated or fallow lands. From 1972 on, arable land is calculated as 17.5% of the country's area, 7.5% being cultivated; the figures of 1976 confirm these but in 1986 they are 16.8% and 6.8% respectively, indicating a 10% decrease of cultivated area in the last 10 years. Steffen, quoting Kopp, in 1979, estimates the cultivated area to be between 12% and 15 % of the country's area, but it seems that the total area of country used as a term of reference (between 132,000 km2 and 138,000 km2) is not the same adopted by the government (200,000 km2).



Top- Agricultural fields in Wadi Dar, Sana'a Valley; *bottom* - Ploughing, Yasla; *opposite* - Main crops during 1988

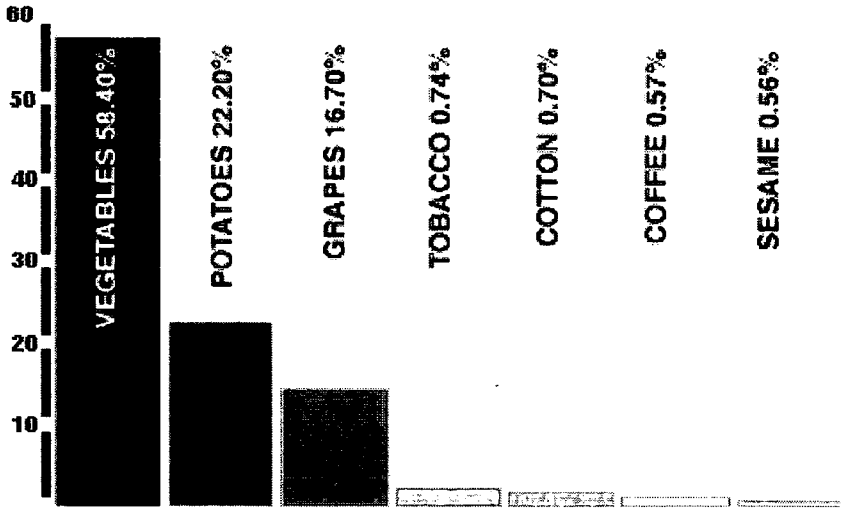
Until the Republican Revolution, farming made up most of the GDP with "*more than 90% of the work force (in agriculture) and industry confined to handicrafts*".[3] Twenty years later, its share in the GDP.was only slightly above 20% due to the rapid development of other economic sectors. Yet, of the 7.8 million resident in North Yemen at the end of the 'eighties, 68% were still active in agriculture and related fields. In the early 'seventies this figure was over 70% of a population of 6.5 million residents.[4]

Subsistence crops - the major component of traditional agriculture - consisted of cereals such as sorghum and millet, some barley, corn and wheat. The main cash crops were coffee and, until recently, cotton.

In the period of 20 years covered by this study, wheat has replaced sorghum in the basic diet; and although its local production has somewhat increased, it cannot compete with imported cereals, which, at lower prices, take the largest share of the market.

Cotton has declined sharply as a cash crop and instead, emphasis has increased on the cultivation of green produce which contributes substantially to an actual increase in agricultural production amounting to 4% a year since the early 'seventies. Other crops which have also developed in the last twenty years are tobacco, sesame and fruit trees.

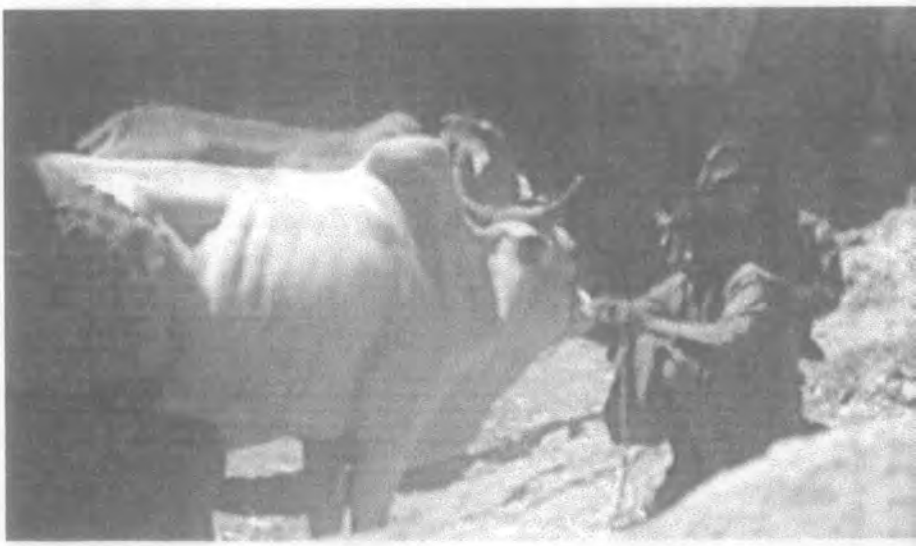
Coffee, which under the Ottomans in the 16th century, became Yemen's most famous export, is now of little value to the country's economy. Once it came to be accepted that it has no future in the bulk world markets, its cultivation was re-established mostly for local consumption and representational reasons.

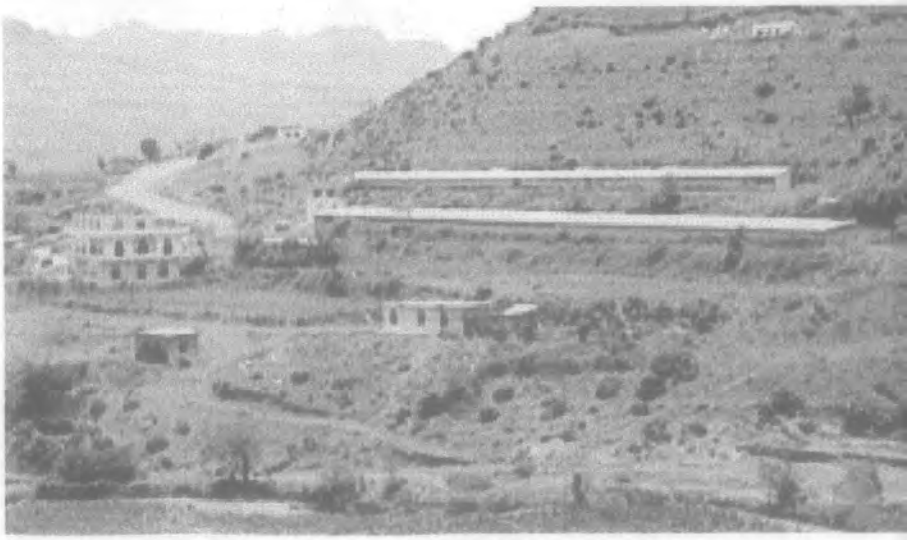


Main crops in Yemen in percentage of total agricultural productions (after YARSYB:88)

[3]Nyrop:86, p. 128.
[4]YARSYB:1988.

Top - Qat fields in Al Mahabisha; *centre* - Feeding cattle, Khubban; *bottom left* - Qat shrub in Wadi Dar; *right* - Chichen farms near Ibb, in 1990





Of increasing importance since the 'seventies is the production of qat (*catha edulis)*, a not very demanding crop in terms of soil, water and attention by the farmer. Qat, which is said to have been introduced into Yemen, from Ethiopia, as long ago as the 13th century ,[5] is a shrub whose tenderest leaves, when chewed, induce a state of well being and alertness, inducing conviviality and thereby sustaining the major pretext and ingredient of regular socializing. Originally a habit of wealthy urban dwellers, its use is now widespread and qat has become the major cash crop in many areas.[6] Some countries as for example Saudi Arabia and the United States prohibit it and would like to see it similarly proscribed in Yemen.[7] This, allied to the fact that qat needs to be chewed soon after being picked, has so far limited its trade to domestic boundaries; and may explain the government's reserve on the issue of official figures about its importance. Yet the large increase in the production of qat is directly related to the opening during the last decade of an extensive rural road network offering a previously non existant distribution system.

Animal husbandry is maintained at a modest level. Except for a few large herds of sheep and camels, seen mostly in both the Eastern and the Western Lowlands, the number of animals in each farming unit is only that necessary to assist as draught and load beasts and provide the household needs of milk, cheese, butter and, occasionally, meat. Sheep, goats and camels graze freely but cattle are normally handfed. The number of animals has moderately increased during the last 20 years, particularly for sheep and chicken.[8] Since poultry farms were introduced, in 1978, their output has multiplied forty times. Their corrugated metal shacks have become a feature of the built environment in many rural areas.

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[5]Dostal:86, p. 358.

[6]The combined production of coffee and qat, however, did never exceed 10 % of the cultivated land. See Kopp:88.

[7] Research on the use of qat was sponsored since the early '70s, in some cases with the declared intention of having it proscribed for its negative effects. It was, however, at the most, inconclusive about the deleterious effects that it was supposed to prove. Nevertheless, direct and indirect pressure has been applied by some of the societies that were responsible for the introduction in the country of such products as whisky and cigarettes, using often the argument of the negative impact of qat on traditional agricultural products. Opinions vary about this but so far there is no indication that qat replaced any of the essential crops, except in places where they would be abandoned anyway because of their low rentalility, introducing instead a source of cash in decaying areas. The U.S.A. finally, in 1990, put qat in their list of narcotics and prohibited its use in the premises of any U.S. agency or institution in Yemen, and Americans in the country were advised not to chew. In January 1992 the National Anti-Qat Association (NACA) was established in Sana'a (See *Yemen Times*, Jan 1).

[8]Thousands of units in 1978 and in 1988 (Source YARSYB:88)

Camels	60	63
Cattle	800	1.000
Sheep & Goats	2.500	4.400
Local Chicken	2.500	4.500
Farm chicken	500	19.000

Top -Terraces in the mid 'seventies at the Hujaryia (*left*) and Haraz (*right*); *centre and bottom* -Terraces in 1990 at Hajja and Yasla

1.2- Terraces

At the beginning of the 1980s arable land was equally distributed between the fairly flat alluvial fields, both of the Tihama foothills and the Central Highland plains, and the terraces that characterise the rugged Western and Southwestern flanks of the Highlands. The area of the former was increasing over that of the latter because of being better suited to mechanised farming.

Terracing is the elaborate process required to obtain and retain arable land and prevent erosion by establishing a control system for run-off water, in mainly rain fed land. Terraced slopes extending from the valley bottoms to the peaks of endless slopes fading into the horizon constitute nearly one third of North Yemen's territory. The importance of terraced fields throughout Yemen's history can be illustrated by the report that Queen Arwa (early 11th century CE) spent the budget of a whole year to help farmers restore and expand terraces.[9]

The size of each individual terrace varies but is seldom large enough to allow proper utilization of standard agricultural machinery. On the contrary, the terraces are often so narrow and located in such a way that the obvious effort put into building them seems disproportionate to the fractional productive land thus created.

Terraces are the work of generations of continuous care and maintenance. Small breaches which might be repaired within the resources of each farming unit, if neglected, carry the seeds of disintegration for the terrace system and eventually the destruction of larger adjacent areas. Once the retaining walls have collapsed and the terraces have eroded, their reconstruction becomes prohibitively expensive.

During the 'eighties the decay of the terrace system became noticeable throughout the country.[10] Less productive terraces were abandoned and wall maintenance neglected. There was also the direct damage from external agents, such as the action of tractors too heavy for the retaining walls and the construction of roads, displacing large volumes of earth and upsetting the drainage pattern to the terraces below.[11]

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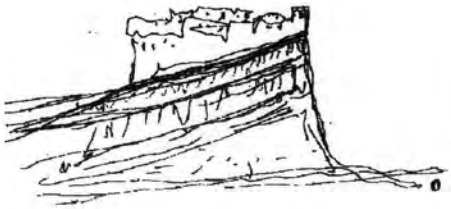
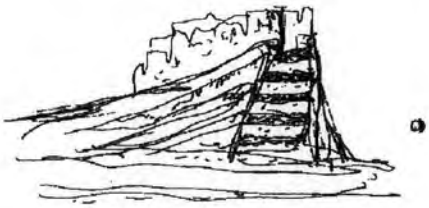
[9] Piepenburg:83.

[10] According to Swagman:88 in the Rayma region alone more than 500 terraces were abandoned in 1983. In Hajja, a district where the most striking examples used to be found, more than 20% of the land was already abandoned by 1981 (YARMAF:81).

[11] Swagman, p. 83, reports "*strong protests from farmers arising from the damages done to the terraced slopes*" on the occasion of the construction of a road in the Ryma mountains. See also Nyrop:86.

From top to bottom - Terrace erosion in 1990 at Hajja, Al Tawila and Sumara. *Centre right* - Terraces near Al Tawila, 1990 (writer's notebook)





The effects of the country's economic revolution on agriculture are inevitably reflected in the change of attitude involving participation in the work load required by the traditional methods. For instance, the emphasis on "labour intensity" appears to be decreasing when describing the evolution of the agricultural territory .

From the mid 'seventies onwards, alternative work opportunities increased both in the urban centres and abroad. Yemenis have always emigrated[12] in numbers that depended on the circumstances of the time and the population that the land was capable of feeding. After the 1974 oil boom, Yemeni labour, especially in the construction industry, started to mount significantly in the neighbouring rich countries. By the mid 'eighties, there were almost as many males working outside as within Yemen.[13] This meant a dramatic reduction of the male rural work force in precisely those areas where work was hardest. At the same time, remittances, although sometimes utilised directly in farm improvement and well-drilling were usually spent on housing, trade, transportation and services.[14].

Other components entered the picture. For example, the first foreign and government aided large scale agricultural programmes were concentrated on the largest level areas, where mechanisation was easier and results quickly became visible.[15] The expansion of a national mandatory schooling system indirectly contributed to a number of changes. One was a reduction of support labour by which children help their families according to their capabilities. This also meant a rupture between the routine apprenticeship process of farming practise and a school education which introduced the vision of a different - and tempting - lifestyle in the future.[16]

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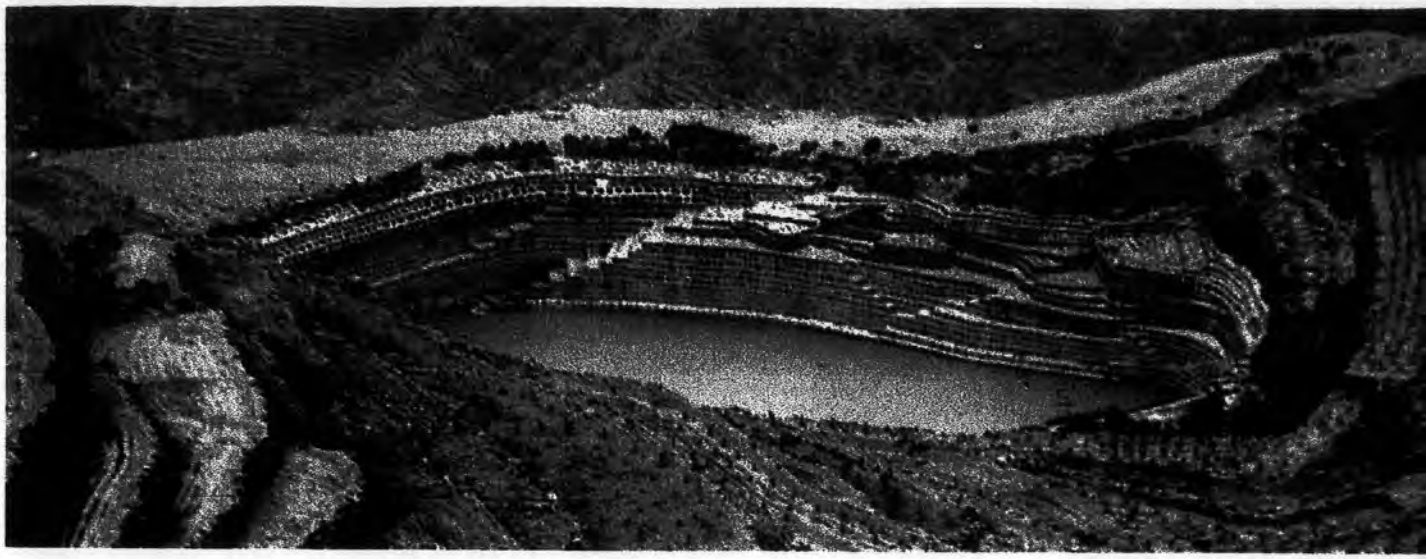
[12] See Nyrop:86 and Swanson:79. Since pre-Islamic times Yemenis migrated to Northeast Africa, a trend that continued well into this century; in the armies of Islam they reached and settled in the westernmost ends of the Maghreb and Southern Europe; since the 19th century, they have gone to places as distant as the Far East in Asia and the West Coast of the United States.

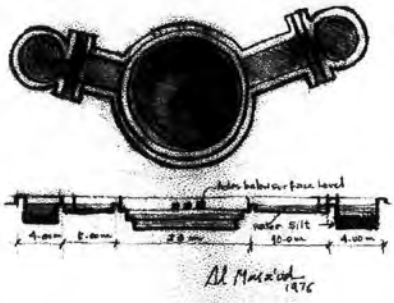
[13] YARSYBs, Nyrop:86. This may have been a peak; in the years that followed construction in the rich oil producing countries - the major employers of Yemeni emigrants - decreased at the same time that a cheaper labour force was being offered by far-eastern workers. Then, following the 1990 Gulf War and the support of Iraq by Yemen, retaliation measures involved the massive expulsion of the Yemenis.

[14] In the mid 'eighties and according to Varisco,p. 80, the two most significant influences on rural productivity were the impact of remittances and the production of qat.

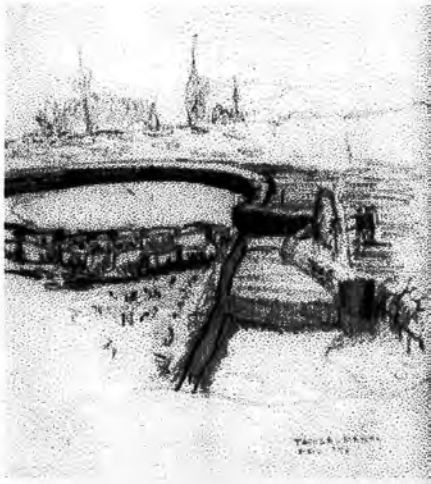
[15] For example, Wadi Mawr, Wadi Surdud and Wadi Zabid.

16 Between 1970 and 1988 the number of schools grew from 768 with 1,743 classrooms to 7,783 with 40,258 classrooms and the number of students increased from 65,526 to 1,300,698 (YARSYB 1971 and 1988)





Top, centre left and bottom left - Ma'jil at Shahara, Yazil (B.Matar) and Kitba (Khubban); *centre right* - Ma'jil at Al Masa'ud and Tawila (writer's notebook); *bottom right* - canal in orchard at Wadi Dahr (photo S. Kennedy)



1.3-Irrigation

Soil, although scarce, is fertile, and the main conditioning factor for agriculture in Yemen has been the availability and distribution of water to the fields. The farming calendar is influenced by the seasonal rainfall and much care has been put into maintaining irrigation systems. These vary from region to region and can be be grouped in categories described as rain fed irrigation, spring irrigation, spate irrigation, traditional lift irrigation and motor pump irrigation.

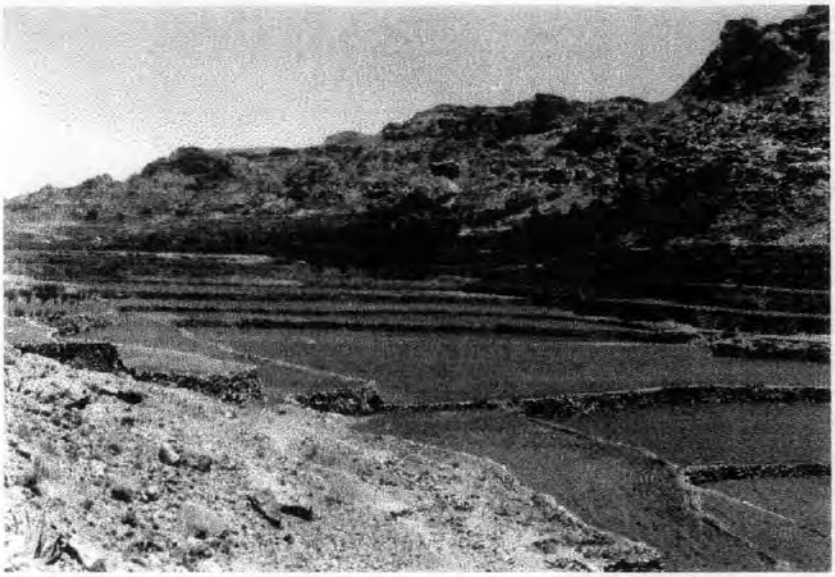
RAIN FED IRRIGATION

Rain fed agriculture comprised 85% of the total of cultivated land in 1972 and 59% in 1988. In the highlands, terraces help to maintain and direct rain and run-off water. Uncultivated areas are run-off surfaces, and by opening ditches the farmer diverts the water from these to the adjacent cultivated fields.

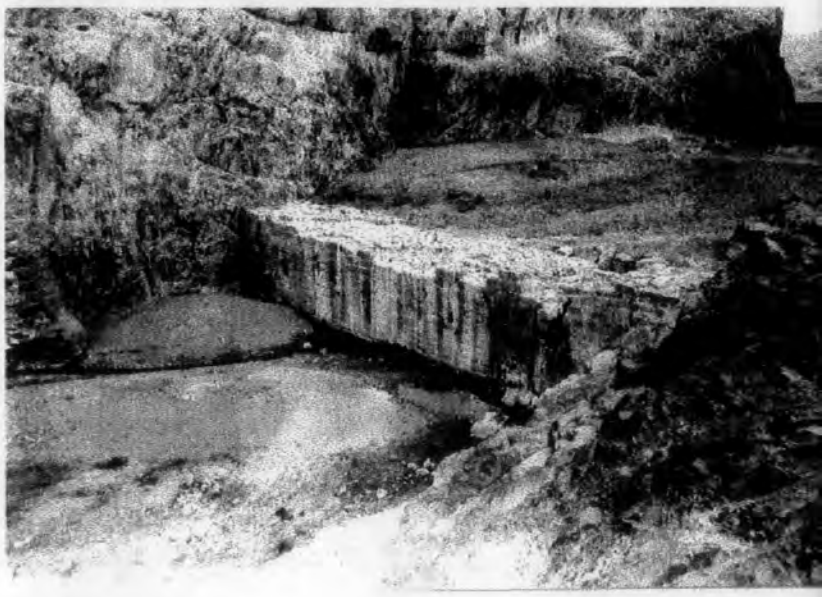
Rain, run-off and spring water is often collected in natural or man-made basins (*ma'jil*). These appear in a variety of forms and treatments, the most elaborate being made of hewn stone and rendered with lime mortar as waterproofing. Generally they consist of a basin made of concentric large levels accessible by smaller steps. Many have silt chambers or pits, connected to the basin, to filter the surface flow. The walls may be perforated below surface level to collect subsurface run-off water. They are often locally said to be "*himyari* " but scholars do not entirely agree as to their pre-Islamic origins. It will be seen later how the ablution pools of mosques, named differently, may have similar forms and perform similar services.

In many cases these cisterns were not only used for irrigation but also supplied the domestic needs of the community and could be located in the centre of settlements. Water for domestic use, however, was generally transported by donkeys or hand carried by women, sometimes for long distances from the source in the valley to the settlement uphill.

Remains of elaborate works bringing water from springs and catchment areas , with basins or wells at different levels and connecting underground and surface ducts, were seen in Habur, Sanhan, Ibb, Dhi 'Ashra and other parts of the country. The city of Sana'a was supplied by systems of this type, built on the initiative of rulers, on the Persian *qanat* principle and known locally as *ghayl* (literally spring or running stream). The oldest recorded was attributed to an Abbasid governor of Persian descent ,



Top left - Farmed wadi bed, Al Tawila; *right* - Driving through Wadi Surdud; *centre* - Underground cistern locally said to be "*himyari*", Al Hada; *bottom* - remains of pre-islamic dams at Bainun, Al Hada (*left*) and Tana'im, Sinhan (*right*)



early in the ninth century and destroyed by the Tahirids six centuries later. Many were used to irrigate the town's and the ruler's orchards, but some served domestic needs such as the *ghayl Al Aswad*, which totally ceased active use during 1973.[17]

The tradition of building both the waterways and cisterns is now lost. Many have been abandoned or destroyed, with their role as a water supply being replaced by drilled wells operated by motor pumps. However, in recent years, both the Central Government and the Local Development Associations have been active in the building of reservoirs.[18] These have no particular design or construction characteristics, usually being basins set in natural or excavated depressions of the ground and, at the most, with a concrete wall lining.

SPATE IRRIGATION

Near the mouths of the wadis, in the Western and Southern Midlands, earth barrages are erected every year as a means of diverting the flood to canals distributed through the fields. In times of very heavy rain the torrent might wash away the earth works and flood the downstream fields. The precariousness of the retaining structures represents to a certain extent a safety device for critical water levels. These and similar works have been much damaged by motor vehicles traversing the wadi beds which in many areas are the only accessible vehicular route .

Under the Republic, agricultural projects in the lower wadis developed spate irrigation methods, with the help of bulldozers to make larger and more solid dams and canals. Government reports indicate an increase in irrigated land of as much as 50% in some of these projects with new irrigation networks averaging 50 kms of extension for each.[19] Nevertheless, the percentage of cultivable land by spate irrigation has proportionately reduced from 8% in 1972 to 6.4 % in 1988.

Remains of the irrigation works that were part of Yemen's ancient historical achievements abound especially in the eastern slopes. Impressive examples are the canals tunneling through the hills of Bainun but especially the Marib dam. This was a barrier to control and distribute the irregular floods that could very quickly represent quantities of water as large as 1700 m3/sec. The 500 m wide gap between the

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[17] Serjeant & Lewcock :83,p. 19.

[18] YARMAF:89 reports 38 dams and reservoirs completed and 24 under construction in 1989.

[19] YARMAF:89.

Top left - Spring and canal, Arhab; *right* - well in the fields of Yasla; *centre and bottom* - wells in Dhamar and Al Rhawda

Balaq Hills was barraged by a high wall and, at both ends, massive structures collected the water in "stilling basins"[20] where its turbulence was lost; thereafter it was channeled through large canals, leading to the oases and stored in basins with up to 15 closeable outlets. These connected to a distribution network, which was successively subdivided so that it came to cover a total area of almost 10 thousand hectares, yielding two crops a year. The distribution of water was regulated by law.

In 1984, with the financial help of the Amir of Abu Dhabi, who claimed descent from the Saba tribes, the construction of a new dam began near the original Marib structure. The dam, 40 meters high has a capacity of 400 million m3. The main irrigation network is 53 kms long and serves an area of 7000 ha. Both the dam and the main network were completed in 1986 and the construction of a subsidiary system of canals, 88 kms long, was started in 1987.

SPRING IRRIGATION

In the Central Highlands springs are the most important source of irrigation of perennial crops, fruit trees and vegetables. They form characteristic "green gardens" often with different crops in the same field. As mentioned before, they may be connected to dug cisterns (*ma'jil*) and could incorporate complex systems of water collection and conduction. Paradoxically, the introduction of modern metal and plastic piping has not been fully exploited to expand irrigation areas. In fact spring irrigation declined from 5% to less than 2% of the cultivable area.

Some areas irrigated by springs are also facing a new threat in that their waters are channeled to augment the water supply of nearby major urban centres .

TRADITIONAL LIFT IRRIGATION

Wells dug at low depths were used to supplement shortages of surface water, both in the lowlands and in the central mountain plains. Steffen points out that "*lift irrigation allowed the limited cultivation of more demanding crops (e. g. grapes, coffee, vegetables) rather than the extension of agricultural land use into marginal, arid zones* ". [21].

Water was drawn out by men or by animals. In the highlands wells were often designed with an adjacent long ramp which made the task easier - going down loaded, and up when emptied. Leather bags were the

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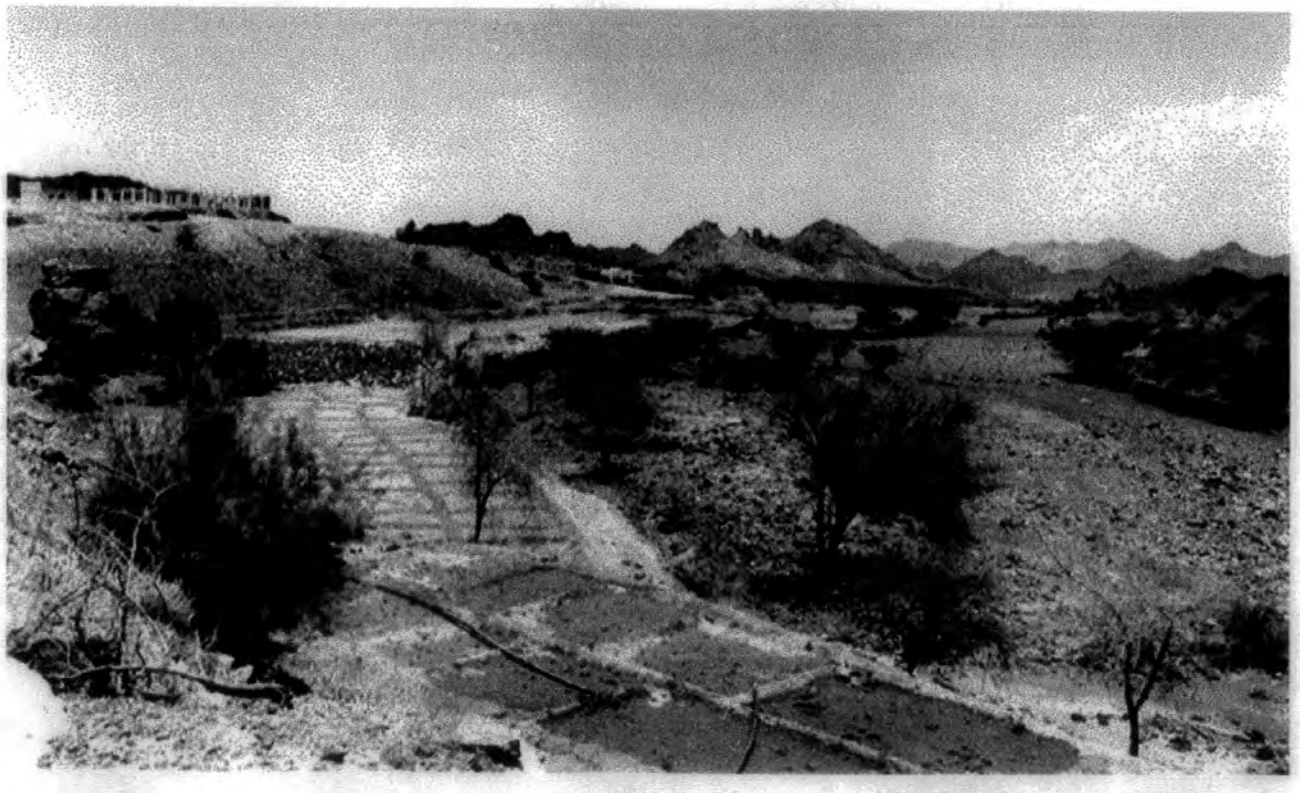
[20]Schmidt:88, p. 55 to 59.

[21]Steffen:78, p.I-37.

Top left - Well near Abs, Northern Tihama; *right* - Well, Sa'da; *bottom* - Wadi and fields, Juban



traditional containers. The proportion of wells for the irrigation of cultivable land was never large[22] and has diminished in favour of motor pumps and drilled wells.

MOTOR PUMPS

Since the mid 'seventies motor pump irrigation has developed to the point of irrigating 9% of the cultivated land in 1988. In 1979 pumps were used only in the Tihama and the Eastern Plateau. The introduction of money into the farmers economy - mainly emigrant remittances and the cultivation of qat- has however stimulated widespread drilling often to depths of more than 200 m.

Indiscriminate boring is depleting aquifers and, in the Tihama, subsurface water levels are increasingly infiltrated by saline water. Various programmes are being studied or nominally implemented at governmental level[23] but in many areas critical levels have already been reached.[24]

A major consequence of pump irrigation is the changed pattern of agricultural land use resulting in the present picture of terrace neglect. It enabled agriculture to expand to flat areas fit for mechanised methods, which had never previously been cultivated, because of lack of water at accessible levels by manual means. Better returns could thus be obtained without the effort required to built up and maintain a terrace based, rainfed agricultural territory.[25]

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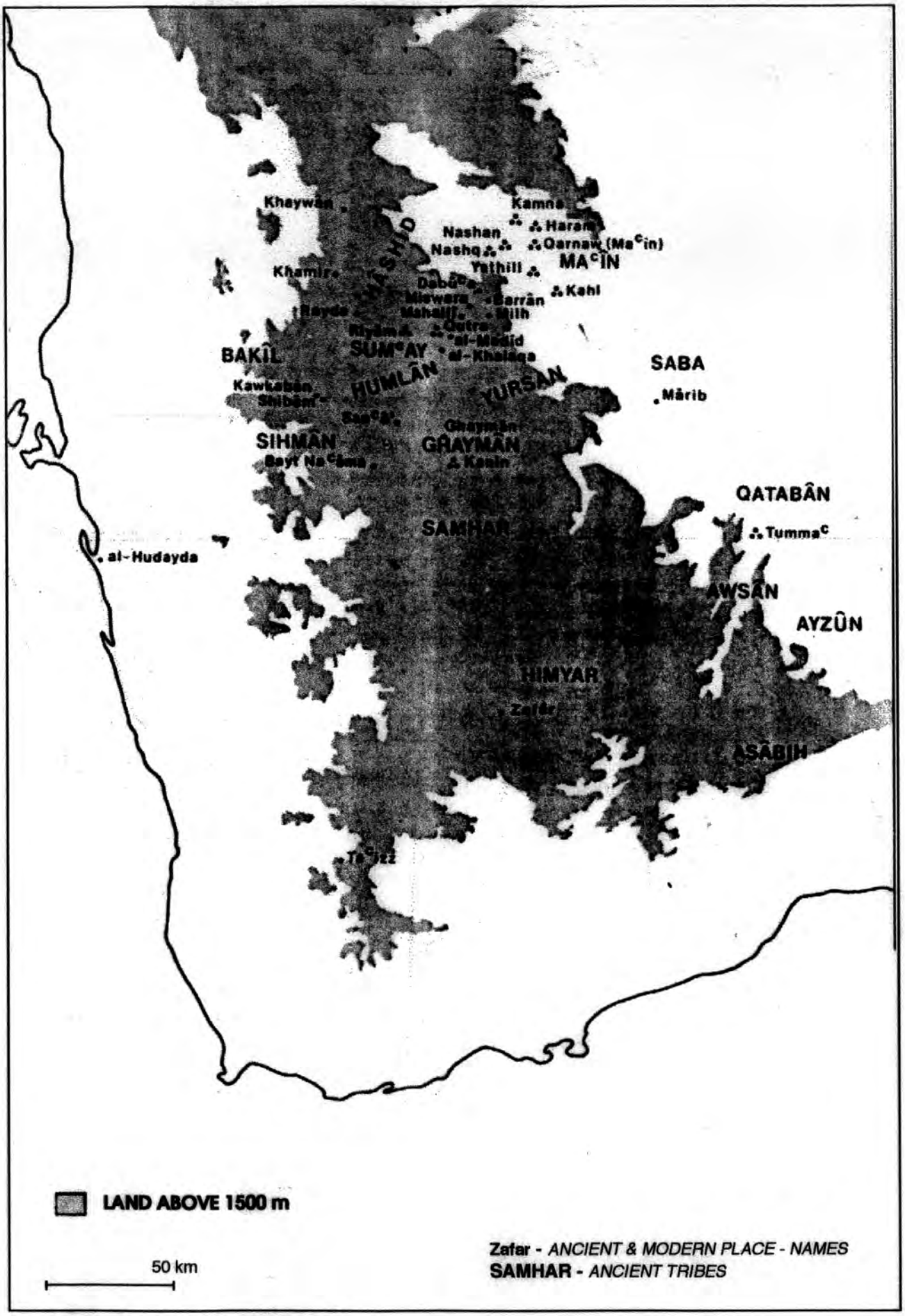
[22]In 1972 only 2% of the cultivable land was irrigated by drawn wells.

[23]The actions programmed by the Government involve a wide range of applications going from improving and increasing irrigation and potable water supply by the construction of dams and reservoirs and controlled drilling, to nurseries (aiming at reforestation), seed improvement and pest control stations , veterinary attendance, and the establishment of local distribution stores and a Cooperative and Agricultural bank, to finance farmers and cooperative projects.See YARMAF:89.

[24]See YAR National Water and Sewerage Authority: "Reapraisal of Sana'a Water Resources", 1984; also YARMAF.

[25]Kopp:88.



Pre-islamic South Arabian Tribes (after Robin:82)

Section 2 - Protecting the territory

2.1 -Tribes

Tribes are the core of social organisation in Yemen. In pre-Islamic times the major tribal groups of South Arabia coincided with the states that developed in the lower wadis of the eastern and southern slopes[26] and which eventually expanded to the Central Highland plateaux. The primitive tribal groups appear to have been based on the acceptance of the same gods. Admission to a tribe involved the adoption of its deities and the obligation to participate in their rites.[27]

Two major types of tribes appear in pre-Islamic Yemen.[28] Those of the Eastern Midlands, just refered to, placed great importance on blood ties, and were based on parentage at least as much as on land ownership. They had large populations living on relatively small areas of intensively irrigated agricultural land. They also had sizeable towns and a statal system .The Highland tribes by comparison were small agricultural communities, with a smaller population controlling a vast, albeit mostly arid, territory. Tribal affiliation was based solely on land ownership. Federations and confederations linked these communities and were similarly based on the possession of land.[29]

The disarticulation of the South Arabian states following the shift of the incense road to the sea, offered a new role for both the highland and the desert nomad tribes. With the Islamic conquest the penetration of the latter imposed a conception of the tribal system based on common descendance from an eponymous ancestor.[30]

The genealogists of the desert tribes, adding to the glory of having the Prophet issuing from their families, made themselves descend from Adam, through his son Adnan. Autochthonous genealogists, in turn, emphasised the greatness of the Yemeni past and found in Qahtan, Adnan's brother, the common ancestor for the mountain tribes. Thus, for instance, the Hashid and Bakil, the two most important confederations of the Highlands, have , since pre-Islamic times, been the two halves of a larger entity called Hamdan, and a genealogy was accordingly elaborated in which Hashid and Bakil were the sons of Hamdan, who, in turn,

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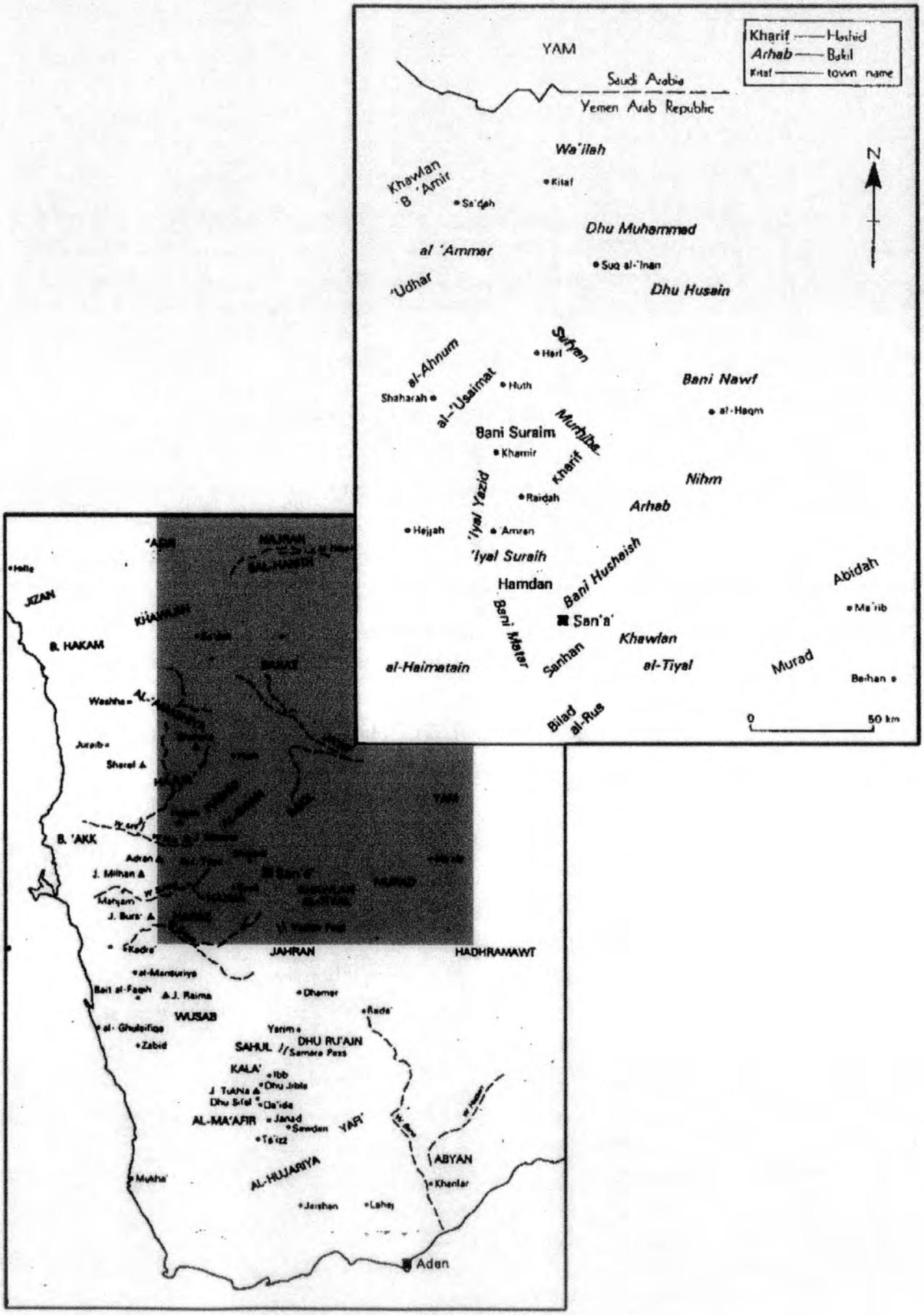
[26]Ma'in (Wadi Jawf), Saba (Wadi Adhana), Qataban (Wadi Bayhan), Awsan (Wadi Markha) and Hadhramawt, at the wadi of the same name.

[27]Robin:88 says that " *as the covenant was sealed among the tribes, it was put in practice by common worship. Thus the sanctuaries of all tribes had to be equally accessible...*"

[28]Robin:82.

[29]Robin:82, Dresh:84.

[30]Robin:82.



Top - Tribes of Upper Yemen (source Dresh:84); *bottom* - Medieval Yemen (source Gochenour:84)

descended from Qahtan.[31]

The nomad tribes have remained on the Eastern slopes, and maintained their characteristic fierce independence and pastoralism. A number of them, however, became sedentary and found a fairly important connecting role with the tribes of the Central Highlands.[32]

A parental type of explanation for the origin of Yemeni tribes, unlikely as it may be for those of the Highlands, gave the tribes of Upper Yemen[33] the means of maintaining the stability they still evince. Only small territorial variations have occurred since the early Islamic times, caused by alliance rather than conquest.[34]

In the Lower Yemen, below the Sumara pass, tribal organization has not the same strong appearance.[35]There, the establishment of the Himyarite state favoured the formation of small fiefs, ruled by aristocratic families with a seat near the central power, with land worked by peasant sharecroppers. The ensuing rulers (the Ayyubids, and particularly the Rasulids) continued and refined the feudal system creating an efficient direct administration where civil servants replaced the tribal chiefs in the representation of their subjects to the sovereign. Unlike Upper Yemen there was no sharp social distinction between peasants and service providers.

The principle of land ownership, essential to a tribesman in the Highlands, carries with it the guarantee of food self sufficiency establishing the tribe's autonomy. Hence the historic emphasis on staple crops such as cereals. On the other hand, land tenure is fairly equitable, land being seldom owned in disproportionately larger shares than that of other tribesmen.[36]

The tribal system, as at present developed, is basically that of pre-Islamic times: a hierarchy of structured groups, composed by sections and subsections and ruled by a leader commonly designated *shaykh*, who is both a civilian and military chief and the dispenser of justice according to the customary tribal law (*'urf*) . The levels of group division do not

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[31]Dresh:84.

[32]Gochenour: 84.

[33]"Upper Yemen " and " Lower Yemen" are designations frequently used by social scientists and historians. Applied to North Yemen, they emphasise the identification of natural characteristics with the social and tribal structure of the country. The separation between the two zones is made roughly at the Sumara pass, in the region of Ibb.

[34]Robin:82 Dresh: 84.

[35]Stookey:78, p. 50, states that *"there is no organized tribal system and traditional genealogy."*

[36]Dresh:84; Gourchenour:84.

Top - Muslim and Jew at Sa'da, 1973; *bottom* - Weavers at Mithal, Al Hada

necessarily have a specific name and are often referred to as fractions of the whole. Swagman[37]illustrated the physical dimension of these segments in the area he researched: thus a subsection might cover 20 to 25 km2 with 10 or 20 villages; a section would comprise 4 or 5 subsections, with five to ten thousand inhabitants extending over an area around 100 km2; and a tribe with a number of sections, comprising a total of thirty to forty thousand members , would spread over several hundred km2.

The leaders of federations are often called *shaykh al-mashayikh* (the shaykh of shaykhs) and those of confederations as *shaykh al-daman*, implying the notion of responsibility toward his tribesmen warranting their obedience on the battlefield and in times of peace.[38] The leaders are normally elected, the autonomy of the shaykh usually being checked by a council of elders.[39] Although the position can be hereditary, it can always legitimately be challenged if the tribesmen withdraw their confidence.

Tribesmen are considered to be socially equal. The tribal code reflects values based on bravery (*muruwwa*) and honour (*sharaf*), involving the notion of territorial inviolability, meaning the right to close and the duty to defend and keep the peace within its borders, the tribe being answerable for whatever happens.[40] It is the tribesman's (*qabili*) right and privilege to carry weapons (namely the curved dagger *janbyia*); it is his obligation to offer protection (*jiwar*) to the "weak people" (*da'yf*) who do not carry them. This includes women and children and people of other religions together with servants, service providers, most craftsmen and shopkeepers (*muzayyin*).[41]

But if the occupations practiced by the *muzayyin* are not acceptable to the tribesmen and involve a rigorous social segregation, the same does not apply to those directly related to building. In North Yemen tribesmen are builders as much as they are farmers and warriors.[42] This may help to explain why it is not dishonorable for a tribesman to emigrate and work in the construction industry.

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[37]Swagman:88, p. 95.

[38]Obermeyer:82.

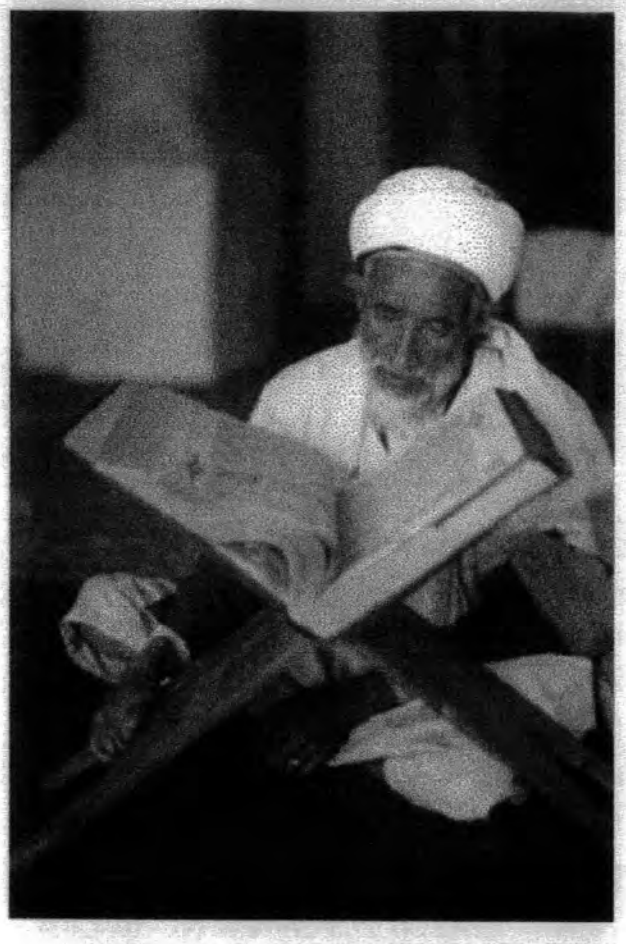
[39]Dostal:88.

[40]Dresh:84.

[41]For example, barber, butcher, bleeder, executioner, bath attendant, inn-keeper, potter, tanner, weaver, water-worker, public crier, *bayya'* (sellers in general such as grocer, coffee seller) See Rathjens, Bornstein, Dostal, Chelhod, Glaser and Al-Attar, quoted by Stevenson:85, p. 94. In Sana'a and other areas the *muzayyin* correspond to the *Bani Khums*, who have no tribal status but are enabled to own land and carry a dagger; and the *akhdam*, who cannot own land or carry arms at all and take the lower services, such as street sweepers. See Dostal: 83, p. 254.

[42]Dostal:88,p. 365, points out that in the Hadhramawt some professions related to construction - brick layer, mason - rank socially lower than other professions seen in Upper Yemen as the realm of the *muzayyin*.

Shibam, 1973 (photos K. Bird)



The tribes are also responsible for the protection of a distinct class having a high status, the *sayyid*, who consider themselves Hashimi or Adnani.[43] They are the descendants of the group of Alids that came with the first Imam, serving as mediators, under the *shari'a*, and performing functions such as religious teachers, scribes and astronomers. They were considered to be endowed with *barakah* (blessing) from the Prophet, through Ali, and were often believed to have healing powers. They were invited to settle in tribal areas and, in return for their services, given enough land for their needs. They carried weapons but would not become involved in tribal conflicts.

The lands and persons of the *sayyid*, their families and visitors were protected by the tribe's honour through the ancient institution of *hijra*, associated with places of mediation where "*the infliction of bodily harm is strictly forbidden*".[44] A similar notion, *haram*,[45] was applied to the places in tribal territory where the shaykhs were elected and markets held. Markets were frequently places where grievances were presented and public reparations made.

The pattern of settlement in the tribal areas corresponds to a segmental organization and is to some extent identified with the hierarchy of leadership. However, there are no dominant characteristics indicating the seat of a larger association - federation or confederation - of tribes. Hamlets (*mahall*) and villages (*qaryia*), generally with populations no larger than a few hundred people, are the basic settlements of the tribal structure. In some regions the village may comprise several hamlets, but the distinction between *qaryia* and *mahall* is not necessarily based on size but on its tribal characteristics and the identification of the village chief with the tribal leader.[46]

The administrative division issued from the central government since the first Turkish occupation tends to correspond with the tribal territorial boundaries, although the government representative does not necessarily correspond to the local shaykh.

The role and characteristics of the tribal system in the country that emerged from the Civil War were bound to undergo profound changes. On

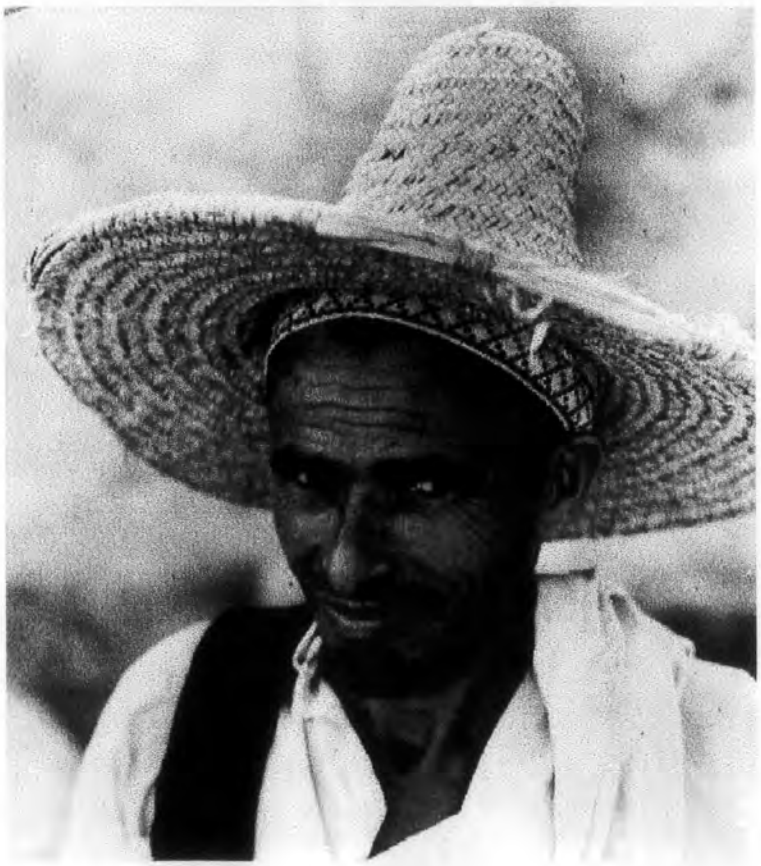
[43] Obermeyer:82.

[44] Dostal:88, p. 355.

[45] See Serjeant & Lewcock:83, p. 39.

[46] According to Dostal:88, *qaryia* is a settlement composed of various subsections of the same kinship, headed by a shaykh chosen from among the elders of the subsections. A settlement composed only by one subsection of the same kinship is under the *'ayn*, (or *'aqil*) who, because he is the eldest, has the right to decide alone.

Top left- Tribesmen dance in Hammam Ali (1974); *right* - Tribesman at Shahara; *bottom:* Tribesmen of the northwestern foothills *(left)* and Khawlan *(right)*



one hand, although the tribes sided with both the Royalist and the Republican forces, they have accepted the Republican government. Although tending to assert their autonomy in cases of grievance against the government and in the resolution of their internal problems, they supported attempts to solve national problems, notwithstanding the fact that they have also regularly been used by Yemen's northern neighbour as a means to pressurise the government. The integration of tribesmen in the regular armed forces and in parliamentary representation is seen as rallying their representativeness to national political and social unity. On the other hand, the remittances from the many emigrants to Saudi Arabia and the Gulf established a large cash flow and consequently the availability of machinery and convenience goods involving the tribesmen in a new entrepreneurial process. The dilution of the social differences between tribesmen and the service providers is a side effect: tribesmen now sell in the market; and former low status, landless people (e.g. the Bani Khums) can now purchase and own land.

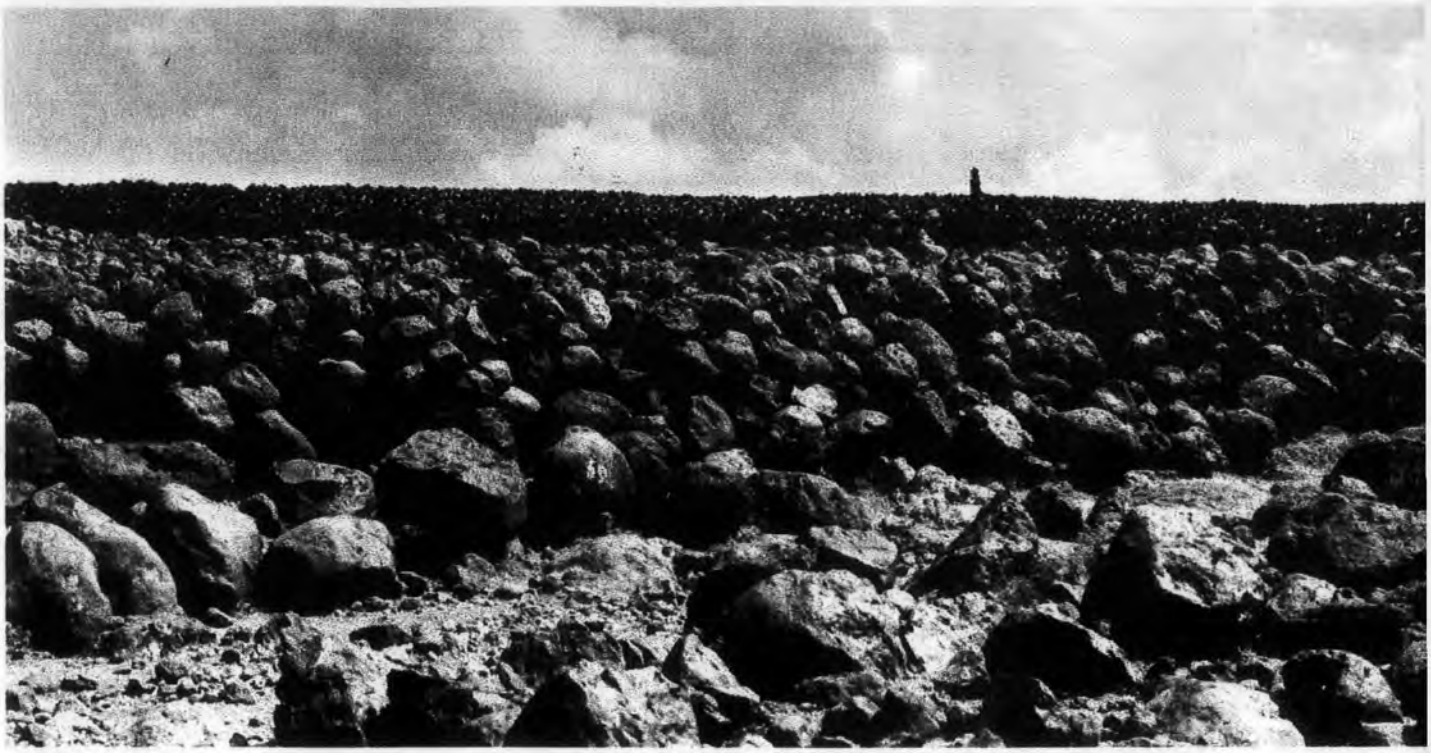
2.2-Land tenure and protection

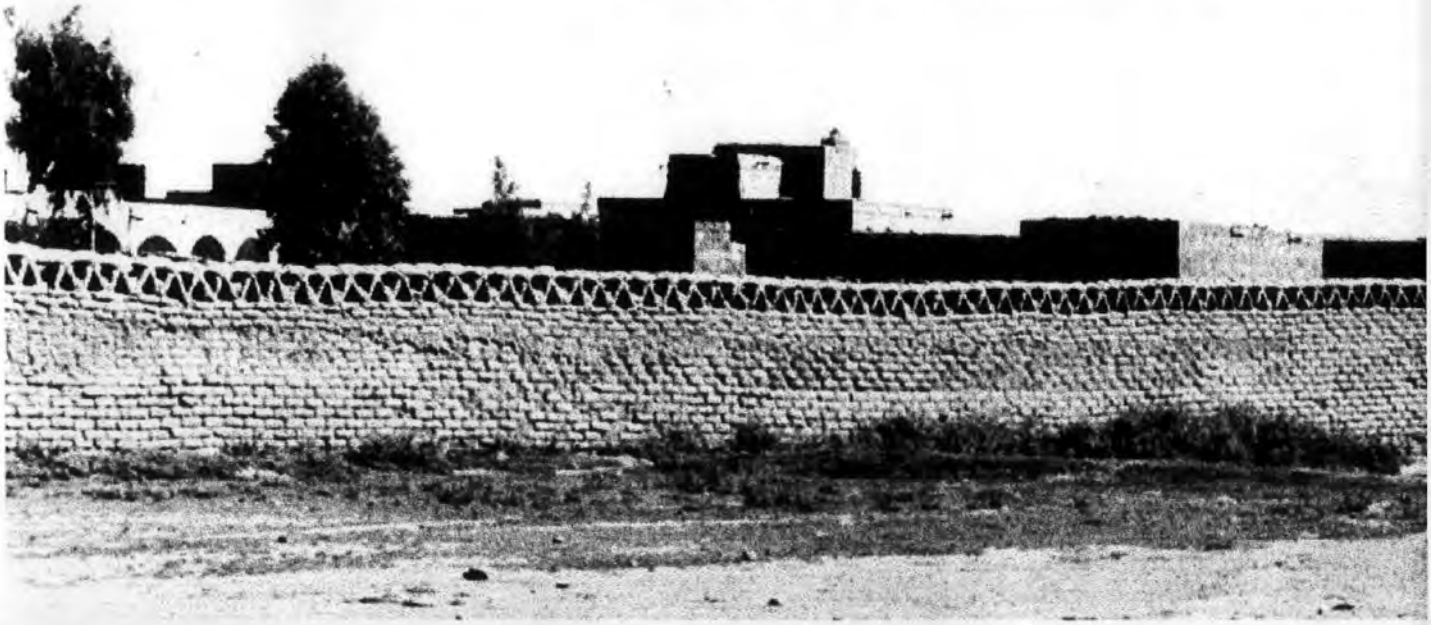
Agricultural land in North Yemen is of two main types : numerous small landowners farming their own land[47] or large land holdings belonging to a few landowners and worked by sharecroppers. The geographic distribution reflects tendencies indicated by other components . Thus, the Zaydi area of influence, in Upper Yemen, coincided with the strong and long established tribal system. In the Tihama and Lower Yemen, where Sha'fi dominated, tribal affiliation might be part of the individual claim for status but class stratification resulted from the feudal differentiation between possessing the land and working it.

Besides privately owned land (*milk*), which accounts for more than 70% of the total agricultural land, other categories exist: communal foraging grounds (*himi*), open to all the members of a tribe or community; state owned land (*miri*), a very small percentage, most of it fulfilling similar functions; and land deeded to the mosques (*waqf*) which is administered by the religious authority and represented by a government ministry (Ministry of *Awqaf*). *Waqf* land is estimated at being 15 % to 20% of the total land area and is sharecropped or farmed by community volunteers.

The use of land and access to water are major concerns and consequently

[47]Subsistence farmers tend to have their property scattered in small parcels over a large area, rather than in consolidated holdings. Supposedly this is to minimize risks and also a consequence of the fragmentation that comes from inheritances distributed among various beneficiaries . See Varisco, p. 70.



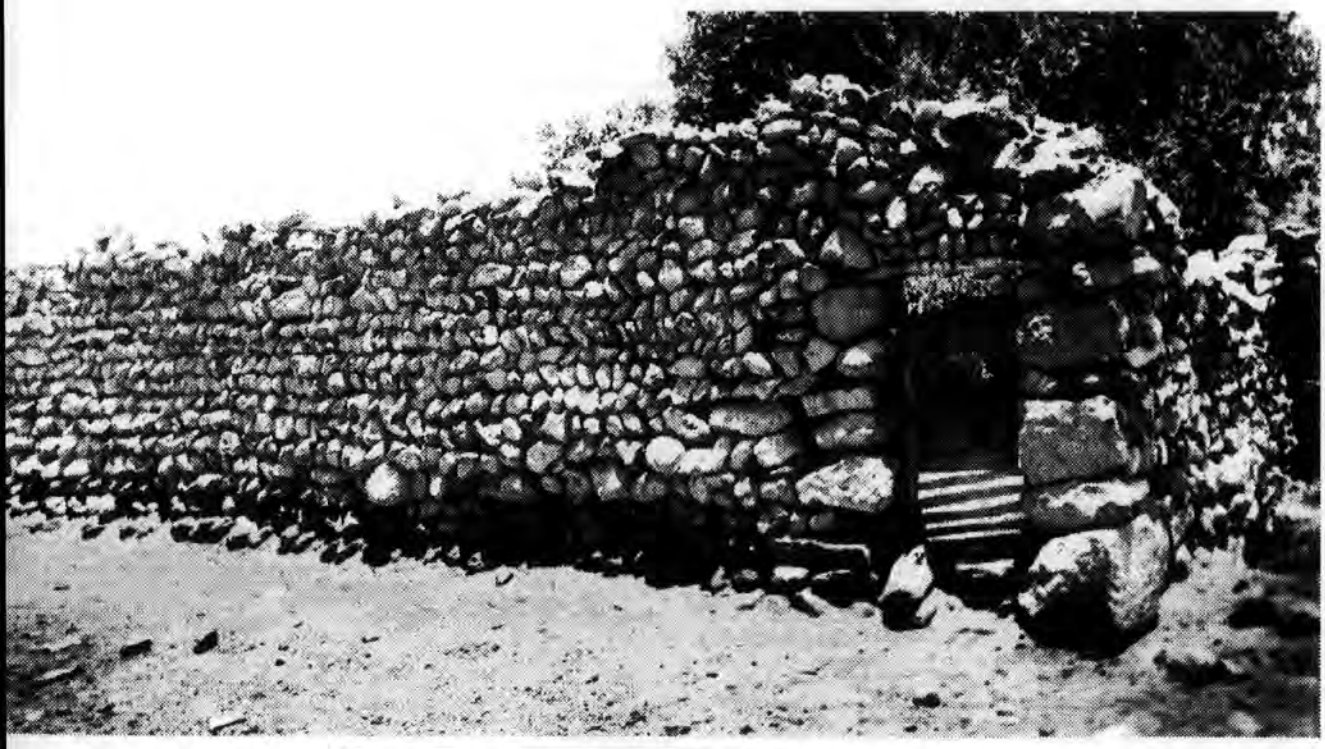


Top - Stone wall, Dharahan; *centre* - Sun dried mud block wall, Dhamar; *bottom* - retaining walls, Al Khuthayb, Haraj; *opposite* - Stone wall, Sinhan

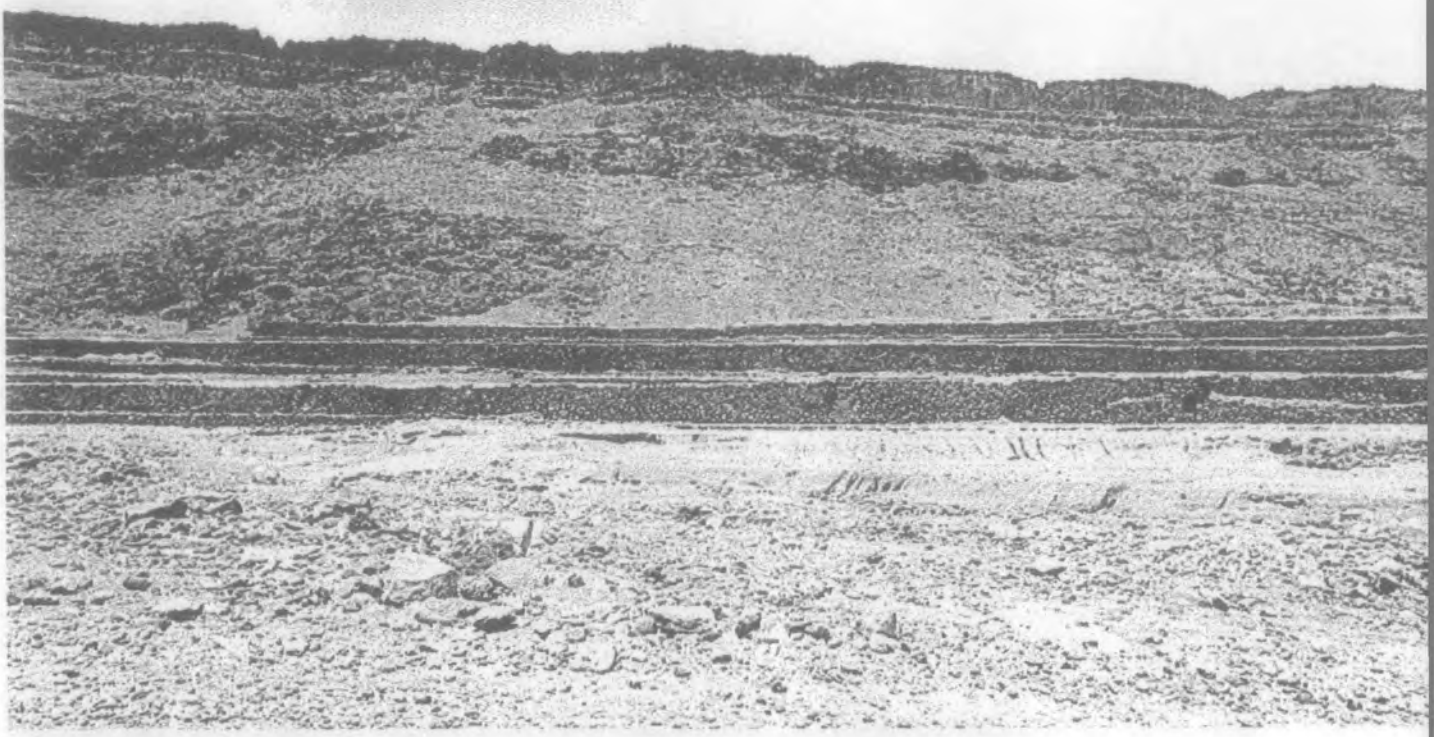
regulated by customary and Islamic laws and principles such as that water is essentially an ownerless source and a right that all Muslims share; that water rights are attached to land rights and cannot be alienated; and that most water sources are protected by an easement (*harim*) by which nothing shall divert or defile its flow. Similarly no obstacles may be raised to access to shared water sources or to its passage along a common channel. Spring water flow is shared by farmers whose lands are nearby, through a system of cyclical turns. which can be yielded up or rented but not alienated.[48]

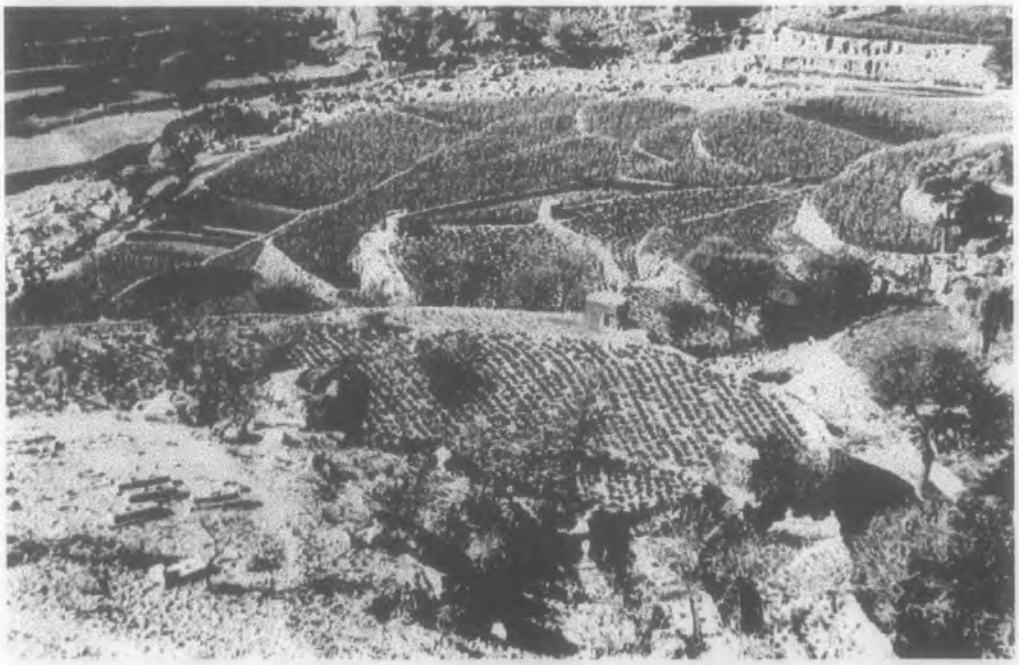
In the Highlands run-off water is often directed to the fields by lines of stones along the slopes. These may become permanent walls to discourage displacement to other than the intended fields.

Property boundaries of both land parcels and water lines may, in this way, be represented by loose stone walls extending over long distances. In the Central Highland plains the orchards are often divided by fairly high walls in stone or earth.



[48]Varisco, p.66.



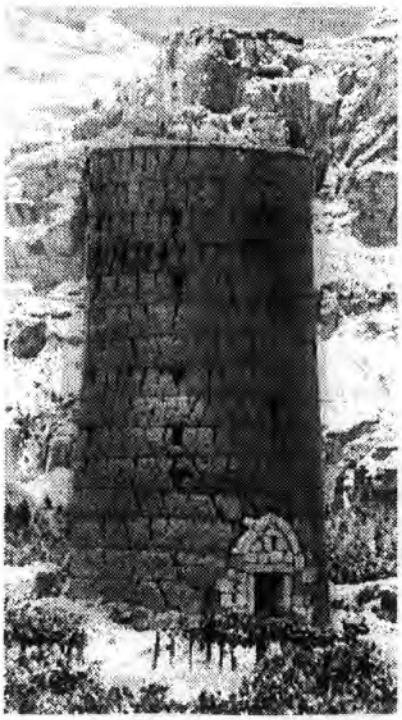


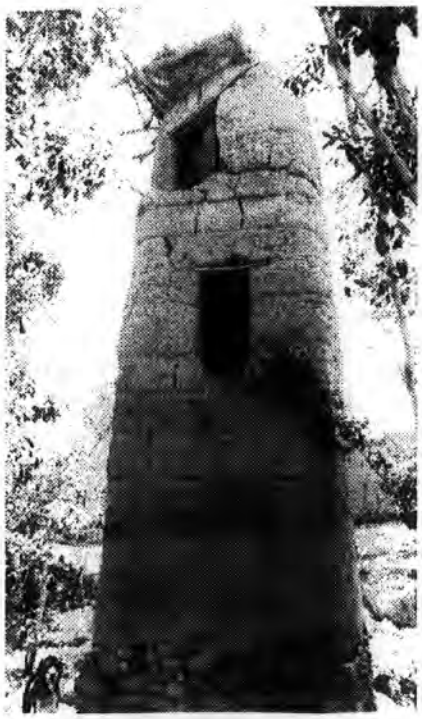
Top - Guard houses embedded in terraces, Dharahan; *centre and bottom, left to right* - Thula, Dhi 'Ashra (Khubban) and Juban; *opposite* - Tall guard houses at Rada', Al Ghuras and Al Sirr, Bani Hushaysh

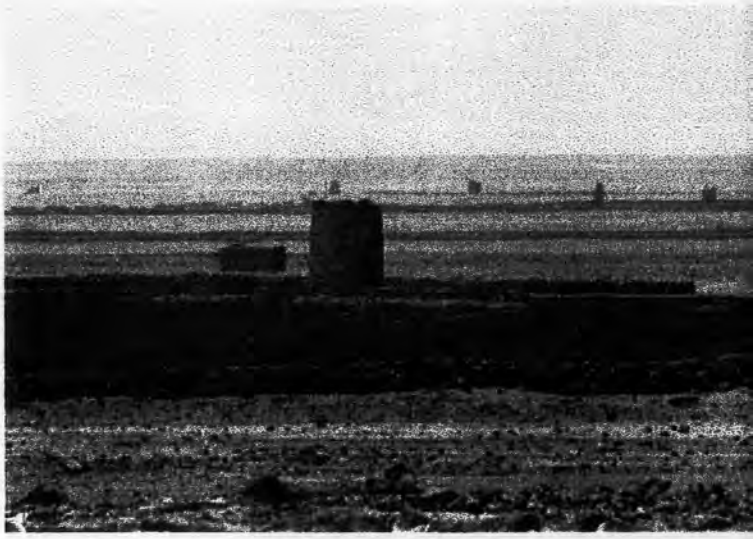
The protection of the fields is further ensured by guard houses (*dayma*), which are particularly evident in the case of valuable crops like qat. There are regional variations in form and materials, but at their simplest they are but one room stone or mud huts. Very often they are integrated into the terraces, appearing as an opening in the middle or at the ends of the retaining walls. Expanded forms may have two storeys, the top accessible by an external ladder and being the guard room proper, with the lower floor used for storage. Elaborate forms have an internal stair and become a close approximation to the watch towers of the more vulnerable plains in the Central, Eastern and Southeastern mountains.

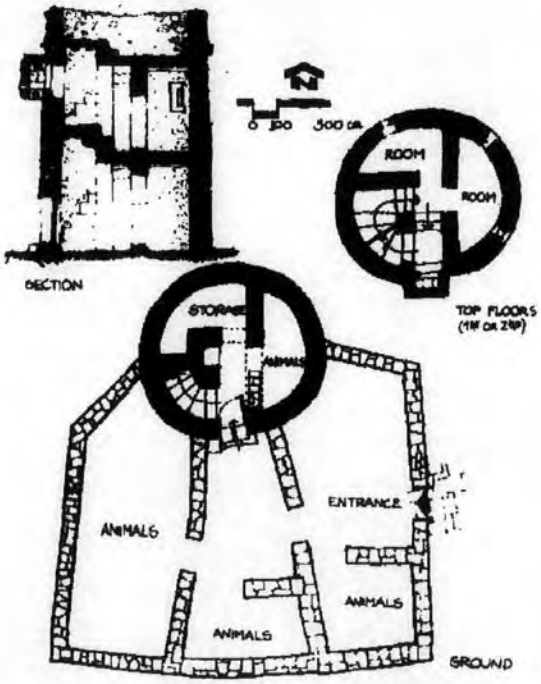
Watchtowers (*nawba*) fulfill a function of surveillance and protection for settlements in areas frequently subject to raiders and doubling as storage spaces in calmer times. Characteristically they feature one or more machicolations, shooting holes in the walls and roof parapets and, occasionally, spouts for pouring out hot oil. Internally, compartments are distributed around a central stair for two or three storeys. Sometimes adjoining roofless animal pens have been built, suggestiong occasional occupation by shephers or nomads.

As the embryonic form of a recurring mountain house type, watch towers occur as isolated structures and in clusters detached from the settlements. They may however become part of the settlement itself and be transformed into permanent dwellings. The use of the building for domestic purposes may be evinced by the elimination of defensive devices and the multiplication of decorative features.

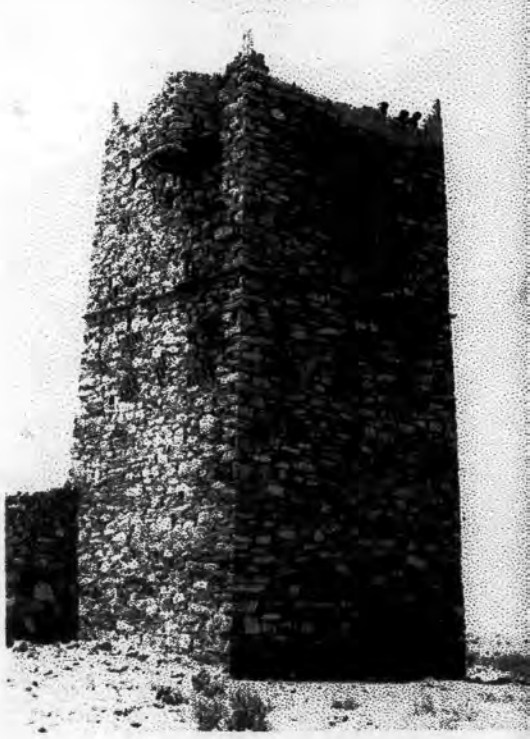








Towers at Bani Ghuthayimi, (*top*) Huth, (*centre*) Al 'Ashmur ('Amran), (*bottom left*) and Sha'ban (Al Baydha), (*bottom right*)



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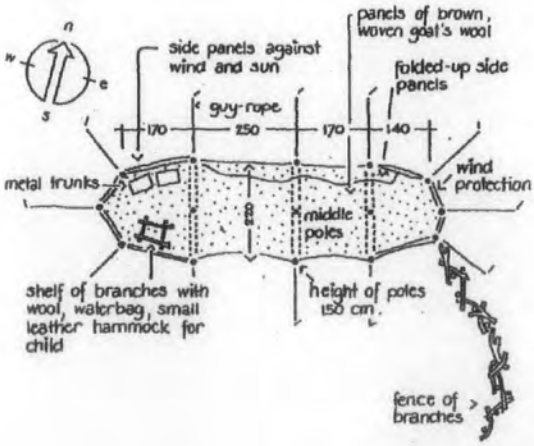
Top and bottom right - Simple nomad tents at the Barat slopes; *bottom left* - Tent at Al Ghrijra (Source Steffen:78)



CHAPTER 2: SHELTER AND SETTLEMENT

The environmental regions of North Yemen fall, basically, within three distinct physiographic groups - the Tihama, the Mountains and the Desert - with correspondingly strong cultural and constructional characteristics.

The range of aspects of the building process is best illustrated in the Mountains, and it is from there that most of the examples have been taken. Building in the Tihama is mainly covered by descriptions in later chapters. Dwellings in the Desert are only touched upon due to their limited relevance in the North Yemeni context.

Section 1- Elementary needs

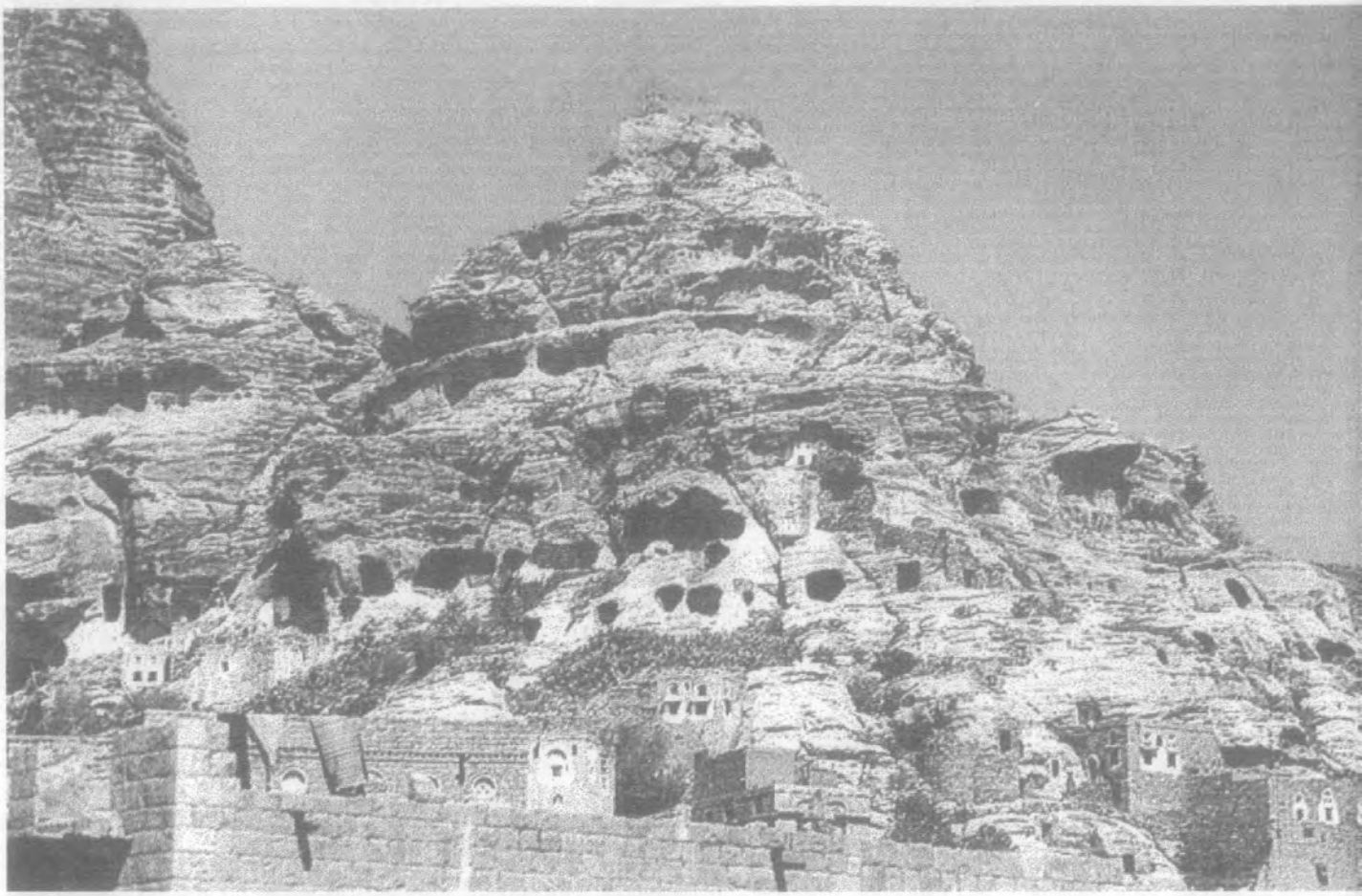
1.1 -Tent and Cave

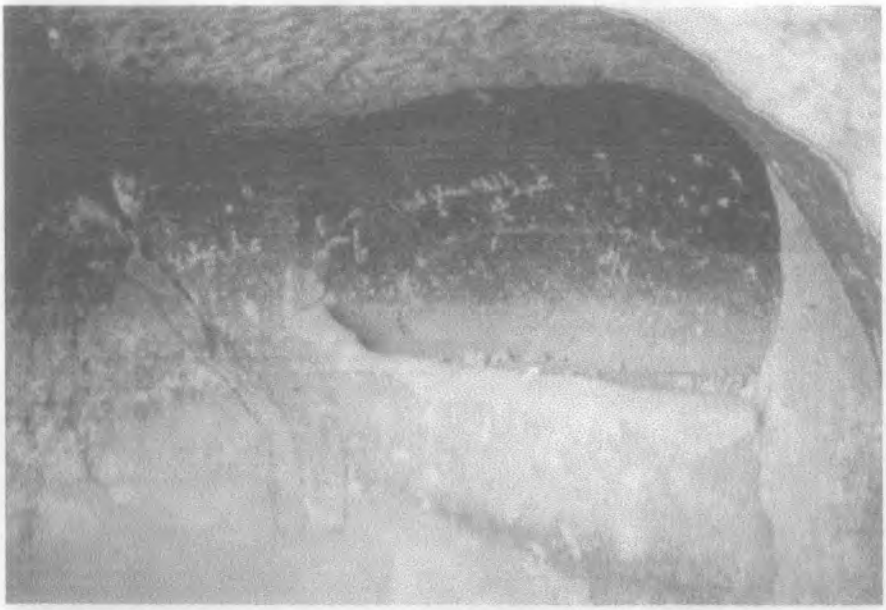
The most elementary forms of shelter observed in the mountains of North Yemen take two structurally opposite forms: the tent and the cave. One is the creation of a portable, totally manufactured, shelter, an extension into space of one's own clothing, implying total mobility. The other is the use of a natural feature for fixed shelter, involving little adaptation.

The nomads' tent typically seen on the lower Eastern slopes consists, in its simplest form, of a makeshift frame of branches or stakes covered with woollen rugs. Surrounding trees and shrubs provide additional shade areas and places to hang utensils, extra rugs and occasionally a crib. Sometimes only women and children sleep inside the tent, with the men sleeping on open ground.

More elaborate forms, in the grand tradition of the Arabian deserts, are described by Steffen: a frame of upright wooden poles, topped by carved mastheads, is anchored to the ground with ropes and covered with woollen strips, up to twenty metres in length and one metre in width, carefully sewn together. The sides of the tents can be left open or hung loosely to allow the circulation of air and smoke from the inside fire place. Blankets and rugs are used to cover the ground. One end of the tent, reserved for the bed, personal effects and household provisions, is often reinforced with additional rugs as protection against the wind and heat.

Cooking utensils, clothes and other household implements hang from pegs on the poles or from the guy ropes. Adjoining the tent is a yard surrounded by a fence of thorn scrub and branches to enclose sheep,



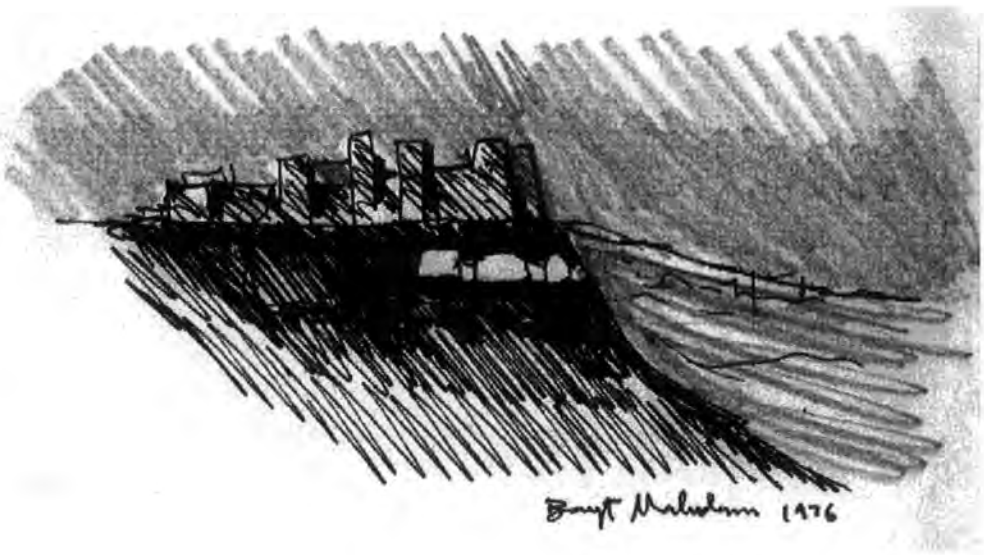


Top- Caves at Shibam; *centre* - Funerary "*himyari*" cave, near Al Mithal, Al Hada; *bottom* - Caves at Al Husn, the fortified outcrop overlooking Thula; *opposite* - Scheme of settlement in Bani Matar with caves opening to the slope of the village site (writer's notebook)

goats and cattle. A small shed beside the tent serves for the storage of water. Nowadays, as they progressively replace camels, four wheel drive vehicles and petrol drums are situated next to the beduin tents.

Natural caves adapted by man as well as man-made caves abound in the Highlands. They have served the temporary needs of nomads, shepherds and wayfarers but many have been made into permanent dwellings and some show a high degree of elaboration of the interior, with plastered walls, carvings, and niches.[1] The Northern, Central and Eastern Highlands are particularly remarkable for the number and clustering of caves used both for funerary and living purposes, which suggests the earlier existence of organized communities of cave dwellers.[2] In times of war the caves have sheltered both refugees and military garrisons.[3]

Communities also exist that are built above a complex of caves, creating an underground network connected to the house of the shaykh or village leader as at Dharahan. In peace time they are used as stables, stores or granaries In troubled periods the population takes refuge underground and is able to escape through exits situated beyond the settlement's perimeter.

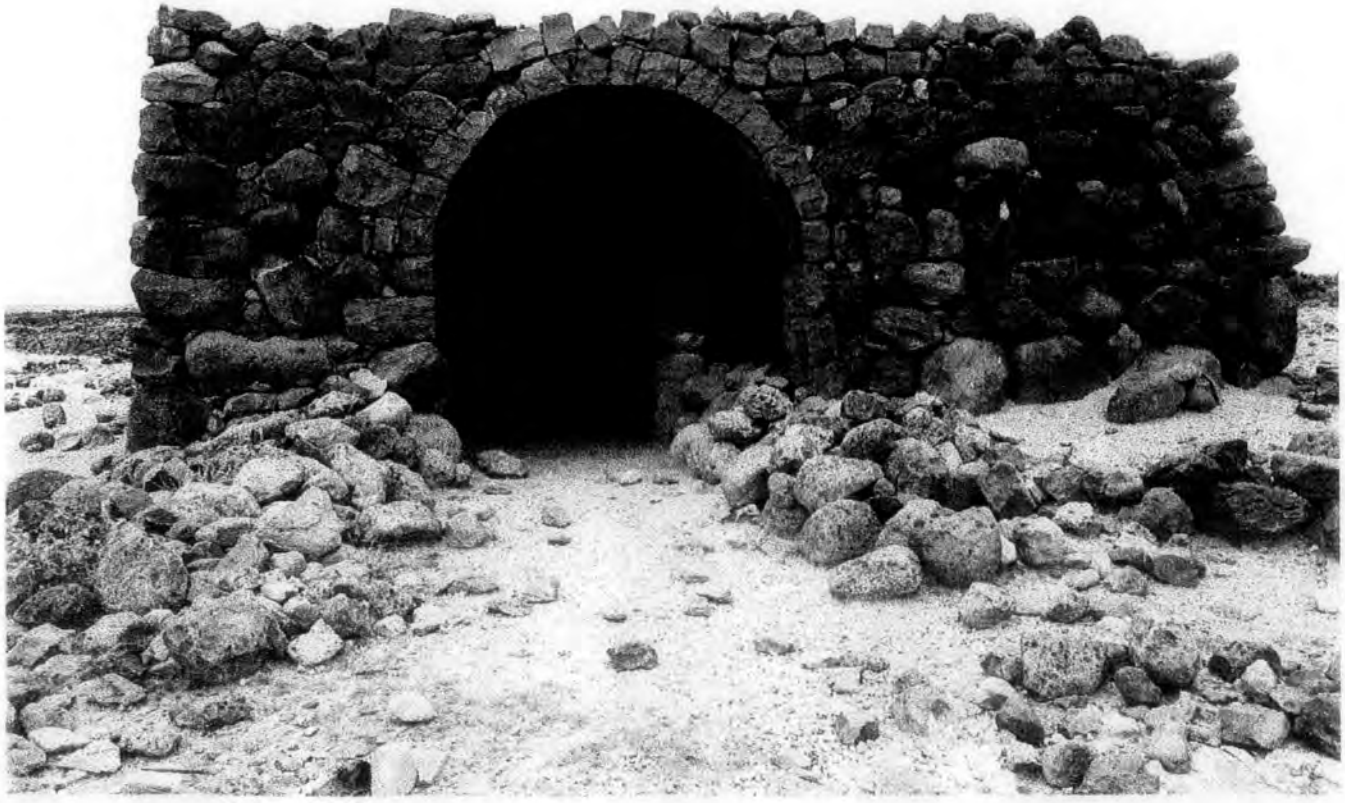


[1] Such is the case of the caves by the fort-citadel in Al Husn, the high outcrop overlooking Thula.

[2] For example, Sa'da, Thula, Shibam, Bani Matar, Bani Hushaysh, Al Hada.

[3] As in the caves at Al Masna', north of Sa'da, where the imams troops camped for extended periods during the Civil War.

Top - Schematic section (writer's notebook) and top course stones of round plan *saqif*, Haraz; *Centre and bottom* - Rectangular *saqif* in Bani Ghuthayimi (*left*), and Dharahan



1.2 -Temporary shelter

Other than the guard houses (*dayma*) for the fields, the simplest covered structures seen in Yemen are the *saqif* (literally roof) used as temporary shelter by wayfarers and shepherds with their herds. They exist all over the central and western Highlands, but the writer observed them mainly in the areas of Tawila, Khamir, Sana'a and Haraz. They are quadrangular or round constructions made of rubble stone, spacious enough to accommodate a small herd and therefore requiring a certain degree of structural complexity.

The round plan *saqif*, appearing more often in the western and southwestern Highlands, is built as a rough corbel vault[4] with an average diameter of 4 metres. Stones are laid on their flat sides in progressively smaller circles keyed with one or more slabs of rock. The exterior is surfaced with rubble held in place with earth and the entrance lined with more regular yet uncut stones, arching over the opening.

In the rectangular plan, more frequent in the central Highlands and along its eastern and western fringes, the walls are a man's height and the opening is made by an arch of hewn stones at one of the narrow sides . The almost capricious shapes of these primitive arches are a distinctive features in otherwise subdued and uniform volumes. The enclosure wall is made by large stones. Intermediate arched segments, carrying cross beams made of long stone pieces, support a roof of stone slabs, covered with earth. Sometimes there is more than one arch per segment, supported by monolithic shafts or columns of piled up stones. Wood is never used in either the quadrangular or the round form.

The quadrangular *saqif* represents the rudiments of the structural option adopted by all the indigenous architecture of the Mountains, with wood replacing stone for the roof beams in all but the most primitive forms. On the other hand, in no instance did the writer see a natural evolution of the structure represented by the circular *saqif*, there being no domes or corbel vaults in domestic buildings.[5]

Similar structures - often of greater simplicity consisting of small contiguous rooms rather than ample arched spaces - were used as dwellings in places with large temporary populations such as the thermal springs and hot baths. These, as for example at Hamman Ali and Damt, attract large numbers of people in mid-winter, when farming activity ceases.

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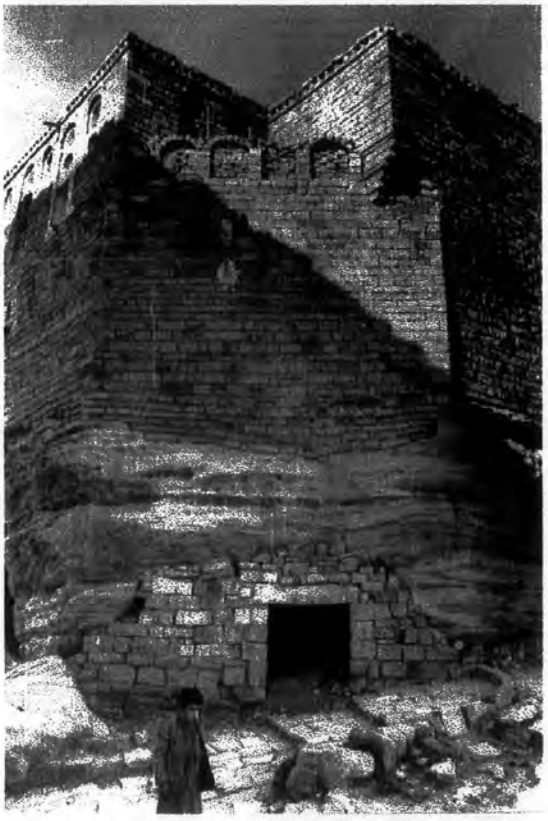
[4]This type is reminiscent of the *trulli* found in southern Europe, from the former Yugoslavia to Portugal. See Oliveira:88, p 149 & foll.

[5] Domes are found only in funerary and religious architecture.



Top -Bayt Mahydin (*left*) and Arhab (*right*); *centre left - Wadi Dahr; centre and bottom left* - Thula; *bottom right and opposite* - Near Al Tawila

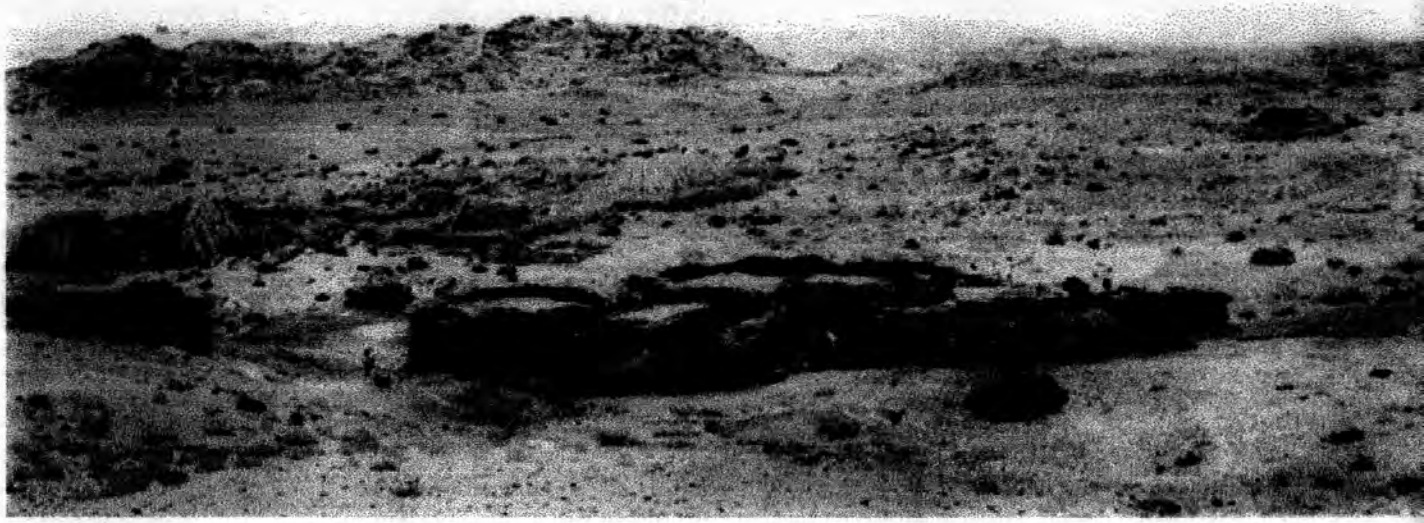
1.3 - Permanent dwelling: elementary forms

A step forward from cave dwelling is illustrated by the construction of walls and roofs , adapting and completing recesses of cliffs and mountain sides to shelter elementary communities .

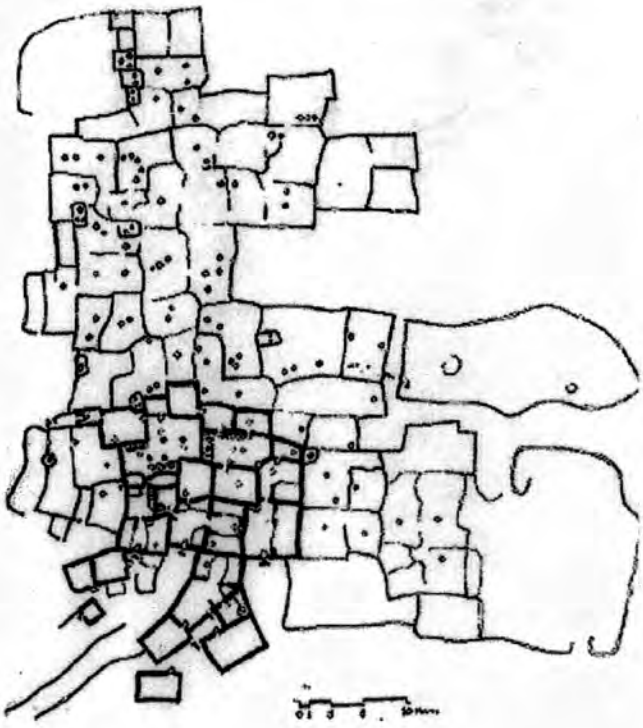
In the cases observed the settlement appeared to be identified with the notion of refuge or resistance in times of war.[6] Its continuation up to the present day, notwithstanding the proximity of a formal village cluster, appeared associated with sections of the population living with only the possessions required for survival and the satisfaction of the simplest needs.

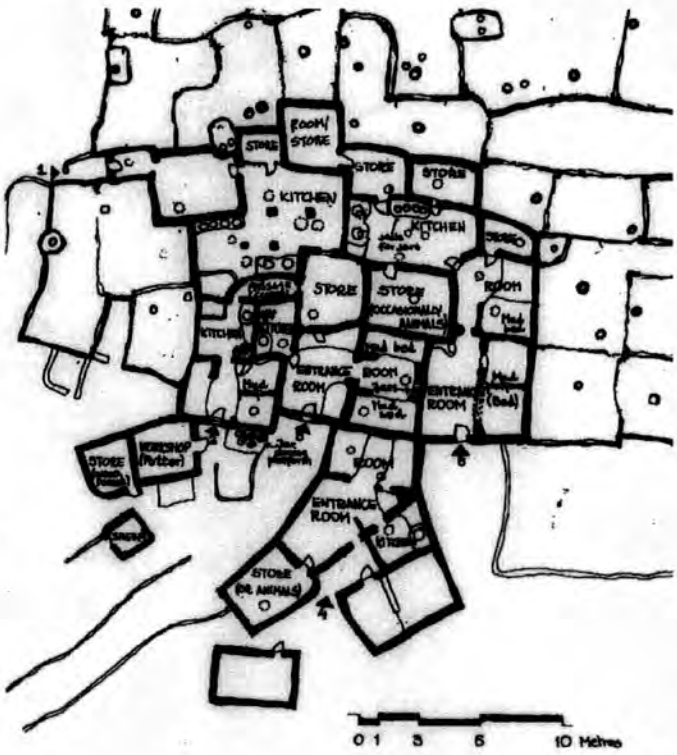
However, adaptation of natural features is constant also in higher standard buildings. Many examples exist of carefully hewn stone houses, with two and more storeys, built under ledges and over rock outcrops, as frequently seen in the Tawila and Al Hada regions . The Tawila area is particularly noticeable for the latter, where simple guard-houses and elaborate buildings may appear poised over or clinging to megaliths. Near Sana'a is the well known example of Dar al Hajar, a former Imam's palace built on and around a large rock outcrop in Wadi Dahr. Examples were also noticed at Thula and Al Tawila where a cave was integrated into an adjacent construction in such a way that it was difficult to say where the cave ended and the building began .

[6]This is the case of Bayt Mahyidin a community of 15 families dwelling in contiguous units for the whole extension of a rock ledge. The local tradition places the origin of this community at the first Turkish occupation.



Top - Near Al Swaydiya; *centre and bottom* - Interior, partial plan and general layout of cluster at Al Janad; *opposite* - Clusters and towers at Al Khawa (writer'snotebook)

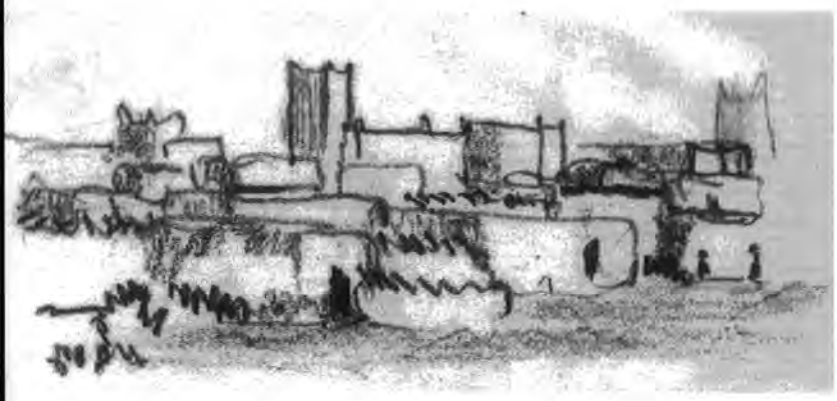


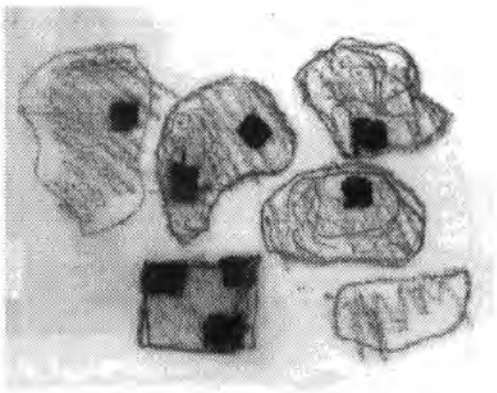


This mimetic[7] component is also noticeable on flat ground in both isolated and clustered dwellings. There, roofs may appear as a continuation of the terraces (seen in Al Hada, Khubban, Shahara foothills, Sumara, Taiz, and elsewhere), or as low swellings of the ground, being again barely noticeable when approached from the surrounding hills as seen at Dhi Bin, Al Janad and north of Al Baydha.

Such an arrangement could be associated with date of the construction rather than with strategic reasons, the structures being identified with the "first settler" of a later agglomeration and now either inhabited by a "poor relative" or used as an ancillary space for larger houses built in the vicinity as in cases recorded at Al Hada and Al Sabahi. In Arhab, linear clusters of low houses, stepping down the slopes and now abandoned, are locally associated with the original settlers.[8]

In other cases this reflected an essentially passive defence attitude, either in populations deprived of autonomous means of protection such as communities of craftsmen and service providers as at Al Janad, or areas in the path of frequent bedouin raids such as Al Swaydyia, in the Southeast. Here the intention was stated as to live in a form that raiders would not notice or covet. Nevertheless a measure of active defence initiative is revealed in the existence of watch towers in some of these clusters, in which the population could take refuge. In more peaceful times these function as collective granaries and stores and occasionally as dwellings. In chapter 3 these dwellings will be described in the general context of house forms and spaces.





[7] The words "mimesis" and "mimetic" are applied in this context as meaning the formal and material identification with the immediate environment resulting from the natural answer to direct functional problems. This does not include the constructions purposefully made to "look like" pre-existences, which are elsewhere part of the erudite architectural vocabulary of recent times.

[8] Compare with the description of proto-historic settlements in Maigret:88.

From top to bottom - Mountain-top settlements near Al Tawila (first two), Dhu Awlayin. Dhamar, and Al Qifla, Khubban; *opposite* - Entrance gate in Al Jihana, Khawlan

Section 2 - Settling Strategies

2.1 -Siting

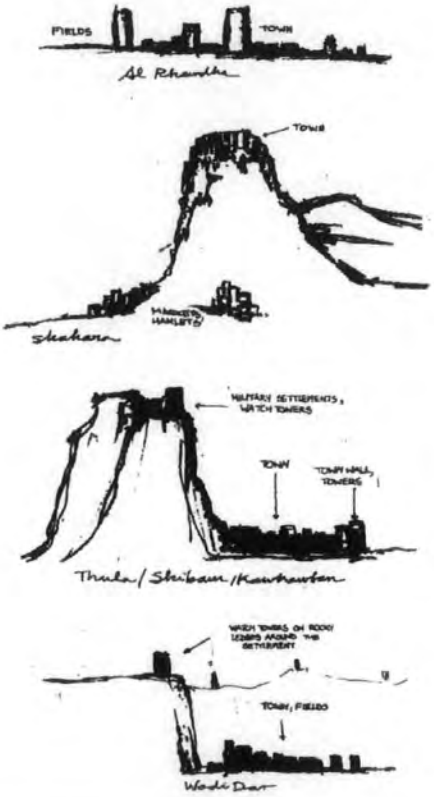
The same notion of "mimesis", but reflecting a different attitude, can be extended to another type of settlement, in which the choice of the site clearly indicates a strategy of land utilization and protection. This is represented all over the highlands by what has come to express the popular post-card image of Yemen's settlements: clusters of tall houses impossibly perched on hilltops and cliff edges, giving the illusion of rock formations.

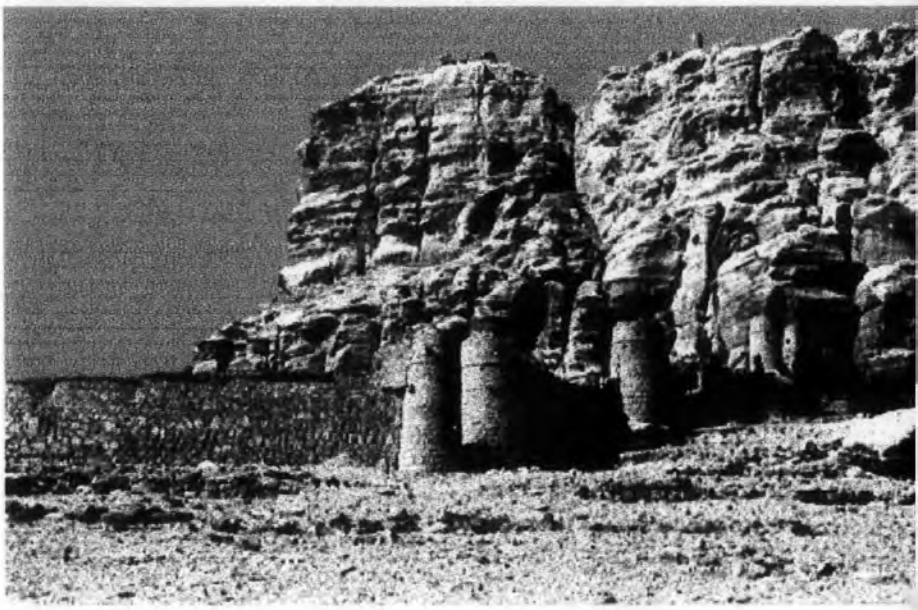
A commonly accepted theory is that agriculture started at the bottom of the wadis and, as population pressure increased, climbed the slopes and placed the human settlements on the sites that were unsuited for farming and provided the best and most inaccessible vantage points from which long distances could be controlled: the mountain tops, the edges of cliffs, and the rock outcrops on flat land.

2.2 - Containment

The settlement's natural confinement is a major element of site selection. This is well illustrated by the way the external walls of the outer belt of houses of most highland villages often continue up the steep rock outcrop on which they are planted. These peripheral houses, by virtue of their internal organization, function in lieu of a rampart, with the lower floors, for animals and storage, literally windowless, and the living quarters on top as look out positions. The settlement's gate or gate may be incorporated in these dwellings or part of the wall in a gap between buildings.

Below - Schemes of settlements and protection (writer's notebooks); *right, from top to bottom* - Cliff and wall at a small settlement near Juban; view of Thula from the east. Notice caves on the cliff side, and the fort on top of the outcrop; Bab Najran, Sa'da; *opposite*: Kawkawban wall and gate on the cliff side.





On flat ground settlements may have no visible containment and their defence depend upon watchtowers in the periphery or fortifications on the nearby hills and cliffs, as at Wadi Dahr and the Dhamar plains. However, and particularly in the central and northern highlands, settlements are normally confined by a wall with one or more gates depending on the size and importance of the settlement - small villages have a single gate, Sana'a had seven. Walled settlements may also be built against the foot of a natural scarp. A path threading up the scarp within the walled perimeter makes the only connection with a fort or another walled settlement, higher up at the scarp's edge.

In their most complete form the walls, which may be of stone, mud or a combination of both, will have bastions at intervals, and shooting holes. The wall may be walkable along its entire length or interrupted by both the original houses and later encroachments in an earlier continuous wall. The gates consist of a chamber with a single outside door or two doors at opposite sides, often preceded by a "trap" made by the projection of walls and bastions, to deter entry. Moats could be used for the same purpose. A remarkable example was seen in 1976 at Bayt Na'ama in Bani Matar, used by then as part of the settlement's irrigation supply system; but elsewhere moats had mostly been filled with earth and rubbish.

Top - Settlements on flatlands. Notice peripheral fortified positions and (*left*) orchards; *bottom left* - Farmhouse near Khamir; *right* - scheme of village in Al Hada, in 1976

2.3 - Patterns of settlement

Forms of settlement vary with the regions but follow a few basic patterns. Thus, in the Tihama, besides the harbour towns and fishing villages of the coastline, major settlements are by the trade paths of the middle region. Farming hamlets and villages are concentrated by the wadi basins as it also happens in the midlands of the western and southern mountain slopes. In the highlands hilltops are, as we saw, preferred, whereas settlements surrounded by free-standing walls in the middle of the plains or against steep cliffs typify the northern and central plateaux. In the Mashriq small settlements occur in wadis and around markets but a significant part of the population is nomad or semi-nomad and lives in tents.

Communities were seen of scattered stone huts in transitional or unstable zones[9] but in general even the smallest settlements appear as tight clusters of buildings belonging to one or more separate but related nuclear family units.[10] The word *bayt*, meaning both house and patronymic lineage, is also commonly used for hamlets and villages.

The hamlet (*mahall*) is the abode of members of the same family or lineage, the village (*qaryia*) that of members of the same tribe. Occasionally these may be dispersed among several neighbouring hamlets. The application of the word *qaryia* may vary with the change in region and tribal context[11] but falls, as a rule, on settlements that display a certain size and spatial organization. In 1975 more than one third of the country's population lived in villages 100 to 250 people , the village being the "urban centre" of a tribal entity.[12]

A typical highland hamlet of the simplest type, such as a basic farming unit, contains a cluster of tall buildings with one or more clusters of low adjoining structures for animal pens, fodder, tools and grain storage.

At a later stage there may be a differentiation of a building or group of buildings for the village chief or shaykh either by location, size or external signs of distinction.[13] The shaykh's complex may include the community

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[9]Such as the foothills at the Tihama or the former borders with South Yemen.

[10]Dostal :88, p.357, identifies in Bani Hushaysh three types of family : the patrilocal extended family; the nuclear family; and the "fraternal joint family", consisting of the family nuclei of two brothers, originated by the dependence in which a younger brother may find him self due to unequal division of the inheritance.

[11]Dostal:88.

[12]Steffen:78

[13] Usually, however, the shaykh's house is not unduly ostentatious in relation to his tribesmen's

Left, from top to bottom - Bayt Qurayimi (Dhawran), Al Shariya (BaniHushaysh), Al Mayfa'a (Bani Matar) and outskirts of Al Tawila; *right* - Threshing near Sa'da (writer's notebook); Ta'la tree with fodder , Wadi Bana; *opposite* - Ancillary spaces at the periphery of settlement, Rayda

food store and act as a citadel. Eventually it may even be transferred from the main cluster to an improved strategic location.[14]

Grain is stored in granaries above ground (*tabaqat al-habb* , literally "grain coffer") or underground (*madfan*). In the simplest settlements they form part of the shaykh's house. Barley and wheat are usually stored aboveground, and sorghum underground. In larger settlements community granaries may exist, serving as a central collection point from where the *zakat* tax, valued in grain, was collected.[15] Outdoors underground storage of larger collective reserves is not uncommon, being built along the same principle of the domestic *madfan* - conical pits, accessible from the top with an average capacity of 10 or 12 m3. Impressive examples are at Kawkaban and the Thula citadel which alone could feed at least 1000 men for 200 days.[16]

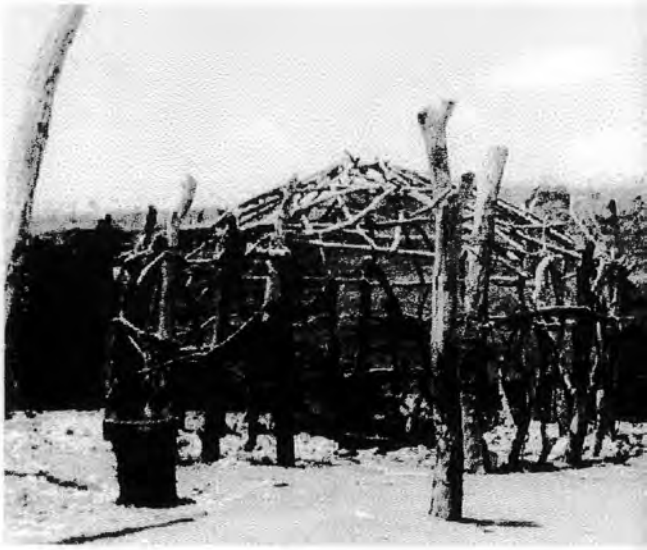
Sites for the rural community service activities are located in the open spaces left within the built-up area of the settlement in relatively central locations. Threshing floors[17] or oil presses tend to be more central than animal enclosures and the places of preparation and drying of dung discs for domestic fuel. Fodder and straw may be stored under cover or stacked in the open. In the Central/ Western Highlands, stone plinths are often used to raise the stacks from the ground. In the Southern Highlands straw stacked in the forks of acacia trees (*ta'la*) is commonly seen with each family having its own tree.

[14]Local informants at Al Hada, in the Eastern Highlands, said that in their areas buildings were not allowed next to the shaykhs' houses and that was why they stood out so visibly from the main clusters.

[15] See Golvin & Fromont: 84

[16] Gast & Fromont:85, p 197

[17] Threshing is done with wood sticks swinging from a handle with a leather loop. Threshing floors are also used to grind grain by means of a large stone dragged around by oxen or donkeys.



Top - Communal grinding mills at Al Dharayimi *(left)* and Al Zaydyia (*right*); *centre* - The suq outside the town entrance, Dhawran, 1976; *bottom* - Cemeteries at Thula and (*opposite*) Al Baydha

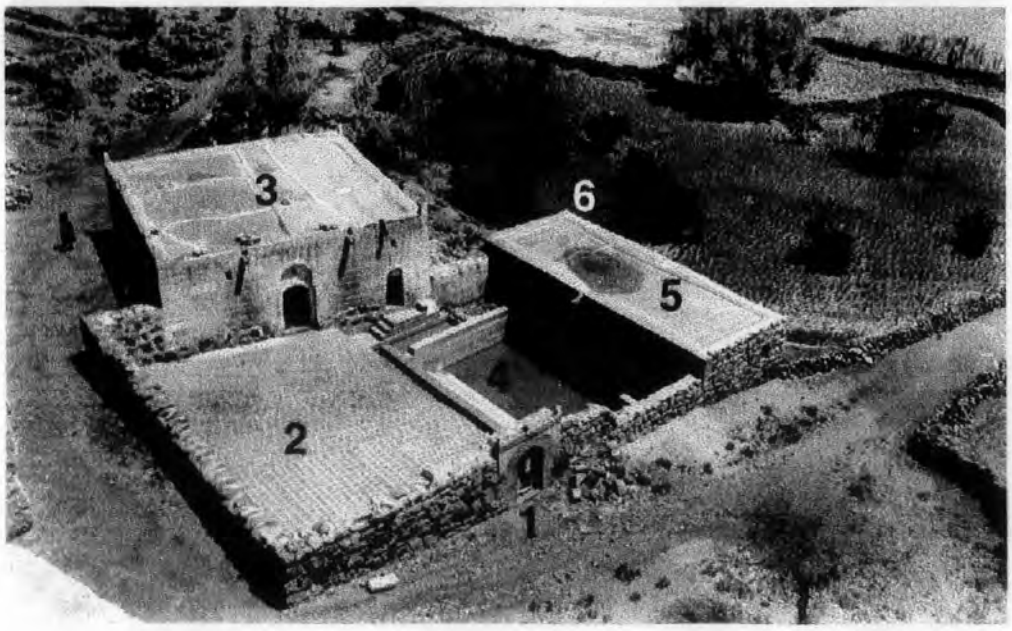
The siting of some facilities - such as the communal oil press in the centre of a small village - introduces the installation of other activities such as a shop or tea house or a place where women sit and feed their cattle. A place of this kind may represent an informal meeting point associated with leisure as well as with specific occupational activities.

A few buildings, including general store, craft and repair workshops are often located at the entrance to even small settlements. They may later develop into secondary clusters beyond the settlement's enclosure, sheltering a community of non tribal service-providing groups such as *muzayyin* , *bani khums* and Jews. A settlement may progressively extend its wall to encompass developed clusters of this kind.

Cemetery and mosque form part of the settlement from its early formation and may exist even in the smallest isolated hamlets.

Burial grounds are located at the edge of the settlement, outside the wall where it exists. Usually tombs are marked only with a headstone and occasionally with rough flagstone. More elaborate stellae and domed tombs appear in some cemeteries of Upper Yemen such as those of the citadel of Thula and at Sa'da . The tombs of notable imams may be placed in a mosque and attract more careful treatment.

In Lower Yemen domed tombs are more frequent. One striking example is that of the cluster of tall conical tombs in the cemetery of Al Baydha. The cult of holy men, common in the Shafi' areas, is indicated by the large number of domed quadrangular or octogonal tombs, some very elaborate, that exist throughout the Tihama and Southern Highlands, both as isolated structures or combined with mosques.



Top - Al Qawfa, Khubban; *centre, left* - Ma'jil and prayer place, outskirts of Dhamar; *right* - Sa'id mosque, Thula; *bottom* - Typical village mosque, Mithal, Al Hada

1 - Entrance
2 - Courtyard
3 - Prayer Hall
4 - *Sabil*
5 - Bath houses
6 - Orchard

2.5- Places of prayer

MOSQUES

Mosques in their most basic form are variously associated with the house of the village chief. In elementary situations they appeared within the shaykh's precinct,[18] or sharing with the village chief's house the space provided by a distinguishing natural feature such as a rock outcrop in the middle of the settlement.[19] Eventually they occupy relatively equidistant positions between the chief's house and the community cluster. As communities develop the number of mosques increases and a mosque is always sited so that outsiders can have access to it without entering the settlement.[20]

At the periphery of larger towns, wide enclosed paved open spaces - *Jabbana* - are used for collective prayer on special occasions such as *Aid al Adha and Aid al Fitr,* the two great festivals of the Muslim year. A small prayer hall may adjoin the *Jabbana.*

Outside the settlements, prayer places may take the simplest form. The most elementary prayer place seen was at Dhamar and consisted of a stone paved area with a raised stone for the *qibla* , adjoining a *majil* [21] and instancing an early stage of the form given to the close relationship between water and ritual.

One room oratories are found among the fields, on the path between settlements and in other appropriate locations. They may include an ablution pool (*sabil*) which sometimes is so large that it suggests an use not only for the strict purpose of ablution and irrigation of the mosque's fields but also for the community needs in lieu of the *majil*..

A fully developed mosque has a covered prayer hall with a niche (*mihrab*) viewed on the outside as a quadrangular or rounded projection, (*qibla*), and indicating the direction of Mecca. This is preceded by a paved courtyard and sometimes a covered entrance, an ablution pool with bathhouses, and a minaret. Small mosques do not have to have all these elements. Large mosques may have more than one minaret and *mihrab* and a complex praying area, with the main prayer hall facing Mecca and open colonnaded spaces at the other sides of the courtyard.

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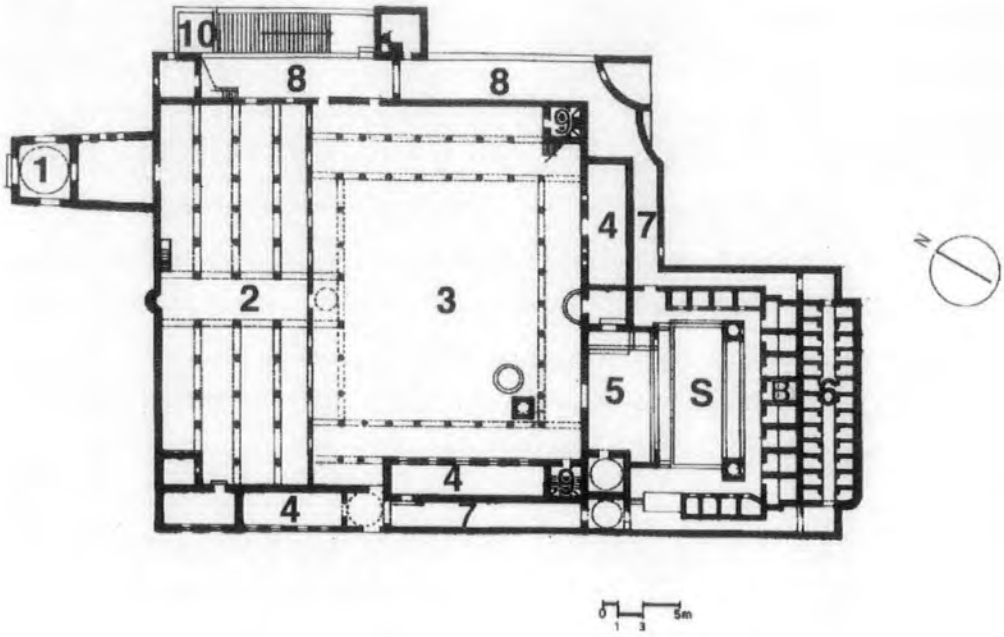
[18]Al Sabahi, Khubban.

[19]Bayt Nu'ama, Hujjaryia.

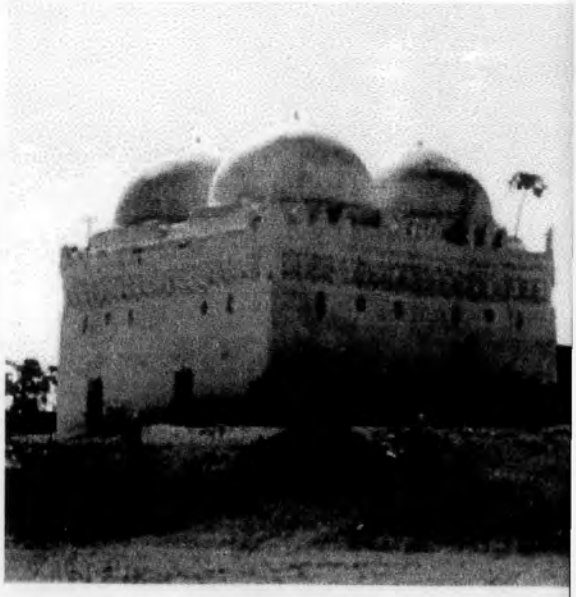
[20]See Audouin, Breton & Robin:88, p 63. By tribal custom a stranger to the tribe can only go through its territory in the company of a tribesman (*rafiq*); this naturally applies to the restricted perimeter of the settlement which should not be entered without asking permission to the village chief.

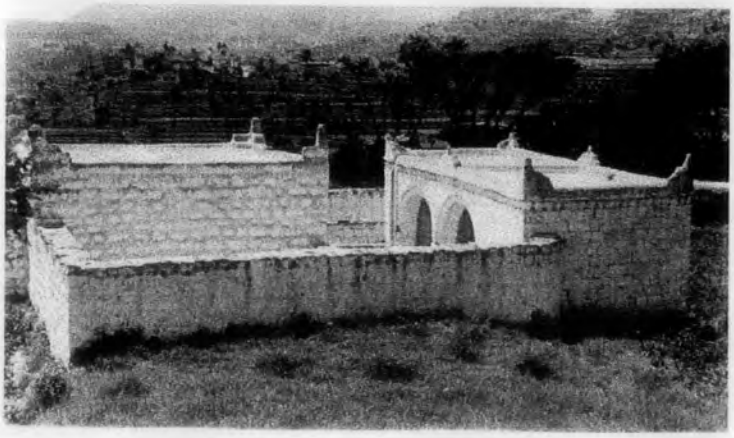
[21]The dug-out irrigation cistern described in chapter 1.

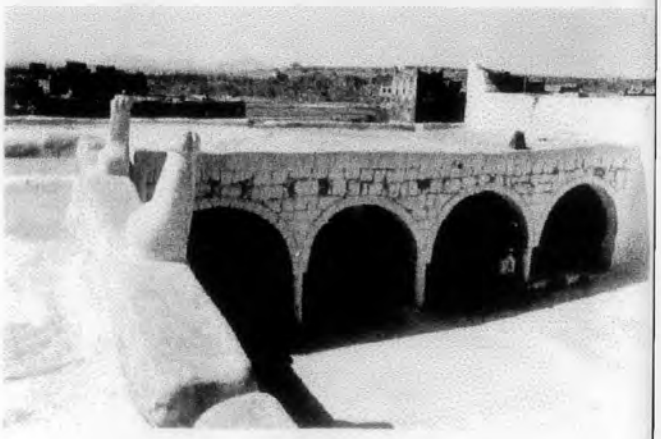


1- Main Entrance;
2- Prayer Hall;
3- Courtyard;
4- *Madrasa;*
5- Ablutions
S:*Sabil*;
B: Bath stalls;
6- Toilets;
7- Path;
8- Roof terrace;
9- Minarets;
10- Entrance from lower level

Top - Schematic plan of Queen Arwa mosque, Jibla; *centre left* - 'Udayin; *right* - Al Rahida; *bottom left* - Bahdan; *right*- Qaryia Sawda; *opposite* - Ceiling at the Great Mosque, Sana'a



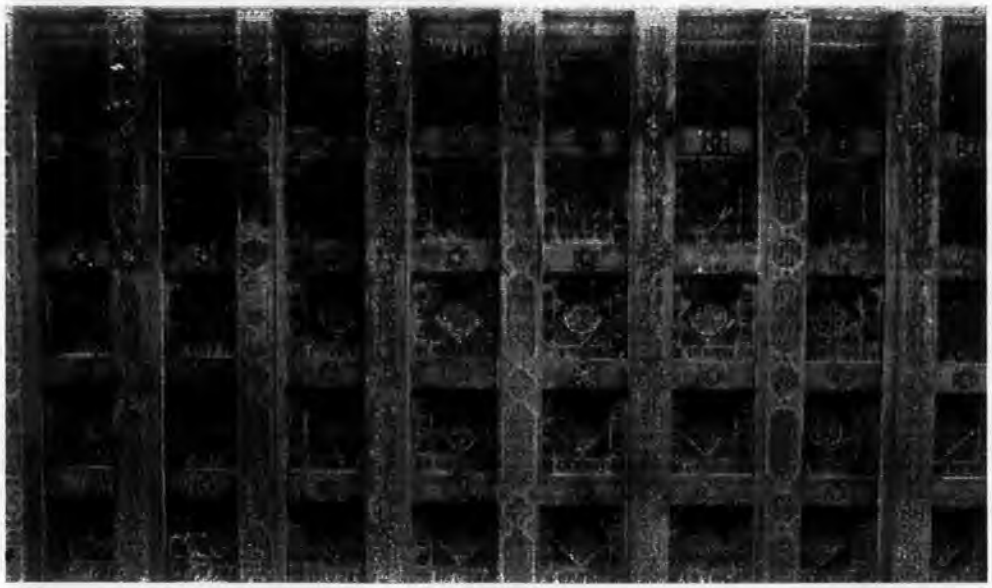




Any settlement of some importance has at least one congregational mosque - *jami'* - where the community assembles for the Friday noon prayer. When the settlement has its own market a Friday mosque is usually associated to it. Friday mosques are equipped with a *minbar* (pulpit) from where a homily is delivered. Until the arrival of radio some 30 years ago the *jami'* was also the place where news and announcements of general or political interest were given.

Flat roofs, carried by wooden beams on supporting columns or arches, and forming a rectangular plan, are the most common in the mosques of the Mountains, and are identified with the earliest examples at Sana'a and Al Janad.[22] Domes, as much as elaborate decoration, appear to reflect the influence of rulers and craftsmen imported to carry out the work[23] or of resident immigrants.

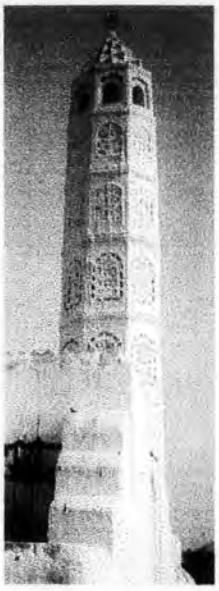
The peaked corners so characteristic of the small mountain mosques are known locally as *shahada* and said to be dedications to Islam, with the builder placing as many stones on each corner as the number of persons assisting him with the construction. This feature is also frequent in domestic construction and there may be other explanations for its origin.

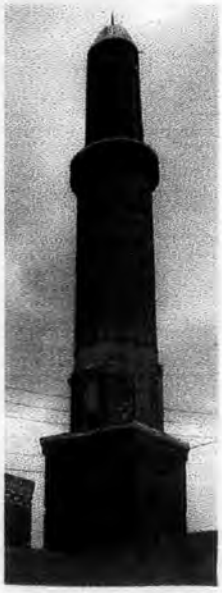


[22] Lewcock:76, p 17 considers that a possible reason for the flat roofs in mosques is "*the influence of the Persian Royal Hall, the* apadana, *which may explain the construction of a number of high mosques with elaborate moulded and decorated ceilings carried on high slender columns*". See also Lewcock and.Smith:73 p 117-130. This explanation, however, is hard to apply to the widespread model of small mosques with no visible erudite influence where, on the other hand, the association with the basic principle established in the rectangular temporary shelters, *(saqif)* inevitably comes to mind, showing a similar problem - the covering of a wide space - with a similar solution. The monumental tradition of sacred buildings in South Arabia was also based on a structure of monolithic columns and beams carrying flat roofs. See Schmidt:88, p 78.

[23] "*The kings of Yemen are always bringing in from Egypt and Syria groups of artisans because of the few of them to be found in Yemen*" - Ibn Fadhl Allah al 'Umari, Egyptian writer, 14th century, quoted in Serjeant & Lewcock:83, p 169. The Rasulids - 1129/1454 - played an important role in the introduction and dissemination of the dome in Yemen. See Sadek:90.

Top - Outsirts of Hays, Tihama; *below, left to right, first row* - Minarets at the Tihama: Khawkha, Mawza, Mocha and Zabid (*last two*); *second row:* - Stone minarets at Al Zarayja, Jubban, Al Baydha, Ibb, Kawkawban; *third row* - stone minaret, Dhamar; brick minarets at Al Rhawda and Sana'a (*last two*); *opposite left* - Minaret in *zabur*, Suq Al 'Ainan, Barat; *right* - Dhamar

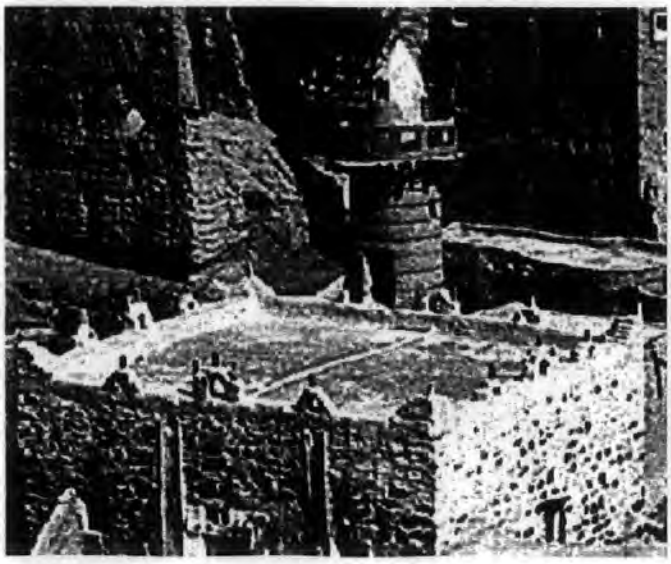




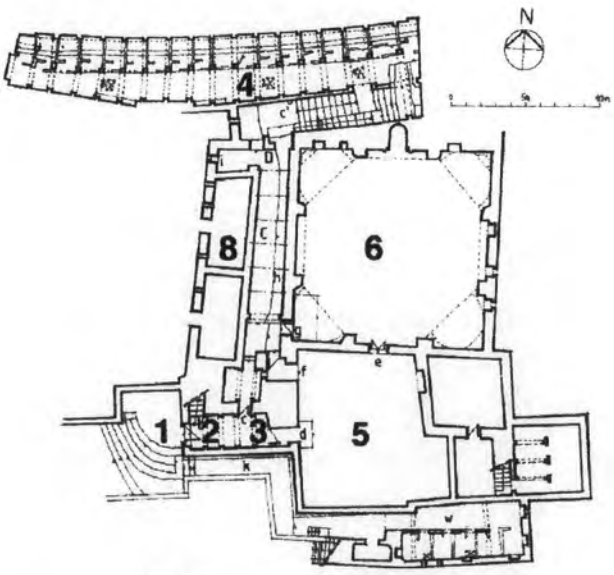
Originally the call for prayer was made from the roofs of mosques. Early Zaydi imams prohibited minarets, but as time progressed they have developed as the most elaborate feature of otherwise unadorned buildings. Minarets appear in a variety of shapes, at their simplest a covered niche on top of the mosque wall and accessible from an external stair, as that at the great mosque of Dhawran, destroyed by the 1983 earthquake. In general, however, minarets appear as slender slightly tapered cylindrical structures, on a quadrangular base, with one, two or three cantilevered balconies, topped by a small dome. Quadrangular plan minarets appear in the Southeast of the country and occasionally in the Tihama, where short stocky minarets may appear in both small and large mosques.

Minarets are usually built and decorated in baked clay brick even when the mosque is of a different material. Stone minarets were occasionally seen in the Central/Southern Highlands as, for example, at the Sana'a and Thula great mosques, Kawkaban, Dhamar, Ibb and Wadi Bana. Sun dried earth minarets were only found on the Eastern slopes, in mosques similarly built of clay.

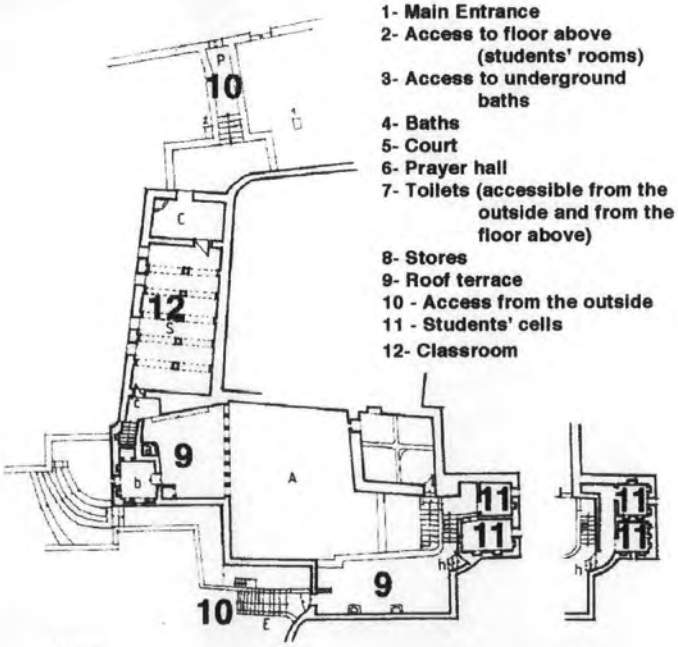
With the diffusion of sound by electronic means, minarets became functionally obsolete and served only to support the loudspeakers. It is not surprising therefore that simple metal trellis structures were erected for small new mosques or mosques having no minaret. With time, these appendages have come to assume the same emblematic value and provide some attempt at embellishment, as it will be illustrated in Part 2. Yet, inspite of their functional redundancy, new minarets have been built, along traditional aesthetic principles and materials , regardless of the form and materials of of the mosque itself. New minarets in cut stone have appeared in later years, particularly in the capital and other large cities having a tradition of stone construction, such as Dhamar or Taiz.



Top - Mosque and madrasa, Suq al 'Ainan, Barat; *centre* - Madrasa Qubba al Hadi, Thula (Source Golvin:84); *bottom* - Madrasa added to mosque, Al Sirr, Bani Hushaysh; *opposite* - Al Tut madrasa and mosque, Sa'da

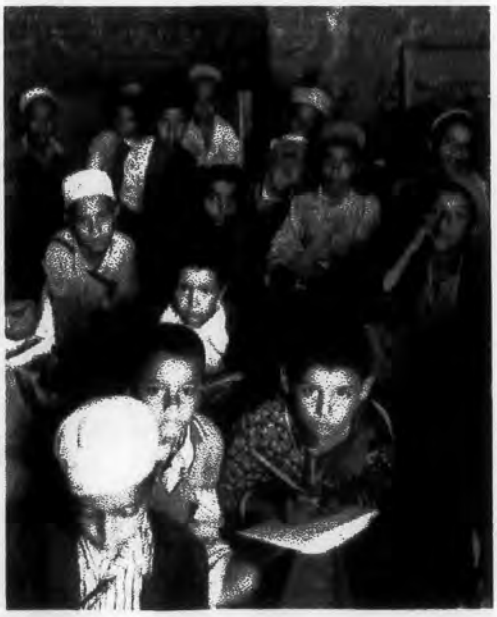


Level 1



Level 2

1- Main Entrance
2- Access to floor above (students' rooms)
3- Access to underground baths
4- Baths
5- Court
6- Prayer hall
7- Toilets (accessible from the outside and from the floor above)
8- Stores
9- Roof terrace
10 - Access from the outside
11 - Students' cells
12- Classroom



MADRASA

Mosques are also places for rest and study. Before the arrival of secular schools with the Revolution, education of a religious nature was administered at the mosque itself or at a *madrasa.*

According to Madelung. *madrasa* is "*a religious school with endowment funds from which teachers salaries were paid and scholarships awarded*".[24] Sunni rulers and dignitaries sponsored the building of *madrasas* and, from the arrival of the Ayyubids onwards, particularly under the Rasulids and later the Ottomans, *madrasas* flourished throughout the Sha'fi areas. In Upper Yemen, the Zaydis had their religious schools in the mosques and in the places under the status of *hijra.* Thus "*madrasa* ", in this context, defines those establishments consisting of a complex with, besides a prayer hall and court, rooms for resident students and baths. These may take a larger volume than the prayer area itself.

[24]Madelung:88, p 175.

Top and centre - Sabil at Hajja and Dhafar al Ashraf; *bottom* - separate paths leading in and out of the ablution area at the Dhi 'Ashra (Khubban) Great Mosque

BATHS

The necessity for water used in ritual ablutions explains the location of even the simplest places of prayer near a community water source and has led to schemes combining the large common pool with enclosures for private baths and latrines linked to methods of processing waste and used water for agriculture. Water may be collected from a well or spring nearby or else ducted in from a farther source, passing through the ablution area to be diverted to the fields or orchards.

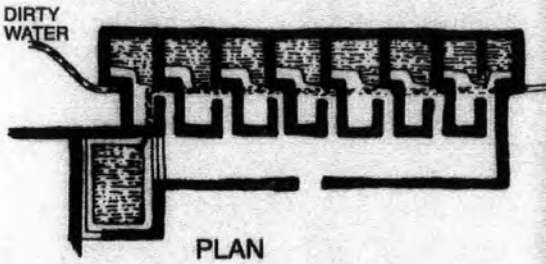
The cubicles for private ablution and latrines are often characteristically covered by rows of small domes, regardless of the prayer hall being domed or flat-roofed. There is usually a separate , even if paralel, circuit to go to the ablution area and from there to the prayer hall.

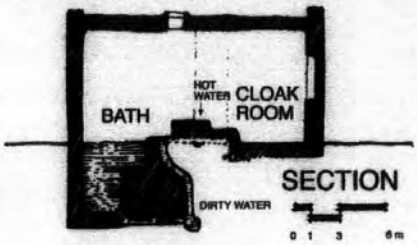
A refinement of the bath services provided by the mosque is the *hammam* - the hot public baths - found only in the major towns. The origins of the *hammam* in North Yemen are not well established. They certainly pre-date the Turks (that in Thula is 15th century or earlier[25]) and reported Yemeni sources[26] date them from at least the 9th century. At one time they were proscribed but eventually, because of their role in ritual ablutions, they won wide acceptance. Comparing the *hammams* of Sana'a with equivalent establishments in the centres of Islamic culture in Syria, Iraq, Egypt and Turkey, Lewcock emphasises the differences with these and suggests their affinity with the baths of Roman origin in Libya.[27]

Public baths are built close to a spring or well and partly or totally underground to retain heat. Water is heated in a boiler by an underground furnace with hot water and hot air circulated through a system of flues in the walls and floors of the bath.[28]Wood being scarce, the fuel used in the past contained refuse of various kinds, such as skins and bones from slaughtered animals and dried human excrement collected from the houses which, once turned to ashes, would be used as fertilizer. Recently the use of naphtha and discarded rubber tyres has resulted in the *hammam* being recognized by black smoke and blackened domes and its role in the process of urban waste recycling has been but terminated.

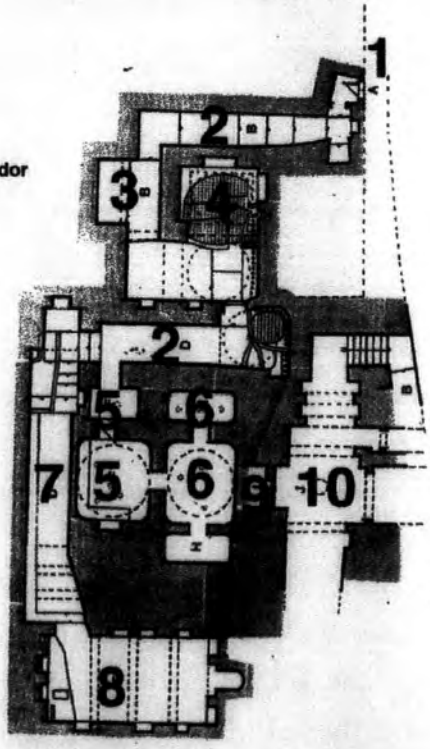
Hammams, from Sana'a and elsewhere have been well described.[29] Their

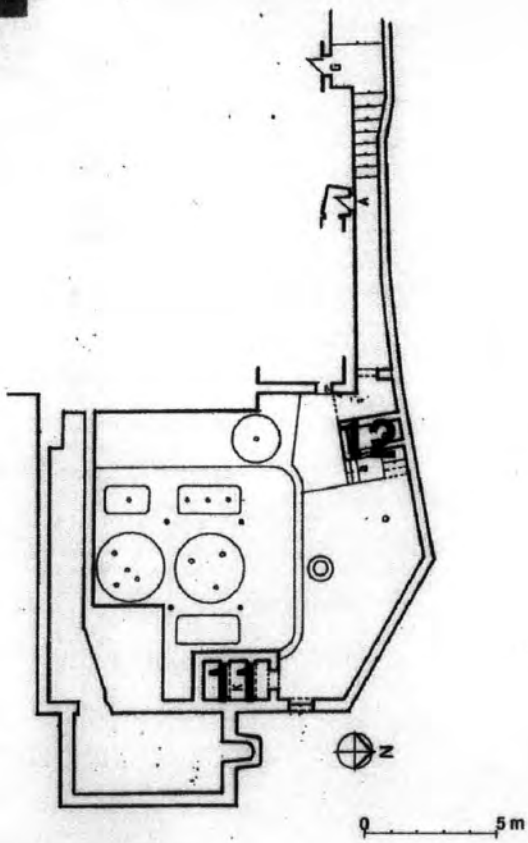
[25]Golvin & Fromont: 84.
[26]Serjeant & Lewcock: 83, p 501 & foll..
[27]Ibid.
[28]Ibid.
[29]Ibid.. See also Golvin & Fromont:84, pg121 and foll..





1 - Main Entrance
2 - Corridor
3 - Ante - chamber
4 - Pond
5 - Warm Room
6 - Steam Rooms
7 - Washing and Massage Corridor
8 - Rest and Prayer Room
9 - Hypocaust
10 - Furnace
11 - Fuel Storage
12 - Bath Keepers Quarters



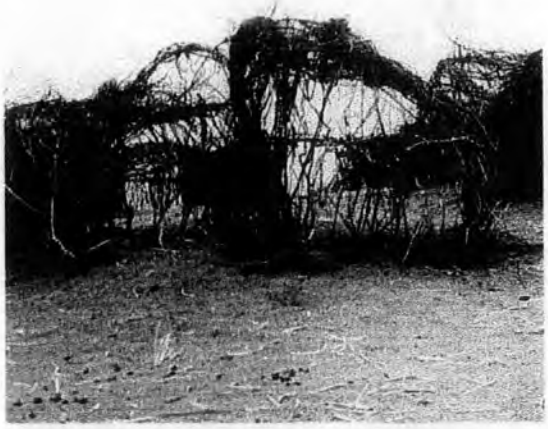


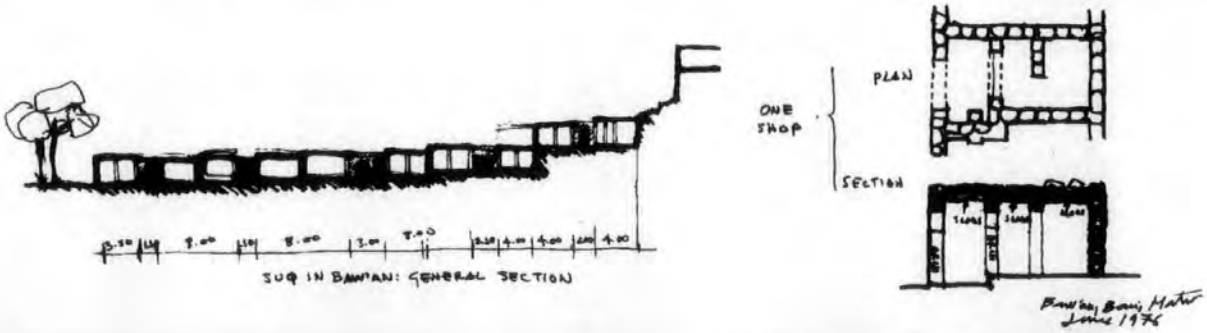
Top left - Cold water baths, Qubba Al Hadi, Thula; *right* - Schemes of cold and hot baths at Hammam 'Ali (after Patrick Llavador); *centre* - Plan of *hammam*, Thula (source Golvin:84); *bottom* - Baths in new mosque, Sana'a, 1976; *opposite*- Domes of *hammam* in Sa'da

basic components are a small entrance room for the *hammam* keeper, followed by a lobby, then a set of rooms or a long descending corridor (such as the impressive one at Sa'da) leading to the dressing room. Next comes a room with a cold pool where the water from the source of supply is collected and conveyed to the underground boiler. This room may be preceded by a vestibule and followed by a wide corridor or hall becoming progressively warmer, before reaching the warm room. The warm room and the hot room adjoining it are of sizeable dimensions. Next to the hot room, there are one or two smaller rooms with bathing water pools. A praying area may also be provided on leaving the warm rooms, or it may otherwise be incorporated in the changing room.

Domes are a consistent feature of urban public baths. Vaults and large domes over the main rooms let day light in through perforations fitted with alabaster panes.

Public baths built near hot springs exist in various regions including Anis, Barat, Damt, Dhamar and are much sought after in the winter season. In Damt small open air bathing pools excavated on the rock were seen. In other instances, such as Hammam Ali, bath-houses consisted of small flat roofed buildings above ground enclosing a sequence of individual baths with connecting spaces reduced to a minimum and reflecting the conventional pattern of the mosques' ablution area with its fairly elaborate processes for drawing up, distributing and disposing of water.





Top - Places o
periodic markets at th
Tihama, near Wa
Mawr, *left*, (photo
Kennedy), and
Dharaymi, *right*; *cent*
above- Rahab al Qa
below and bottom
Baw'an (drawing fro
writer's notebooks)

2.5- Places of trade

"Tribal exchange transactions in Southern Arabia are regulated by a system of staggered weekly markets. Each tribe holds at least one weekly market on its territory on a fixed day of the week, so that there is a rota system that facilitates inter-tribal market relations".

Walter Dostal

"The markets of Yemen are said to be the property of the people of the villages (mamlukah li ahl al qura*) at which they are held but in literature one notices that they were very often under the protection of a tribal lord".*

R.B.Serjeant

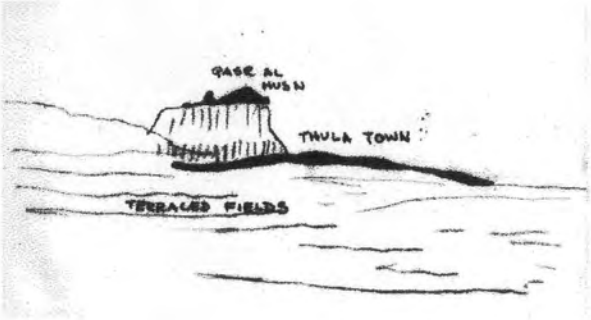
Until the 'seventies markets were, like the Friday mosques, the major places of social intercourse and information exchange.

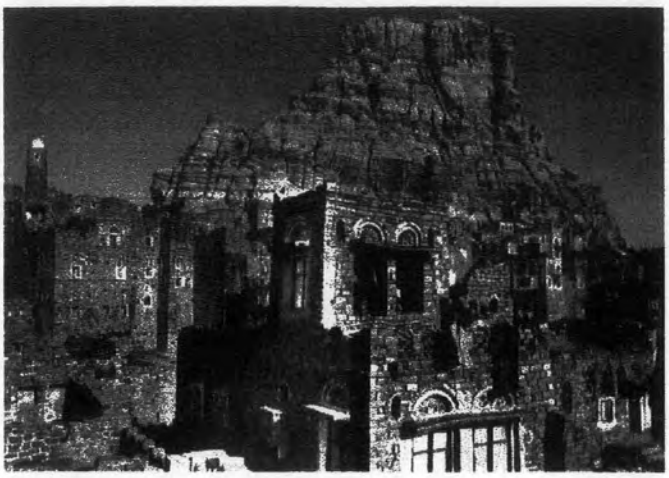
The safety of the market - a prerequisite for its functioning - is ensured by the tribal institution of *haram* , according to which, for the duration of the market, all physical assault to both visitors and workers of the market is strictly proscribed. The tribal group on whose territory the market is held is collectively responsible for the enforcement of the *haram* status. Backed by this guarantee the market organization (*hukmat al-suq*), consisting of a leader (*shaykh al suq*) and delegates from both the tribes and the service providers (*muzayyin*), sets the rules for the maintenance of peace and the provision of "intermediaries".[30]

A map of the location of the rural markets - both in the Tihama and in the Mountains - can be seen as a complex of nodes within large uninhabited areas forming a network connecting the surrounding settlements. These market places are identified by a fixed number of stalls. In the Tihama they may appear as frail reed structures, with most of the activity taking place in the open air, but in the Mountains they are low mud or stone buildings, in numbers varying with the importance of the market. Supplementary open space is left to be occupied by awnings and tents set up on market day. In some cases a small population of caretakers may live permanently on the premises; or they may be otherwise deserted, conveying an eery feeling of abandoned, ghost places.

In general accessibility is the locational factor of the market but sites are avoided that, by their physical and social nature, are the restricted

[30] Dostal:83, p 208, says that *"the function of the intermediaries... is doubtless rooted in the tendency of the tribal community to avoid, from the outset, disputes having an economic basis".*





Top - Thula (drawing from writer's notebooks) ; *centre and bottom right* - Kawkaban and Shibam seen from the path connecting them

territory of the tribal settlement.

The siting and development of a market place does not necessarily imply that the market originate a settlement of any importance; or that it be transferred to the nearest large settlement. Examples were observed of sizeable and well built settlements with only a few shops, at the same time that a large , although rudimentarily built , weekly market existed nearby.

On the other hand rural markets are also held within the boundaries of larger settlements, periodically overflowing the area of their permanent market places. The relationship of these market towns with a defensive position originates a few typical patterns.

In one, the settlement with the market place is at the foot of a cliff whose top is controlled by a fortified position, graphically suggesting the market settlement as an extension and under protection of the closed and fortified nucleus. The lower settlement is enclosed by a wall arching out from the cliff and the connection between it and fortified position is made by a path threading up the cliff and only accessible from within the walls. In Thula the upper location is reduced to a fort and exclusively occupied by its garrison. Communal grain stores are located there, but the population is concentrated on the site of the market at the foot of the cliff.

In a variation of this, settlements appear in pairs as exemplified by the towns of Shibam and Kawkaban, occupying respectively the ground plain and the top edge of a steep cliff. They are connected by the forementioned internal path along the cliff side and accessible only from the interior of either settlement. These communities, although linked, develop autonomously. In the lower settlement a major market is held. Places of assembly , such as a great mosque, stand out and the wall defines the limits of the established population. Periodically, the market may overflow through the main gate to beyond the walls. The top settlement, without a market, is strictly a community of tribesmen - landowners and farmers - and suggests, both in its activity and in its architecture, a greater degree of isolation.

On flat ground unwalled settlements containing the market place are protected, as at Dhamar, by positions on surrounding hills. Otherwise, as illustrated by Sa'da and to a more complex degree by Sana'a, the market site, great mosque and the community developed around them exist in relation to a fortification on a hillock within the walled precinct of the town, sometimes in what used to be a peripheral location relatively to

Top - Market and mosque, Hajja; *centre* - Covered streets in Rada', (*left*) and Sana'a; *bottom* - Bayt al Faqih

the original settlement cluster. The fortification ultimately shelters only a military garrison. Supplementary fortifications may exist at higher surrounding hilltops some of them built or reinforced later by the Turks.

These settlements show functional differences that place them in a group of "market towns" namely those in which, although their original importance and main justification may have lain in their weekly market, the day to day activity is consequence of a resident population of merchants and artisans. The association of market with Friday mosque usually defines the centre of the settlement.

Some urban market places feature streets roofed over in permanent materials, but the writer knows of no entirely covered market place in The Mountains.

In the Tihama , besides the foothill rural markets described, some being regionally important, markets with permanent buildings are associated with permanent settlements. It is in the smaller or larger towns that the Tihama markets are at their best. One is easily tempted to talk about "markets as an oasis", describing how one feels upon entering the coolness and calm of their shaded streets after a journey under the blazing sun. The permanent markets, particularly those of Southern Tihama towns, built in brick and stone, are often roofed over with temporary materials: grass mats, canopies made of palm leaves and branches or cardboard sheets from discarded cartons. An interesting example of successful recycling was seen in 1976 in Bayt al Faqih, where the market was mostly covered with flattened, rusty imported ghee cans set as tiles on a wooden structure. Since the mid seventies the ubiquitous corrugated metal sheet has been used as a more permanent material.

Evident differences between urban and rural markets are in the kind of goods traded and produced and in the number and quality of crafts. Urban markets naturally provide a larger share of imported and luxury commodities, whereas rural markets are basically centered on the trade of locally produced essential goods and the craft of tools and implements needed for the life of the farmer.

Urban markets also reflect the kind of social order that the town sanctions where such oppositions as tribesman versus *muzayyin* or farmer versus merchant/craftsman are diluted. The claim for affiliation with tribal or higher status such as the *sayyid* is compatible with the exercise of certain levels of trade or craftsmanship. Although in the

Top left- Manakha; *right* - Thula; *centre*- 'Amran; *bottom left* - Sana'a; *right* - Coffee-house and inn, Sana'a; *opposite* - Samsara al Jimruk, Sa'da

villages the right to wear a dagger is an exclusive of tribesmen, in Sana'a certain service groups can wear one of a distinctive shape. Thus, whereas in a rural context dwelling places and places of trade are ultimately segregated, the relative proximity of dwellings to the market place may even be a higher status indicator in towns .

The urban market is organized in terms of craft associations occupying physically distinct areas and with their own leadership, although subject to the overriding market authority. In the major towns with Jewish communities, the Jews had a large share of all activities and in some cases the exclusive exercise of certain trades and crafts.[31]

Other characteristics emerge from the nature of an urban market including the need to store and tax goods entering it and accommodating a transient population. This role is fulfilled by the *samsara* , the name given locally to the caravanserai or khan, whose ground floor is a storehouse the inn being at the floor above. Modest restaurants or tea-houses may exist in the *samsara* itself or in nearby buildings.

The expansion of the urban market is normally and progressively made toward the settlement entrances or drawn by a determined pole of attraction. However the most radical change to the spatial structure of the traditional markets has only recently become apparent. It is caused by one of two reasons: the first is the centrifugal growth along new roads more easily accessible by motor vehicles. Building along the roads at the edge of settlements soon grew to create a built up area fronting and often hiding the established nuclei. The second is the central or local government's determination to build a new "central market" outside the urban cluster, for increased space or improved access reasons.

[31] Klein-Franke:88, p.29, quotes a report from Jacop Saphir in the middle of the 19th century:"*The Arabs of Yemen do not work as artisans ... They own fields, vineyards or estates and are engaged in commerce. Nearly all the crafts and trades are practiced by Jews who work as silversmiths, smiths, tin-cutters, tailors, weavers and potters or make gun powder, leather goods, etc.*"

Top left - Shahara; right - Dhawran; *centre* - Al Mahwit; *bottom* - *Sabil*, well and mosque, Shamlan; *opposite* - Aerial photo of tracks and fields near 'Amran

2.7 - Networks

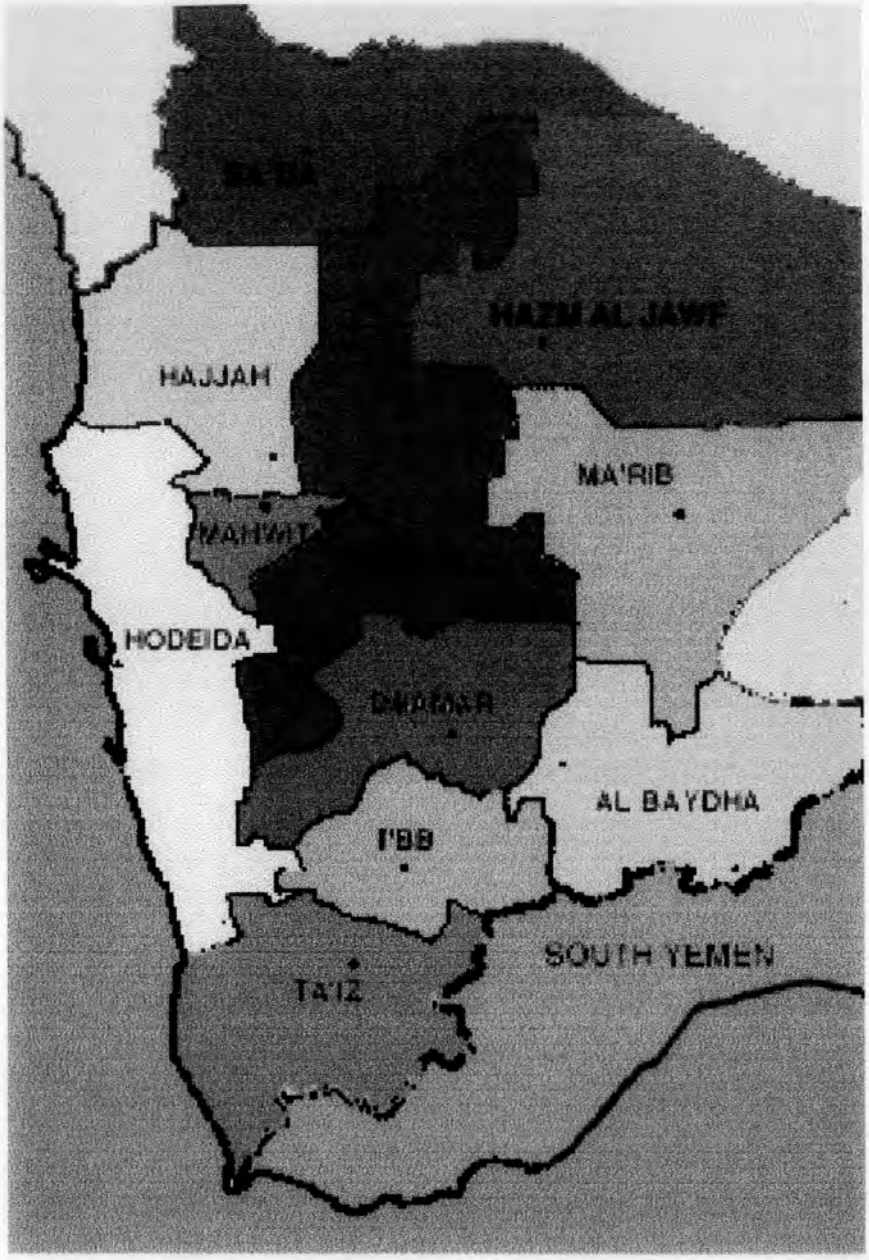
The network connecting settlements and markets is not always physically obvious: the few vehicular roads in pre-Revolution Yemen were unsurfaced except for the rudimentary paved network built by the Turks for their armoured cars and the asphalted road built by the Chinese in 1961 between Hodeida and Sana'a. Mountain villages could only be reached on foot or animals' back along narrow paths or steps in the mountain sides. Certain infrastructure works existed however, and some, such as the famous bridge which connects the two parts of Shahara across a deep chasm, were outstanding .

A common feature of the paths between settlements is the drinking fountains or wells - *sabil*. They are also frequently found in markets[32] having been erected by the religious authority or by pious individuals in the fulfillment of the sacred duty of providing water for those that thirst. The most typical form of *sabil* is a cube with a domed roof and a small door protecting the water from impurities and dust. Sometimes a drinking trough for the animals is provided.

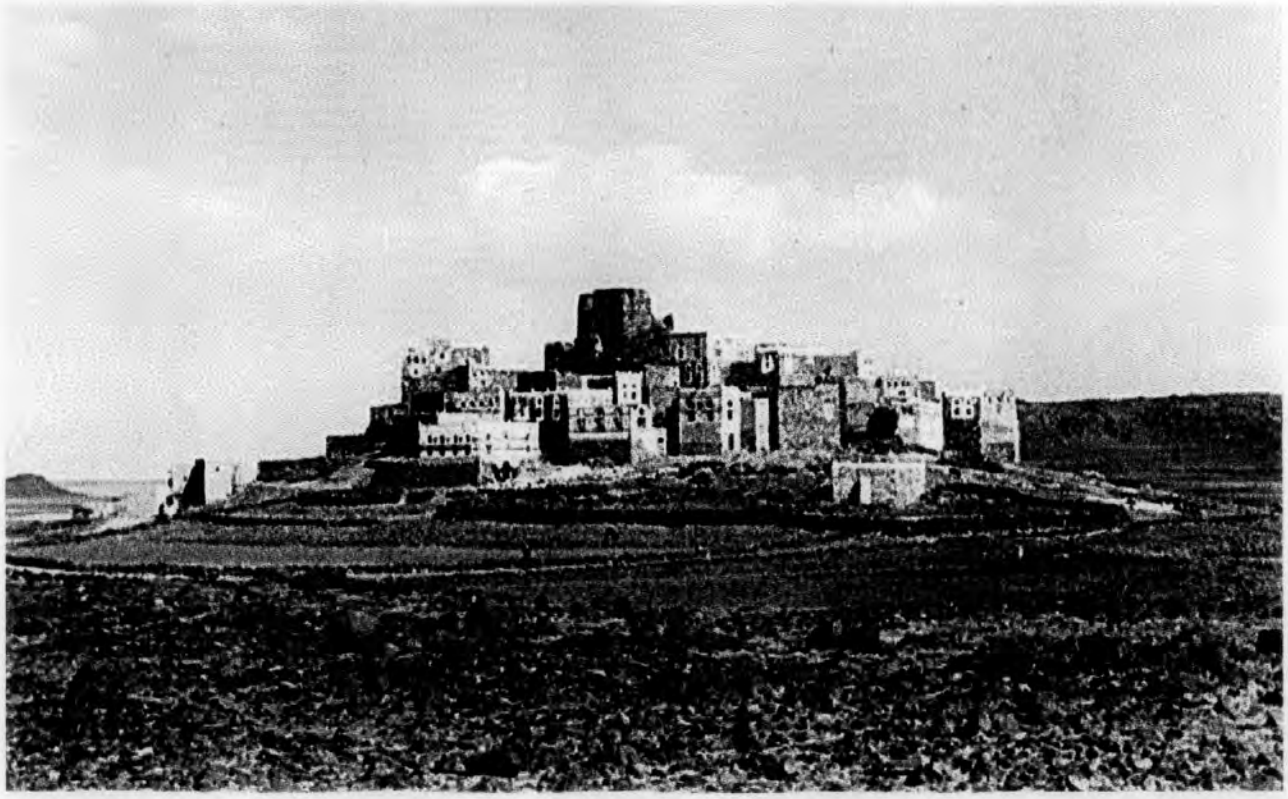
With the Revolution, motor vehicles quickly became widespread - the favourites, for obvious reasons, being motorcycles, four-wheel drive cars and lorries. Repeated circulation contributed to the opening up of rudimentary tracks that began to reach almost everywhere.

Until the mid 'seventies the development of a road network was slow; after that it gained momentum so that by the early 'eighties paved roads connected all the major centres. At the same time a rural feeder network was developed both by the initiative of local populations and the "Local Development Associations". The impact of this is seen in various ways, ranging from building construction to the type of goods sold in the markets.

[32]Dostal:83 reports at least 20 major *sabil* in Sana'a.



Top - North Yemen provinces in 1990; *bottom* - Outskirts of Dhamar governorates



2.8 - Places of polity

ADMINISTRATIVE STRUCTURE

The exercise of polity at the elementary levels is normally concentrated in the hands of the shaykh. Swagman stresses the point that the shaykh, whether as the chief of a small kinship group or as a paramount shaykh, has his power assessed not so much in terms of his capability of raising men for war or of the size of his land holdings, but in his ability to settle disputes .

Arbitration and administration of justice is traditionally done in two ways: the customary tribal law (*urf*) and Koranic law (*shari'a*). The important role of the *sayyid* has already been mentioned as being the extension of the Imam in the diffusion of Zaydism and Sharia law. A similar role was played by another social group , the *qadi*.[33] Although in most essentials *'urf* and *shari'a* are not contradictory, the identification of *'urf* with tribal independence from the Imam's influence often led to it being considered heretical (*taqut*) and thereby condemned. *Shari'a* law was in any case administered not only by *sayyids* , *qadis* and other central government deputies (*hakim*) but also by tribal rulers, who could also be responsible for the collection of the *zakat* tax.

The extension of a central power structure to the local level was represented by various administrative, judicial and tax collection agencies which became part of an increasingly complex bureaucracy. The Turks established an administrative division which has, with minor variations, lasted until the present, with the country divided into progressively smaller categories from governorates and sub-governorates down to districts and subdistricts . Governorates (*muhafadhah*), the largest units, were based in the town after which they were named.[34] Subgovernorates (*qada*) tend to correspond to tribal boundaries and have no local offices especially provided for them. They were however the administrative unit chosen by the "Local Development Associations", for their cooperative actions. Districts (*nahiya*), correspond to the furthest penetration of central government in local politics, with all government services being represented. Like the *qada*, they tend to correspond to tribal boundaries. They are staffed by 1) a District Director (*mudir al-nahiya*), supervising the region, controlling police and security and acting as a mediator; 2) a Director of Finance (*mudir al-mal*) overseeing tax

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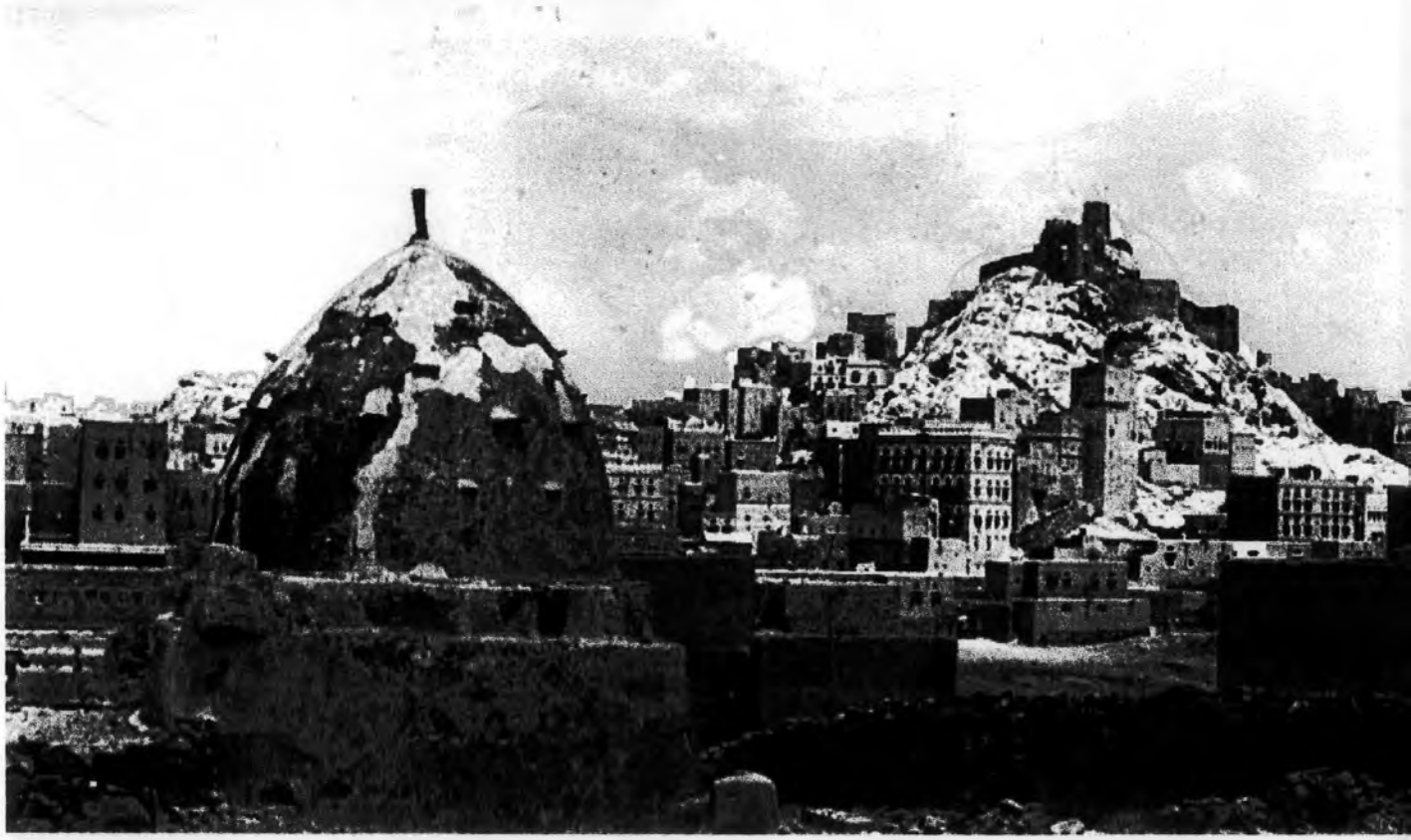
[33]The *qadi* seem to have originated with the tribal structure. Eventually they came to be considered a separate literate aristocracy, second only to the *sayyid* whose claim to lineage made them eligible for the Imamate. See Stookey:76, Obermeyer: 82, Nyrop:86.

[34]In 1990 there were 11 governorates in North Yemen.

Top - Rada'; *centre* - Al Baydha; *bottom* - Sa'da



collection and government expenditures; 3) a Director of Security and soldiers; 4) a Director of Schools; and 5) a District Judge (*hakim*). Finally, Subdistricts (*'uzla*) were the smallest unit of the official state system of administration. Now obsolete, they were created for tax purposes, with an elected official secretary (*amin*), acting for the district director of finance. They tended to respect tribal limits and although several *'uzla* could exist in the same tribal territory, no *'uzla* should cross two tribal areas.[35]

Both the Turkish and the later Imamic rulers tended to superimpose their administrative divisions on traditional tribal boundaries and polity roles were often overlapped. Thus a shaykh could combine his traditional functions with those of a central government representative. Parallel power structures - the shaykh's and the government's - could also be found applied to the same territory. In other cases a government representative could assume functions traditionally reserved to the shaykh. For example, the tax collector (*amin*) who existed down to village level, would, in the absence of a traditional leader in his settlement, act to settle disputes.

BUILDINGS

At the basic settlement level the seat of administration and deliberation is in the shaykh's house, at the *diwan*, the largest reception room. Instances were found where this reception room was part of a separate construction not only because of its polity role but also for reasons of spaciousness. The shaykh's importance or family having increased, the original house was reserved to the shaykh and his family, guests being received and lodged in the new building.

Citadels and forts are the special preserve of the military. Central government representatives, such as the provincial governor (*muhafadh*) have held office in buildings whose design did not basically vary from the domestic model set by the shaykh's house or that of the notables in larger settlements. That is, other than a proportional increase in spaces based on the *diwan* and quarters for guards or a small garrison on the ground floor, the building itself and its location within the fabric of the settlement did not attract any exceptional importance.

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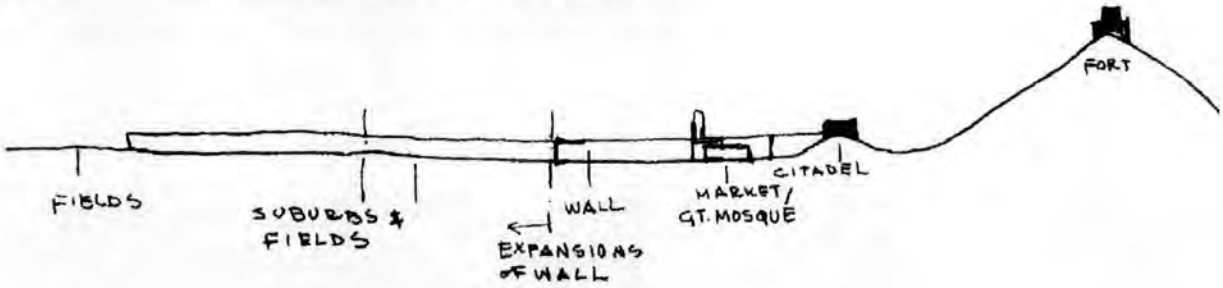
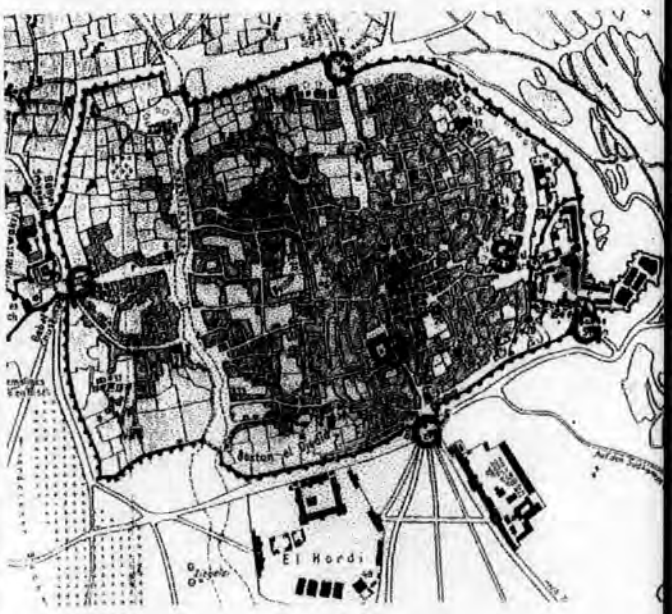
[35]Swagman :88, p 97.

Top - Former Imam's Palace, Hajja ; *centre* - Scheme of town expansion (writer's notebook); *bottom* - Sa'da a nd *madina*, Sana'a; *opposite* - The governor's office and square in Dhamar, in 1976

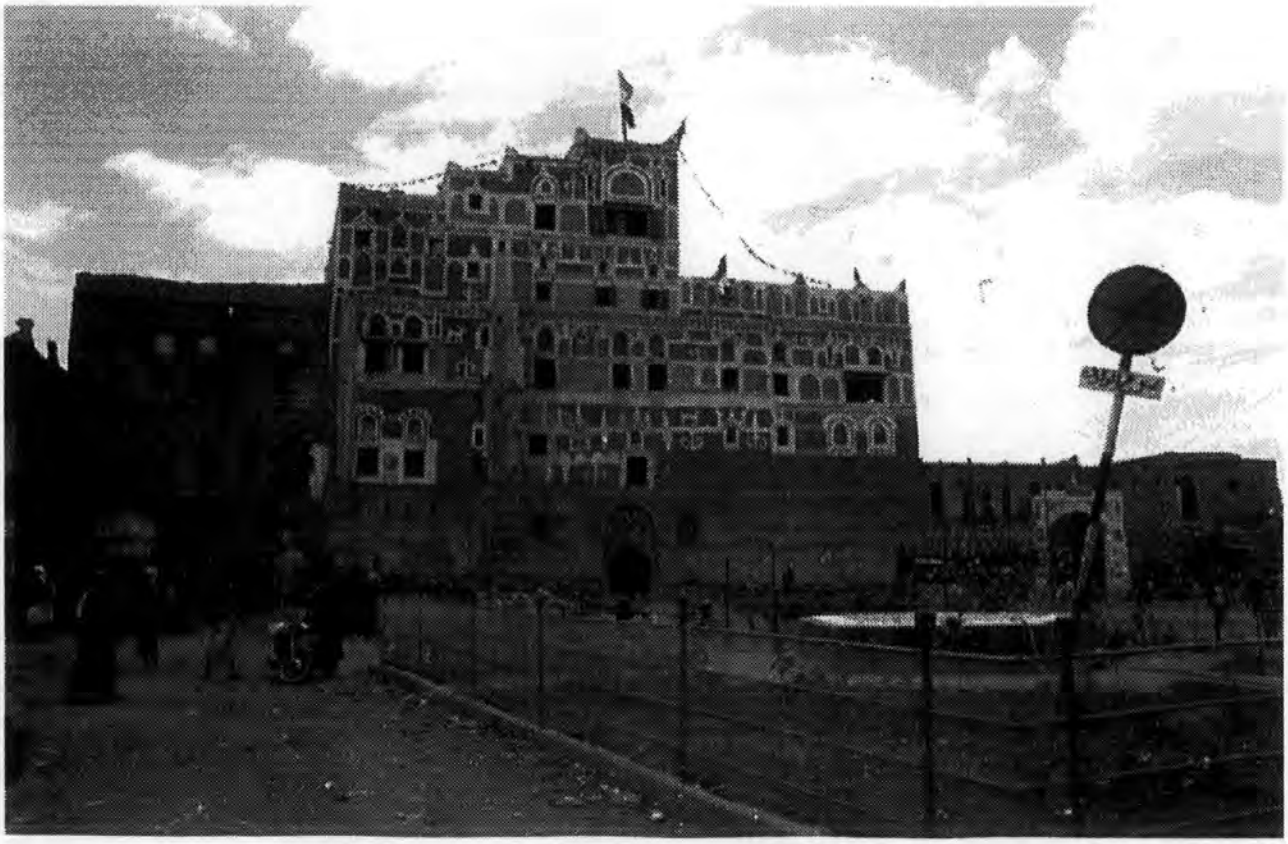


1 - FORT / CITADEL
2 - MARQUET
3 - GREAT MOSQUE
S - SQUARE
G - GATES



In the first years after the Revolution the houses of the former imams and some members of his nobility were taken over for public functions. These buildings, reflecting the taste of their previous owners, often introduced to provincial areas the styles prevailing in the cities. For example, Imam Yahya had the custom of personally presiding over the collection of *zakat* in the various provincial centres and had houses made there with obvious references to the architectural conventions of Sana'a rather than the local idiom.

Places of polity do not seem by themselves to motivate the development of settlements or of core areas in the traditional settlement as obviously happens with the association of market and mosque. They tend to be located in the same general area but do not seem to be part of a structural "town centre" design, and therefore appear as peripheral to such a space whenever it is clearly defined by the location of the great mosque and chosen market areas. Open spaces - more or less defined squares, as at Dhamar, Sana'a, Thula - may exist in front of the buildings designated for government representatives. They were occupied by the overflow from the market on the busiest days, but otherwise operated as parading grounds and places of public punishment.



Top left and right - Al Tawila; *bottom*- Ibb

Section 3 - Urban form

So far components have been described that constitute the basis of the process for settling and elaborating a more complex urban fabric namely the dwelling sites for the social groups at elementary levels and their ancillary spaces for work, prayer and interactive trade. Among the first notions stemming from this description are that even very simple clusters have a mosque; and that, in a rural context, there is a clear space differentiation between the dwelling spaces of homogeneous tribal groups and the markets. The location of places of polity, independently of the complexity of the settlement, does not seem to occupy a primary role in the structuring of the basic urban fabric, and although associated with the settlement core it seems to follow trends primarily determined by the association of market and mosque and the people generated by their functional necessities.

We have seen that towns shelter heterogeneous groups and that, although market places are not necessarily towns, or near them, almost all built form deserving the name of town (*madina*) has a market place.[36] The status of *hijra/ haram* invites conditions for the establishment of non-tribal or detribalized groups and for the co-existence of different tribal origins. In this way major towns are also *hijra* or *haram* places. The result is that the diminishing difference between tribal ancestries and serving groups contributes to the creation of a new social order, namely the emergence of a specific urban class, where claims to illustrious ascendancy may in themselves facilitate prestigious roles but are not the necessary or exclusive condition for economical and social welfare.

In 1970 the major cities were also the capitals of governorates, and their estimated populations were in two groups: the three capitals of the Sana'a, Hodeida and Taiz triangle (120,000, 90,000 and 80,000 people, respectively) and the six peripheral capitals of Ibb, Hajja, Sa'da, Rada' and Al Baydha with average populations of 30,000. By 1986 the administrative divisions had been revised and new governorates created. The population of Sana'a had by then increased in round numbers to 430,000, Taiz, to 180,000, followed closely by Hodeida with 160,000. Ibb and Dhamar were almost 50,000; Sa'da, Al Baydha and Hajja, were between 12,000 and 16,000 people.[37]

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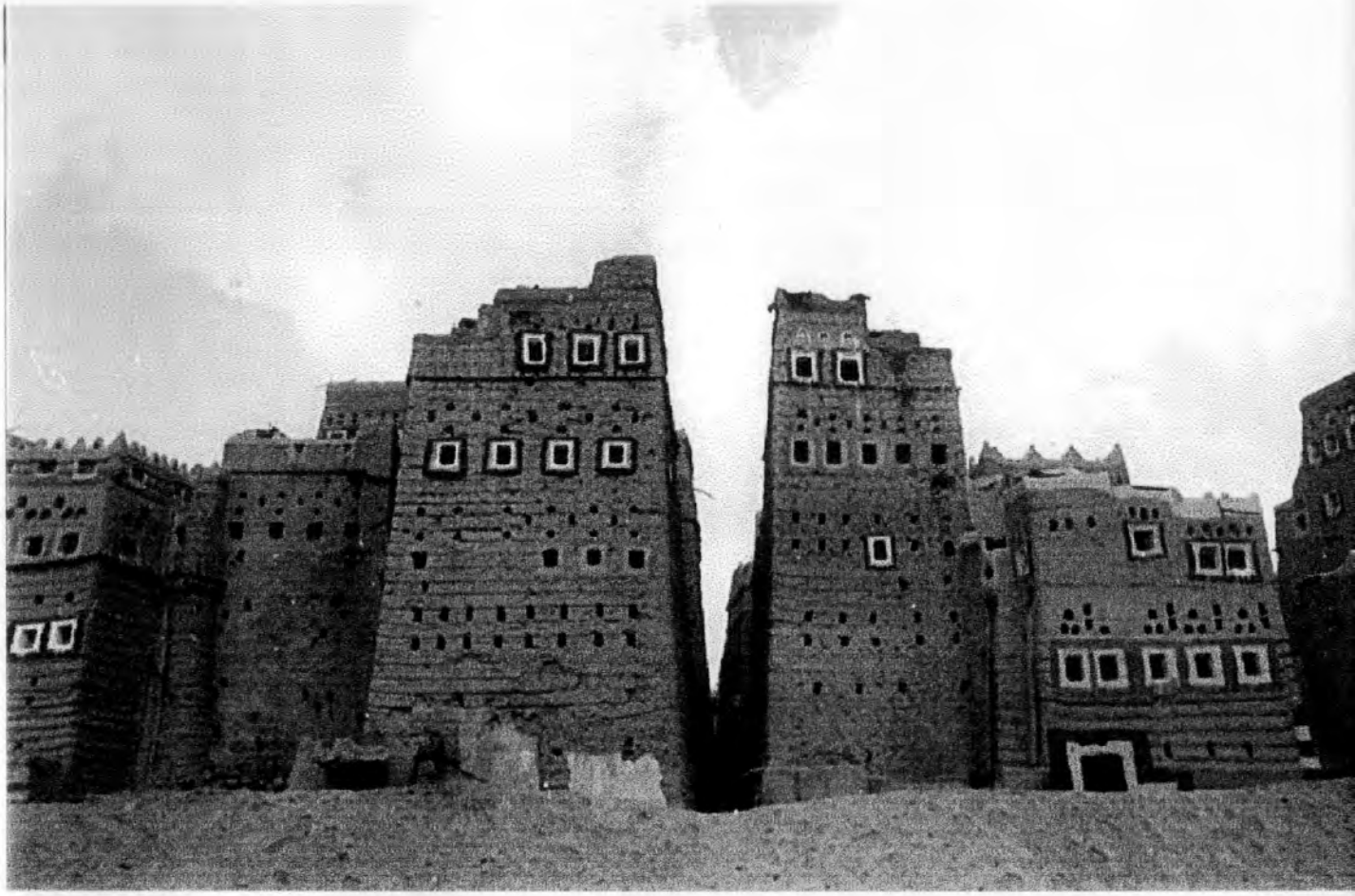
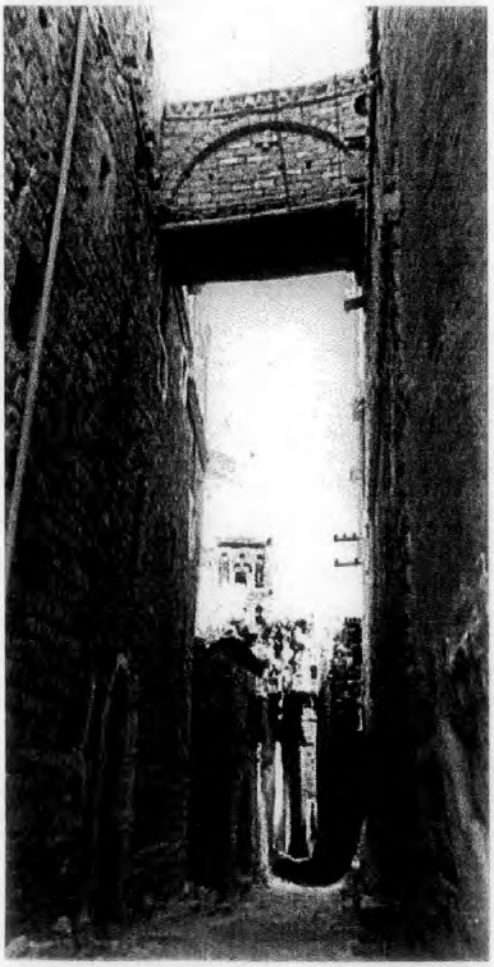
[36] The exceptions to this were found in towns that, because of their strategic position were, in times of resistance, the seat or refuge of the imam, as is the case of Shahara and Kawkaban.

[37] See YARSYB:72 to 88. These figures should be taken only as indicators.





Top - Suq al 'Ainan, Barat; *bottom left* - Thula; *right* - Dhu Awlayin

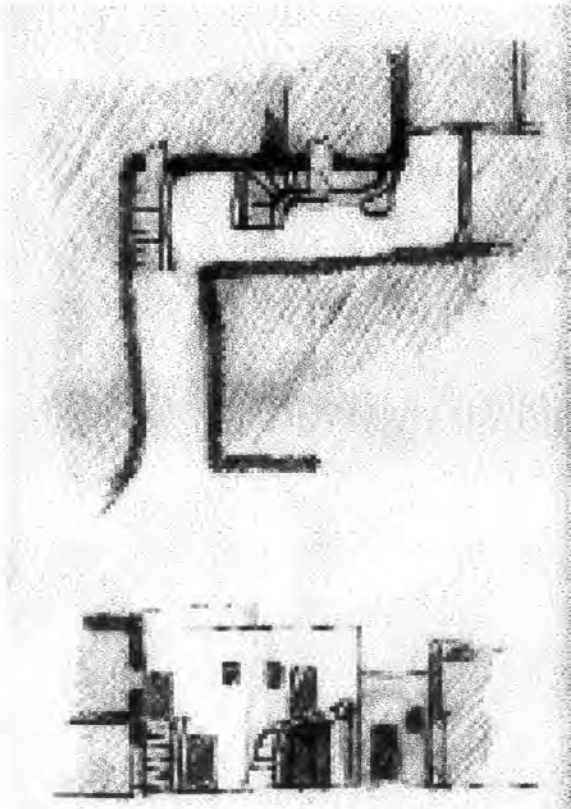
3.1 - Street space

Regardless of size, settlements appear, from outside, formally restrained and discreetly integrated in their natural setting. Yet once one enters even small villages the sensation is that of a scale only found, in the writer's experience, in much larger urban concentrations. This is in consequence of such intrinsic characteristics of the buildings as their size and scale in relation to the thoroughfares; and to the uniformity of a social structure having no wide economic extremities. Consequently there is not the large gap, often found elsewhere, between buildings erected by the very rich as symbols of power for themselves or for the religious establishment, and the modest dwellings of their subjects. In Yemen the settlements are formed by houses of almost identical quality resulting from the individual effort of the owner supported by help from his family, friends and local craftsmen. The development of architecture as large structures is not, unlike other cultures, necessarily linked to that of large towns.

This contributes to the feeling inherent even to relatively small settlements, that "urban atmosphere" is created by the relationship between the volumes of the buildings and the thoroughfares serving them. Small village streets may, thus, not differ much from those of the quarters of large towns. The "urban" value of their form is owed, first of all, to the visual impact of the height of the buildings but also to such features as connections between houses bridging over the streets, occasional widenings that punctuate labyrinthine paths, and so on.
The ground of most village streets is exposed rock or dirt but stone slabs used for paving are still seen in a few towns, such as Thula, Manakha or Ibb in the stone construction regions. In most cases, however, they have deteriorated and are covered by earth and dust.

Although the street is not in itself the object of particular consideration - and the last twenty years have dramatically emphasized the negative aspect of this - it is nevertheless the space onto which the houses face and from which their often elaborate facades can be enjoyed. It is also the space regularly used for the dances and processions of such important events as marriages and funerals; and it often constitutes the only major element of open space relative to the dwellings. There, women sit and talk, on the doorstep of their houses, smoking a waterpipe with their women neighbours and at the same time watching over their children playing nearby.

Top - Street pattern, Zabid; *bottom left* - Dancing in the street, Tawila, 1976; *right* - Village street, Dumran, Yarim (writer's notebooks)



3.2 - Neighbourhoods

In the small settlements, by the very nature of their social composition, the principle of inter-aid is inherent to the community, by which all of its members are bound to participate in any aspect of public welfare, ranging from the construction or repair of terraces to the erection of a school, mosque or other community facilities. At a more personal level help is extended to the construction of individual houses or by offering succour to those afflicted by disaster or misfortune. This partly explains why, even in the very low cash economy level of pre-revolutionary Yemen, abject poverty was virtually non existent.

In towns the equivalent institution is the quarter or neighbourhood (*hara*).[38] Towns are divided into quarters which may have common tribal or ethnic characteristics. Some of these could be confined by walls as, for instance, the Jewish quarters of Sana'a and Dhamar. In some cases this suggests successive extensions of the city wall to enclose the various clusters as they developed.

Dostal[39] says that neighbourhoods may consist of *"family groups that are not descended from a common ancestor and are largely not even related to each other"*. Yet their main characteristic is the obligation of mutual support in such cases of need or contributing to the costs of marriages or funerals. Each neighbourhood has a headman - *'aqil* , the same name that may be given to some village leaders - who is in charge of all the affairs of his area and receives and distributes the monies for the various uses already mentioned. Neighbourhoods usually have at least one mosque, with which they may share the name, and common facilities such as schools for the children of the quarter.

The right of residence in a neighbourhood is acquired by birth and in many cases moving out of it requires permission from the *'aqil* .[40] The arrival of a stranger in a neighbourhood could be the same as in a village of the tribal areas: one needed to be in the company of a resident to be able to circulate within it. In the larger towns this control slackened or totally disappeared during the years following the Revolution.

With the rapid expansion of major towns in post-Revolution years, new

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[38]In Thula the name used for a neighbourhood is *qaryia;* in other places - Tawila, Ibb - the word is *bayt*, both instances being evocative of a certain type of progressive development by association of various groups with different origins.

[39]Dostal:88, p 362.

[40]In Sana'a this no longer applies: one is free to leave the neighbourhood and, more recently, also to move in.

Top left - Street and drinking fountain, Khirab, Barat; *top and bottom right* - Hajja; *left* - Ibb

areas were created. Nominally they are neighbourhoods, but without the same privileges and obligations and the consequent notion of physical and social identity. A common feeling frequently verified by the writer was that of alienation from the social environment in which the residents of the new areas found themselves. The extended distance from the original abodes of friends or family made it all the more acute. As a consequence it was commented that qat chewing was the only way to maintain social links since it provided the pretext to go across the town for visiting.

3.3 - Infrastructure services

WATER SUPPLY

Other than the water supply works mentioned in chapter 1, there is no domestic water supply network in traditional Yemeni settlements. Water for domestic consumption relied, at best, on public and private wells and at worst on open cisterns. Houses having their own supply often had a covered well at the ground level and a vertical shaft the height of the building to serve the kitchens on the upper floors.

In 1972, reportedly 83 % of the houses in the whole country were without well water or a piped supply.[41] In the rural areas women carried water by hand, sometimes from quite a distance and with the aggravation of the settlement usually being uphill from the source.

In urban areas water was distributed by water sellers that went from door to door on foot or with carts. Early in the seventies drinking water peddlers with their water skins and tin cups were still a common sight.

The first installations of piped water reflected the ad hoc approach towards meeting needs by the most expeditious means available. Water pipes were invariably laid , in buildings as in thoroughfares, utilizing the simple principle of the shortest distance between two points, regardless of whatever features were in the way. In some cases the result took on a peculiar, almost sculptural form, but generally it amounted to clutter in narrow passages and an odd contrast with the traditional textures of the built environment.

The public water supply system that emerged after the revolution consists of reservoirs located at high points in or near settlements, as at Sana'a, where the water is pumped up from wells. It is distributed from the reservoirs to a domestic network, and stored in tanks on the roofs of the

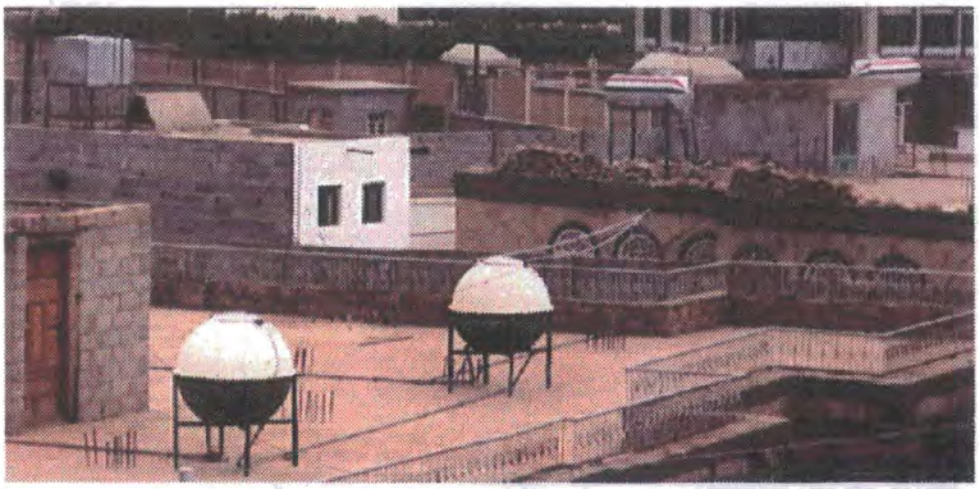
[41] YARSYB:72.

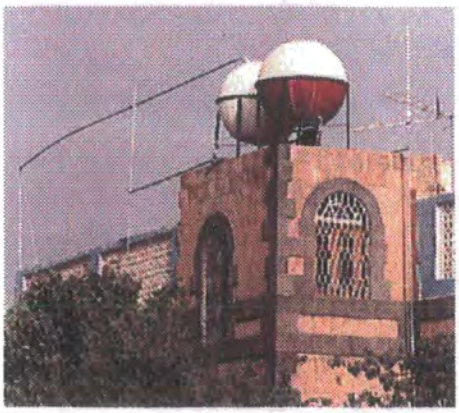
Top - Water tank, part of Dhamar's municipal supply, 1976; *centre left*- "Water Room" in a Zabid house (photo S. Kennedy); *right* - Roof tank , Sana'a; *bottom left* - Holes in the pavement draining rain water onto the *sabil*, "Maydan" mosque, Hajja; *opposite* - Fibreglass water tanks at Sana'a *(top and bottom left)* and Sa'da

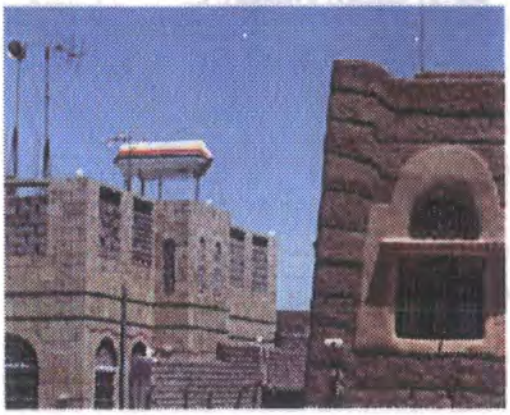
houses. Since the supply has proved intermittent, a feeder sometimes exists at ground level from which water is regularly pumped up to the roof tank.

Originally, these roof tanks were cubical galvanized iron of simple local manufacture but mass produced tanks, in other shapes and materials, such as fibreglass spheres, have now appeared. Some of these have been decorated with painted motifs and suggest the possibility of a new feature in the roofscape of some towns.

Traditionally water for domestic consumption was stored in masonry tanks or earthenware jars[42] in the kitchen, bathrooms and occasionally in small rooms especially designated for the purpose. Water was used sparingly and re-cycled in various ways. For instance, water that was considered unfit to drink or for cooking, having become stale in the containers, would be used for washing kitchenware and clothes; the water from washing the body could be re-used in the toilet and so on. Once piped water was introduced, its use and consumption changed from being sparing to wasteful. The water supply of towns is at a critical point, as it will be seen in Part 2.







[42]Later, discarded mass-produced containers - oil drums and tin cans - have fulfilled the same function.

Top left - Thula; *right* - 'Amran; *bottom left* - Al Qa'a, Sana'a; *right* - Street sweeper, of the *Akhdam*, Sana'a, 1973 (photo Kai Bird)

WASTE DISPOSAL

Waste disposal was, in the pre-revolution, pre-industrial culture of North Yemen, part of a well established closed cycle. Organic waste - virtually the only waste to be accounted for - was re-utilized as fuel and fertilizer. Local household products could be easily assimilated into a production and re-cycling circuit. Liquid waste was literally non existent; the small amounts of water utilized and domestic methods of disposal took care of this. Kitchen waste was absorbed by scavengers - dogs or birds - and the cleanness of public spaces was the community's responsibility supervised by the shaykh or village leader. Once a municipal structure had been set up by the Turks during the second occupation, street cleaning became its responsibility in the main urban centres. This task was done by members of socially underprivileged groups, such as the *akhdam* (who still did so as recently as 1990) and occasionally the Jews. Washing the streets, however, seems to have been left to the action of the rain.

Dogs, inspite of being considered unclean by Muslims and the object of evident aversion by the population, probably because of their scavenging function, were also the neighbourhood night guards, warning and preventing the passage of strangers. In Sana'a, a campaign of dog extermination in the mid 'seventies terminated their use for both functions.

Thus, it was true that streets could be made of dirt and look neglected but dirty they were not, as the writer was well able to observe throughout the country, during fieldwork in the early 'seventies[43]. Since then, there has been a massive introduction of canned food and bottled beverages together with a wide variety of plastic consumer goods, from shoes to bags and wrappings. Similarly the introduction of piped water supply without an equivalent disposal system has caused both the direct discharge of increased amounts of waste water directly on the street or the overflow of cesspools. This has completely wrecked the balanced system of use and re-cycling that had been adequate for even the largest towns, when a town of 50,000 people was a large one.

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[43]A century before,Joseph Halévy had considered Sana'a "*the most beautiful and cleanest town in Arabia, with streets that were wide, straight and usually paved*".See Bidwell:83, p 112.

Inside the town walls, Thula, 1990

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CHAPTER 3 - THE HOUSE

Section 1 - Generalities

1.1 - Behaviour

Ritual is traditionally associated with building. At the first stage of construction, when digging the foundations or when the first arch is raised, the house is dedicated with prayers, a sheep is slaughtered and a celebratory meal arranged. A similar ceremony, when the building is completed and before the tenants move in, involves the recitation of Koranic verses by the 'ulama. Contemporary conditions may have caused an erosion of some of these ritualistic aspects, but dedication of the house still takes place.[1] Punishment, in the form of having one's house demolished, is recorded in Yemen as the privilege of rulers. In pre-Islamic Southern Arabia conquerors destroyed the palaces and inscriptions of their vanquished foes. In the mid 'seventies ruins could still be seen resulting from a similar exercise by the Imam on his subjects.

The way the house is occupied reflects social practices which may vary but are generally consistent. In rural areas both men and women work in the fields. Men do the shopping, in the towns as much as in the countryside, and women carry out household chores. Women have a strong and diversified relationship with the house: for instance, in nomadic societies it is the women's responsibility to set up and dismantle the tents;[2] and in the Tihama the decoration of reed houses is done by women. Elsewhere their intervention may be less evident but is nonetheless as important.

Women move into the husband's house when they marry, returning to their fathers' house if divorced or widowed. In rural areas the sons may build separate houses for themselves at marriage. Commonly , however, rooms are added to the father's house, and several agnatic families accommodated in the same building, each having a private area and sharing certain communal rooms. In the largest families the parents live with the eldest son; they are never expected to live alone, it being part of the moral code that protects parents when they become old and weak. The best rooms are usually reserved for the eldest and the youngest. In extended families, women usually share the household duties but, to avoid

[1]The writer heard various tales embroidering around the theme of the materialistic builder who neglected to dedicate the house and fell from its roof top as soon as it was completed.

[2]Steffen:78

Top - Sitting (drawing J.Varanda and squatting; *centre* - Cobble and masons finishing stone an earth wall; *bottom* - Grindin grain, eating , washing (writer notebooks)

conflict, each family unit has its own kitchen whenever possible.

Entertaining and socialising play a more prominent role in the town than in the country. During the afternoon, men and women meet separately. Qat chewing sessions are the main male gathering pretext, and, as will be seen later, a room may be dedicated especially for that purpose.

1.2 - Postures

Observation of the postures taken in rest and activity helps to understand how space is occupied, particularly within the house. The body is directly related to the function it performs, and any intermediate tool exists only when the hand itself cannot do what is intended. Thus the man who builds a house in mud or surfaces it in plaster shapes it with his bare hands. Even when tools like a trowel or a float are used, the hands often follow, to smooth and to adjust.

The farmer uses short hand-tools to dig the ground, to thresh the grain; and so does the mason to cut his stones, or the woman who sweeps with a short broom even when long handle versions are available. It is the body that encounters the field of work. The ground is the natural surface of work and rest; tables, benches, counters, for working or for eating are rare in the Mountains. A carpenter works on the floor using his hands and feet to hold materials and tools, women prepare the meals on the kitchen floor, one eats on the floor. Sometimes mud benches or small platforms were seen[3] but they are rather a means of separating a static area from a circulation zone; it would be unusual to see someone sitting on the ground and eating from or working on those platforms. In the Tihama the wood frame beds that are the one ubiquitous piece of furniture are used in a similar way.

Squatting is a common position for rest and function, both inside and out;[4] it is also the position for washing, urinating and defecating, both for men and women.

Sitting postures allow for extended periods of time in the same position. They require a minimum of furnishing - a rug to sit upon with something solid to lean on - which is the origin of the particular kind of hard cushions used in sitting rooms. One sits cross legged or with one knee raised and the other down, with or without arm rests; or on one's heels, easily passing to a kneeling posture, which is the preferred position

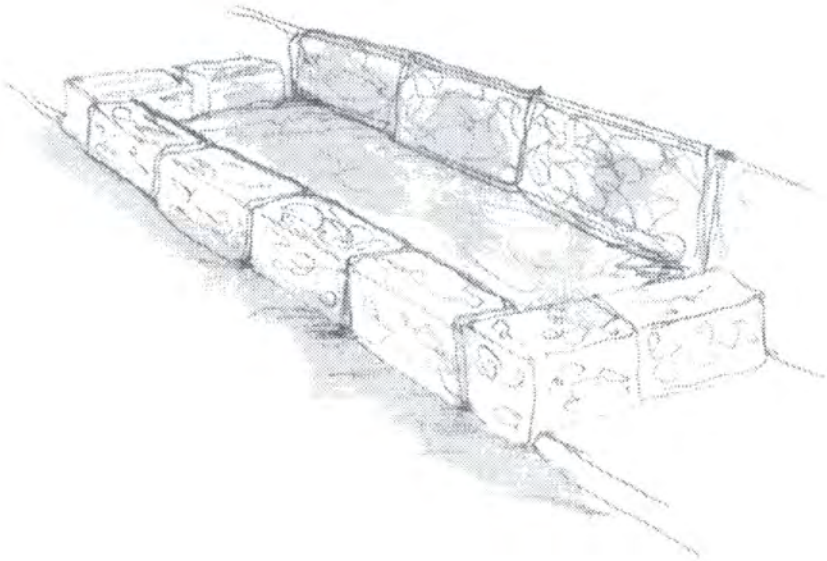
[3]For example in Al Baydha, in Bir al 'Azab (Sana'a) or in primitive settlements such as Al Janad.

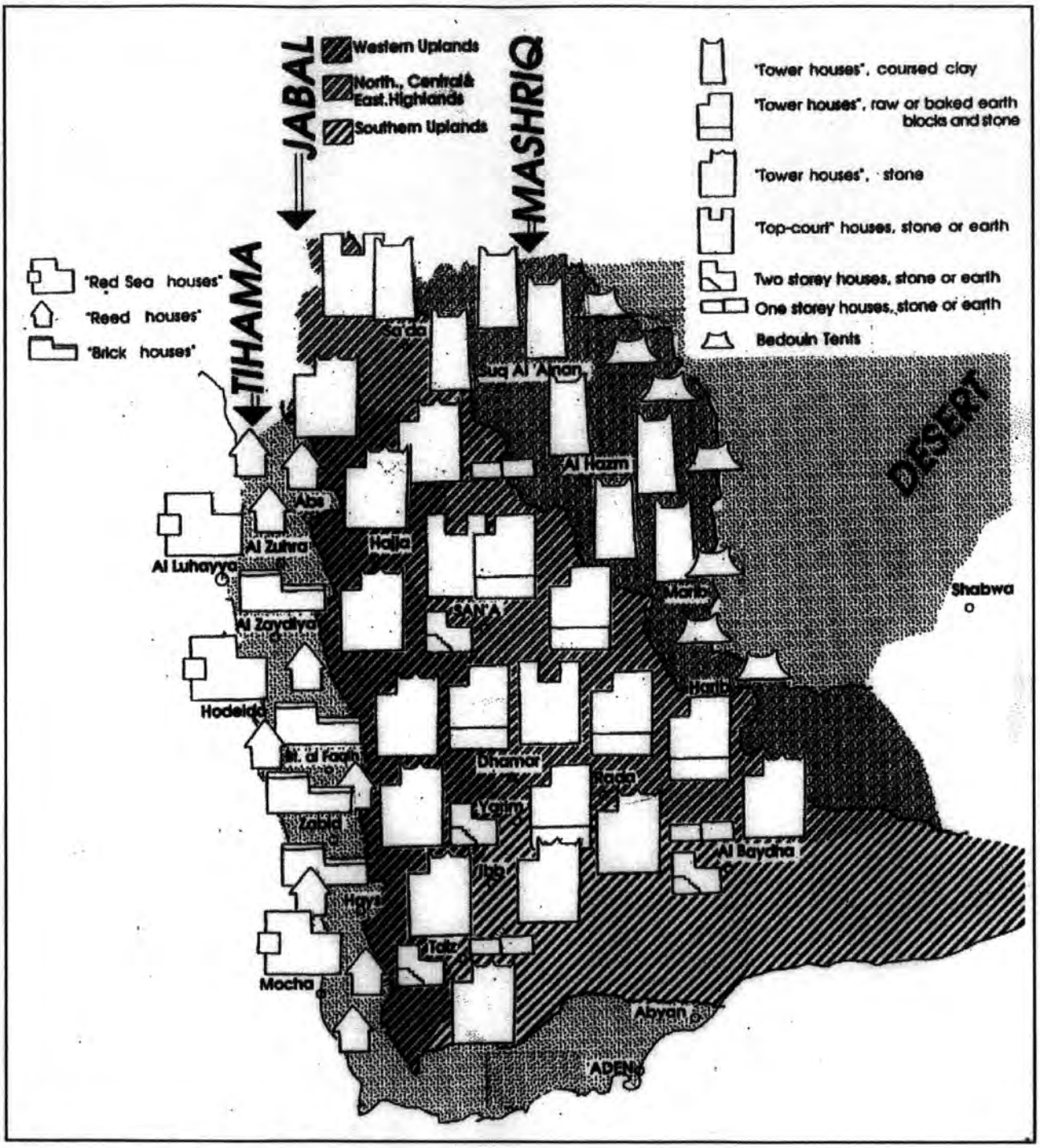
[4]In the area of Al Baydha a cloth belt was used for added comfort that tied the knees close to the body; it was locally designated, with visible humour, as "Al Baydha chair" (*kursi baydhani*).

Top - Qat session, Sana'a; *bottom* - Telling a story at the shaykh's *mafraj*, Al Tawila; *opposite, top*- Bed made for sleeping, Al Sabahi (writer's notebooks); *bottom* - near Bajil, Tihama

for eating. The ease of these positions is conditioned by a few determined rules (such as not showing the soles of one's feet), which contribute to an atmosphere of relaxed decorum.

The position for sleeping is laying on the side, with the hands under the head. No pillow is needed, although some people use a small one (*mukhadda*). It is usual to surround the sleeping mattresses with arm-rest cushions (*madka*) defining an area that appears almost walled. It has been said that this was a means of protection against vermin.





Major house types of North Yemen (Schematic map)

Section 2- Typologies

Basic house types were mentioned in the previous chapter. as part of the general approach to shelter and settlement. An attempt is now made to establish a typological classification based on functional use and spatial distribution.

Two major typological groups are identified: one characteristic of the coastal strip (Tihama), and the other of the Mountains and their eastern extension, the Mashriq. Besides other factors of difference, based on natural and ethnic features such as the Tihama's proximity to Africa, one feature is immediately obvious, namely that in the Tihama the dwellings are predominantly organized to expand horizontally and in the Mountains vertically. Also, whereas variable methods of construction and textural treatments arising from regional diversity do not influence the basic plan of each type in the Mountains, in the Tihama a classification based on spatial organization may largely coincide with one based on construction materials.

2.1- The Tihama

Although in the foothills detached small quadrangular huts with stone walls and thatched pitched roofs appear as transitional forms, Tihama houses, from the standpoint of spatial organization, are of two basic types. In the first , dwelling units consist of one-room single-storey structures disposed around, and accessible through, a high- walled yard (*hawsh* or *hawyia*). In the second, two or more storey buildings, with several rooms per storey, have an internal stair directly accessible from the street and are topped by usable terraces.

The first type, extending throughout the whole region, takes two forms, henceforward designated "Reed houses" and "Brick Houses" depending on the predominant structural material. The second type, concentrated in the major ports and with isolated appearances in the larger inland settlements, is known as "Red Sea Houses" and is part of a style, built in coral stone and/or baked brick, which elsewhere extends from Suakin in Sudan to Massawa in Ethiopia.[5]

House furnishings are simple and common to the three types. The basic piece is the "Tihama bed" (*kursi*) consisting of a four legged wood frame, sometimes carved, supporting a sitting or lying surface and a small back rest of interlaced rope some seventy centimeters above the

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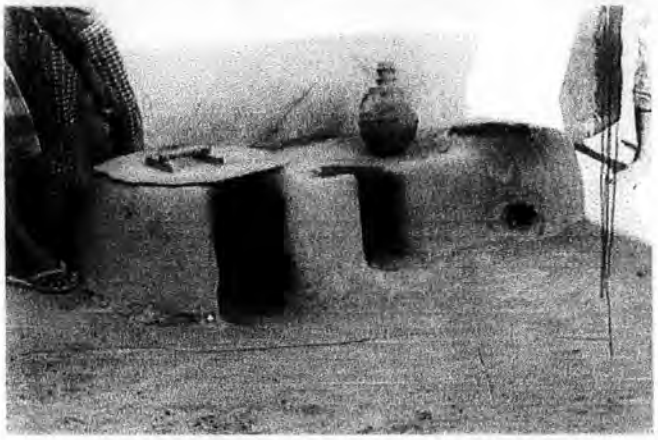
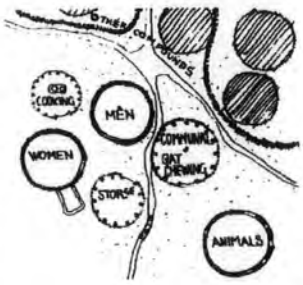
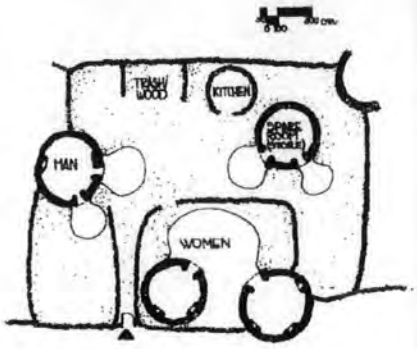
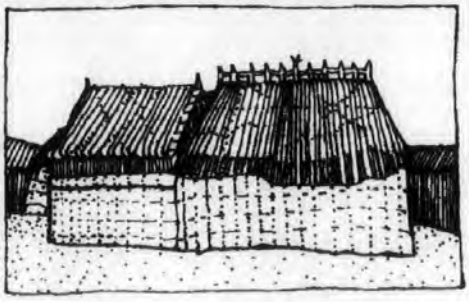
[5] Matthews:54



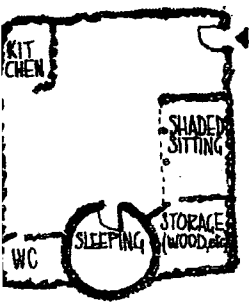






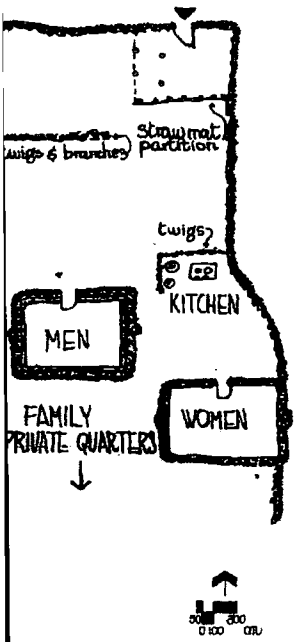
Top - Near Abs; *centre, left* - outdoors cooking place, Zaydyia; *middle and right* - "open plan" and compound" (source Varanda:82); *below* - Al Zuhra; *bottom* - Abs, Al Zuhra and Al Luhayya (drawing J. Lebre); *opposite* - Schematic plans of houses for young couple and for larger family, Al Luhayya

floor. Occasionally, matresses and cushioned back rests, of the mountain type, may be added to the *kursi* or spread on the *rawshan* floor of "Red Sea Houses", as seen in Hodeida. Spaces in which to store personal effects were similar to those in the mountains: pegs, boxes, trunks and, in both the "Brick Houses" and the "Red Sea Houses", plaster shelves and plenty of decorated niches , with or without doors.



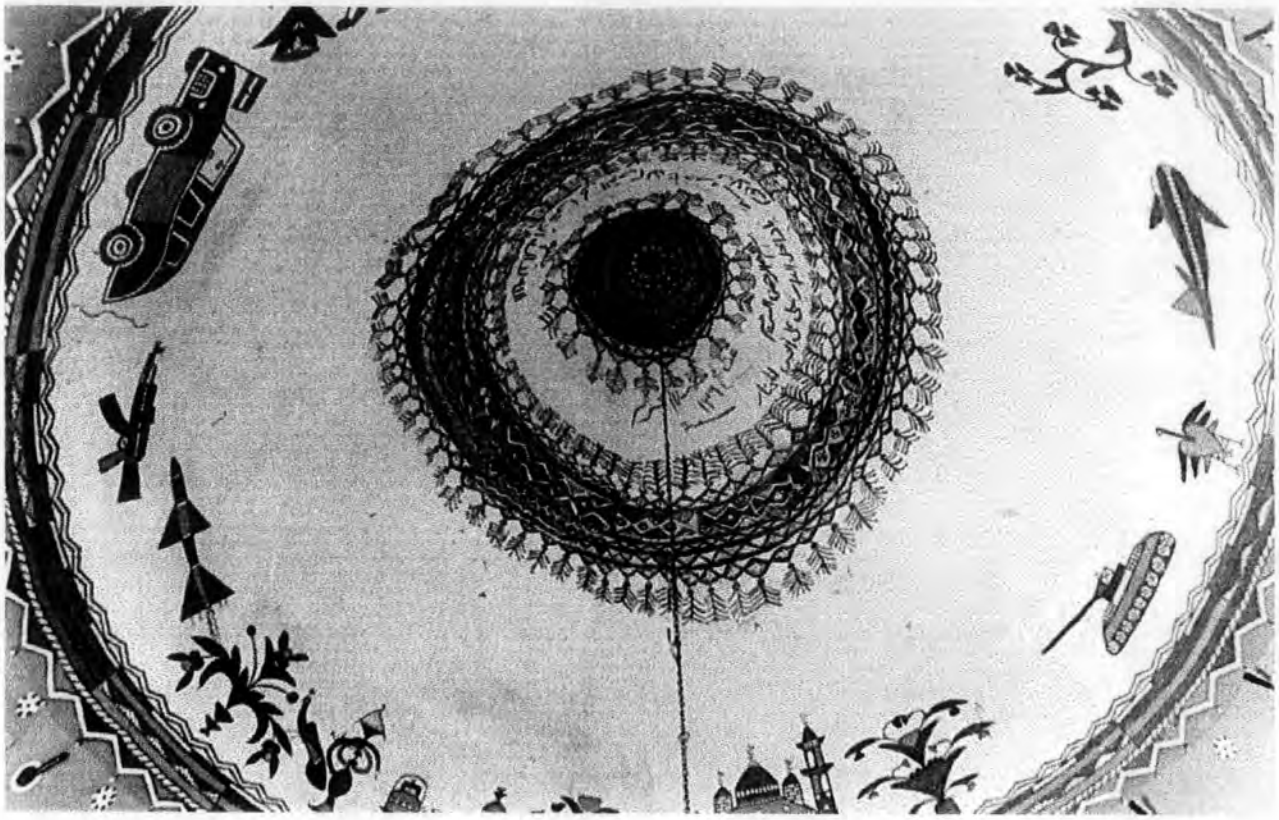
"REED HOUSES"

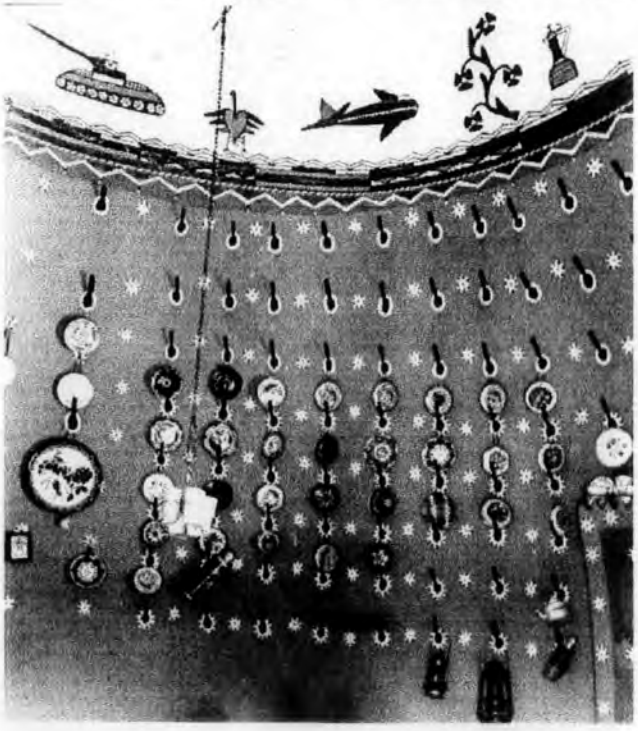
Reed houses may appear isolated or with several units disposed in an "open plan" arrangement, that is, without being physically contained by a compound wall. The common rule, however, for both grass and brick houses is of easily extended compounds containing a) one or more sleeping/sitting units (for men and women, separately), b) a cooking place (*mawfan*) which, in the case of the reed houses, is usually outdoors in the yard, c) an enclosure, often roofless, for ablutions and latrine, d) an enclosure or covered unit for agricultural or fishing implements and e) another enclosure for animals. A wall-less covered area (known as *barud* in the reed houses of northern Tihama) is commonly seen for informal gatherings and qat chewing, doubling as a sleeping area on the hottest nights. Many compounds have their own well.



Known locally as *'ushash* , reed houses, are found throughout the whole Tihama and appear in both round and quadrangular plan forms. Round houses may be detached from the compound wall but quadrangular houses are generally set so that the yard wall continues the exterior walls of the buildings. Further typological subdivisions may be possible based on the predominance and variations of each of these plans but this was not attempted for the present study.

The structure is formed from vertical poles regularly spaced, founded in the ground and cross-tied with flexible reeds. In the case of round buildings, those are tied together at the apex, forming conical roofs. In quadrangular houses the pitched roof is based on a ring beam on the four walls and a ridge board running the length of the building. The whole is then covered with layers of vegetable fibre - palm leaves, straw or reeds - ranging from grass laid loosely over the frame to a woven fabric tied with ropes in careful geometric patterns. The exterior of the roofs is solely made of grass. Mud may be used for interior rendering of walls and ceilings and occasionally for solid walls.



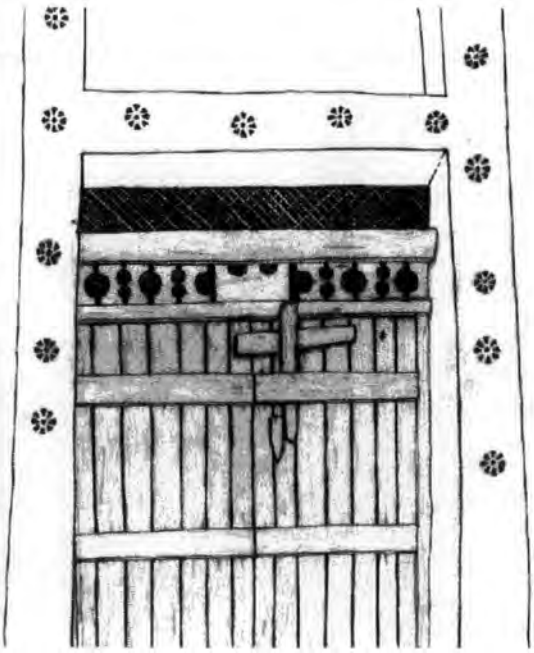


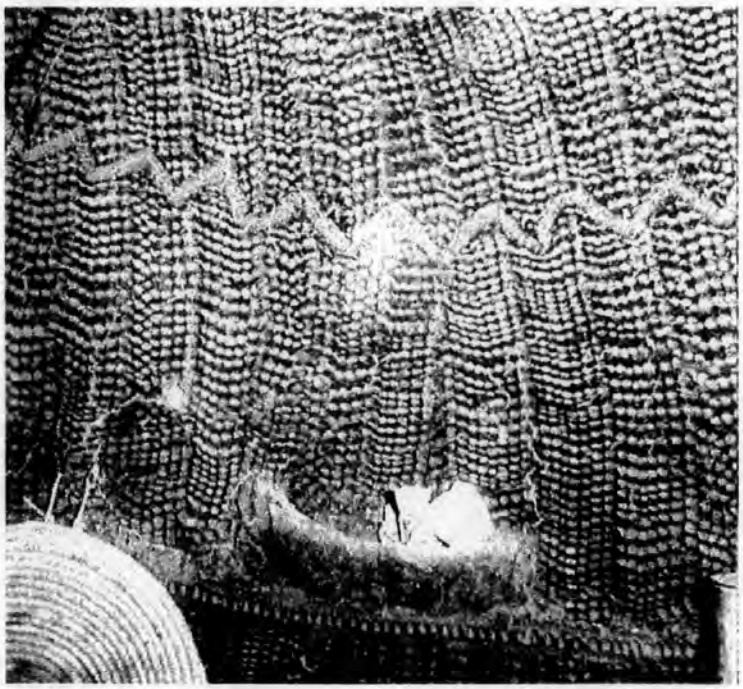
From top to bottom - Ceiling, wall, alley and yard, Al Zuhra; *opposite, left* - Door, Al Zuhra; *right* - "Fingerprint" decorations, Wadi Mawr (photo S. Kennedy)

In the simplest houses the structural frame may be exposed internally. In general, however, it is covered with either straw mats for walls and/or ceilings, or with mats on the ceiling and mud on the walls; or mud throughout. The separation between roof and walls may be emphasised with rope motifs or ventilation strips.

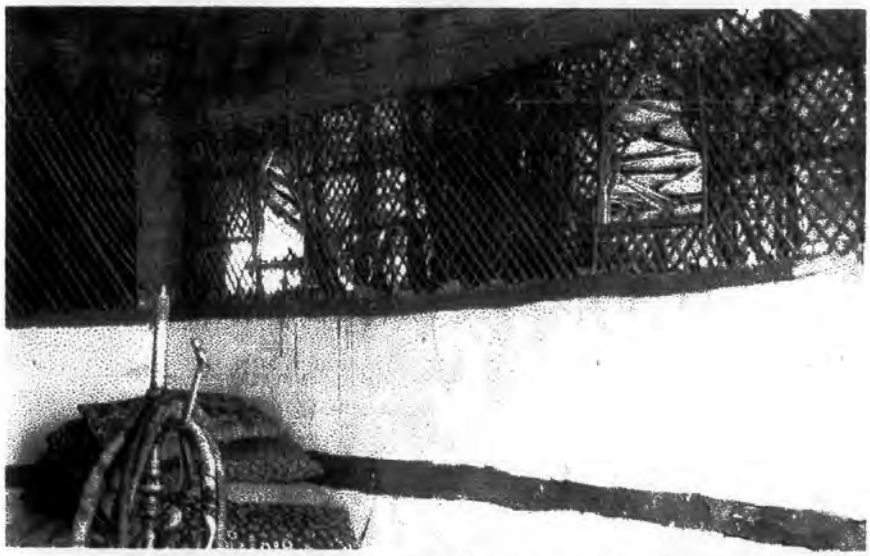
There is much formal variety in the textural treatment of thatching, the best examples being in northern Tihama, such as Al Luhayia for quadrangular houses and Al Zuhra for round. In Al Luhayia structural and decorative forms from the neighbouring "Red Sea Houses" are translated into the grass techniques and vocabulary.[6] In Al Zuhra the exteriors are carefully thatched and the interiors entirely rendered in mud, resulting in loftly domelike ceilings. These are colourfully decorated in a profusion of floral motifs, enriched (as in other "naif" situations elsewhere on the coast and in the mountains) by the iconography brought by the Revolution, namely the Republican eagle and flag, planes, cars and machine guns. Other domestic motifs may be added, such as waterpipes, interpretations of mosque stereotypes, and similar simple representations. The upper part of the walls is, in turn, decorated with Chinese enamel plates hanging from a quantity of built-in wood pegs, protruding from rosettes also painted on the wall.

Other forms of decoration, seen in Al Zuhra and elsewhere, consist of patterns of multiple concentric circles made in the fresh clay of the floors and multiple finger imprints on walls and ceilings.

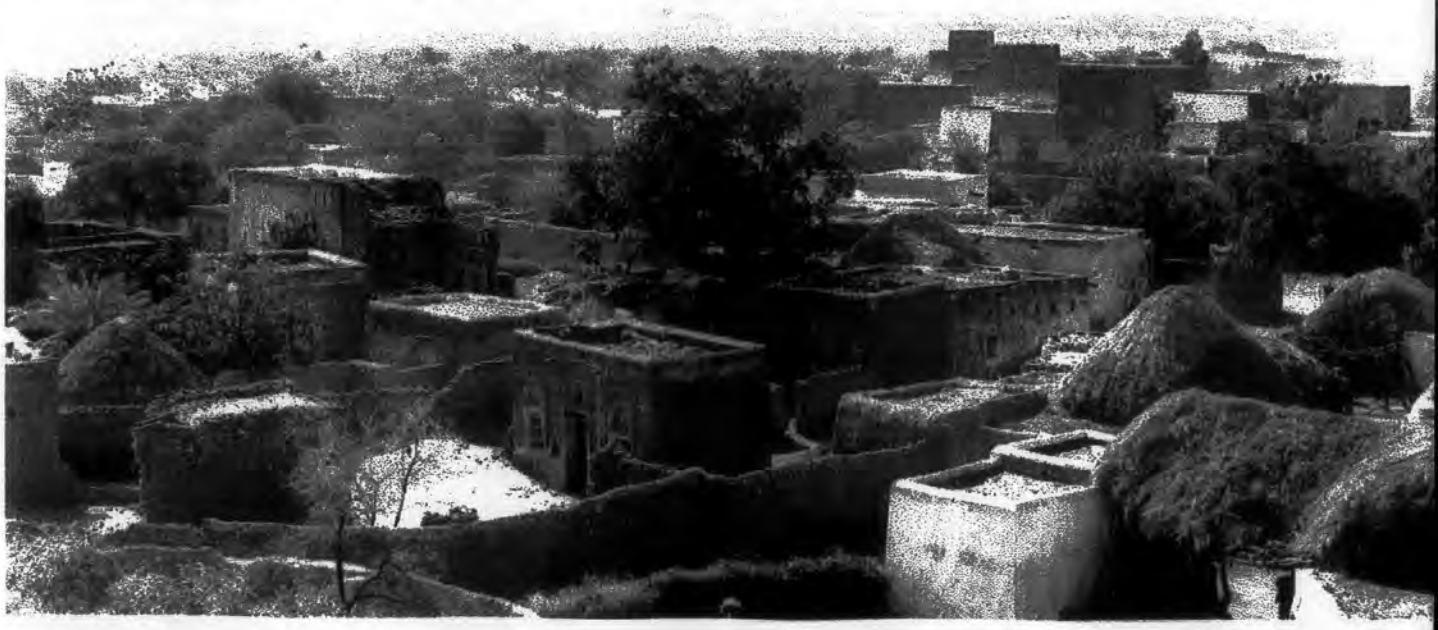




[6]One interesting case of *barud* repeated, in latticed palm-leaf stems, the arched façade of the ground floor *diwan* of neighbouring "Red Sea Houses".



Top and centre left- Barud and ventilation strip, Al Luhayya; *right* - Straw mat "window", Hodeida; *bottom* - Al Jarrahi; *opposite* - Schematic plans of compounds with reed and brick structures in Al Khawkha and Al Zaydyia; *below* - Al Luhayya, with stone constructions in reed compounds in the foreground and cluster of "Red Sea Houses" in the background

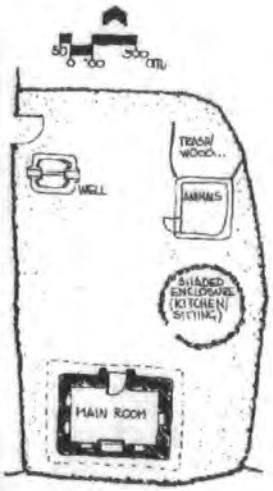


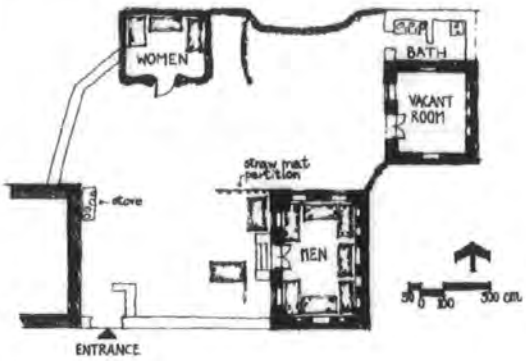
A variety of features keep the interiors ventilated and cool. Floors are regularly sprinkled with water; the wall, if mud, may be separated from the roof by an unsurfaced ventilation strip; or ventilators may be opened in the mud or straw walls or as latticed panels above the entrance doors. There are few instances of windows in an accepted sense, and the recorded examples, as at Al Luhayya usually reflect the influence of surrounding more advanced architectural forms .

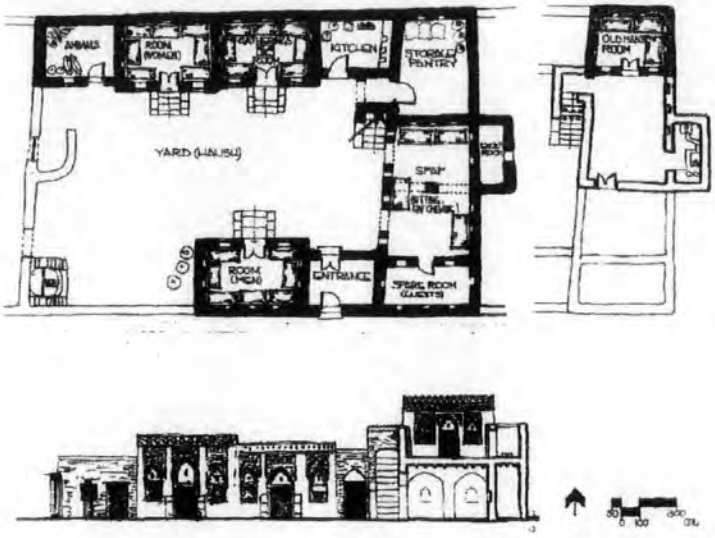
Compound walls are usually thatched but also made of mud or tied branches. Baked brick may, although rarely, also appear in compound walls of reed houses .

A few brick houses appear to have been part of some grass settlements for a long time, usually associated with leadership or administration. Situations where grass and brick structures co-exist in the same settlement or compound become frequent as the areas of brick predominance are approached. It appears that, material means being available, the tendency is to replace the more precarious by the more solid material. Stone was also found in a few cases, such as Mawza and more remarkably, Al Luhayya.

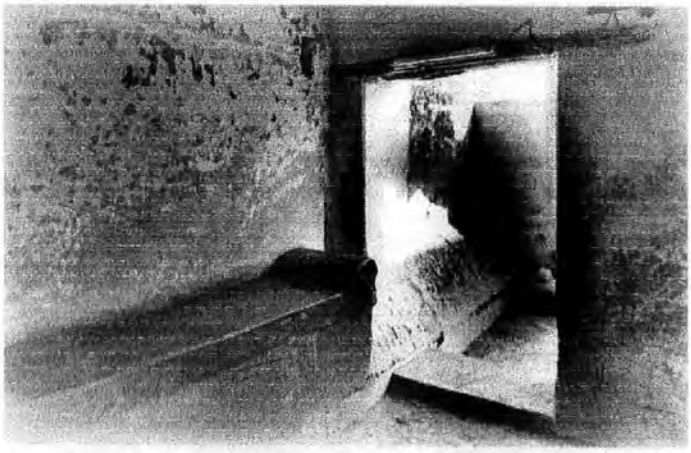
In the last 10 years the encroachment of brick, but mostly concrete, houses, in settlements once wholly built of reed and grass, has not only affected the latter's formal coherence, but also brought a reduction in the standards of reed house conservation and construction.





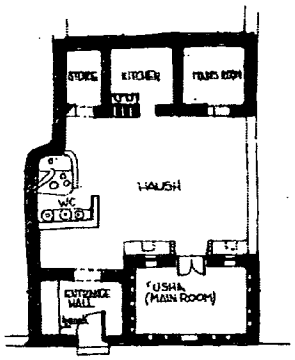


Top, left - Hays; *right* - Zabid; *centre* - Entrance hall *(left)* and *sfaf (right)*, Bayt al Faqih;*bottom* - Zabid; *opposite, top* - Bayt al Faqih; *centre and bottom* - Zabid

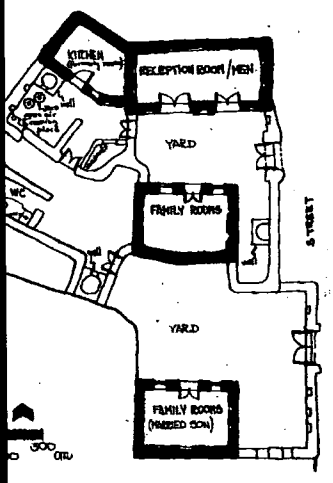


BRICK HOUSES

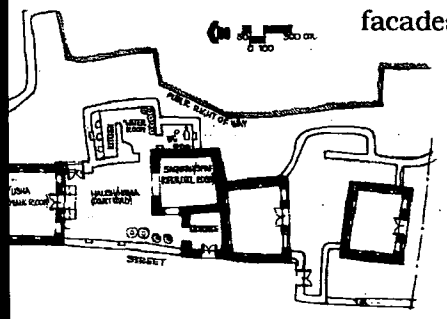
The "brick houses", built of baked earth bricks,[7] are found from north to south of the Tihama, but predominate in the central/southern areas, with the towns of Zaydyia and Zabid representing respectively the northern and southern limit areas of influence. Remnants tell of former important brick constructions in northern Tihama, an area that suffered much from incursions and political instability. Today, a few settlements including Dahi, Al Qanawis and Zaydyia exemplify a distinctive style from the southern half, based primarily on the way the brick decorations are presented. South of Hodeida, the dominant brick architecture is represented by Zabid, Hays, Bayt al Faqih and a myriad of smaller settlements .

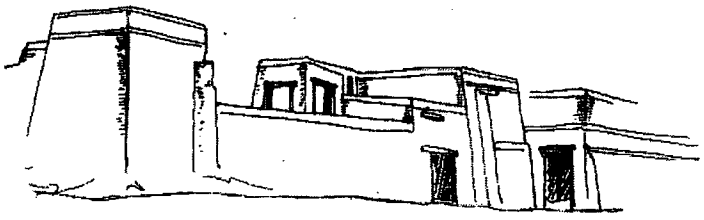


The spatial organization of the brick house is similar to that of the reed houses. Compounds are made of lofty (four or five metres high) one room quadrangular structures, raised from the ground the height of two or three steps and opening onto a central yard. A covered entrance hall, with masonry or wood benches, is characteristic, kitchens are generally indoors and great emphasis is usually given to a main reception room (*'usha* or *liwan*). A covered, but open on the sides and occasionally arcaded, space for sitting/ sleeping on the hottest periods is equivalent to the *barud* found in reed houses and known as *sfaf* or *saqifah*..[8]These structures may be aggregated into continuous volumes along the compound wall and are capable of limited expansion in height with isolated rooms and high parapeted courts on the roof, accessible by external stairs.



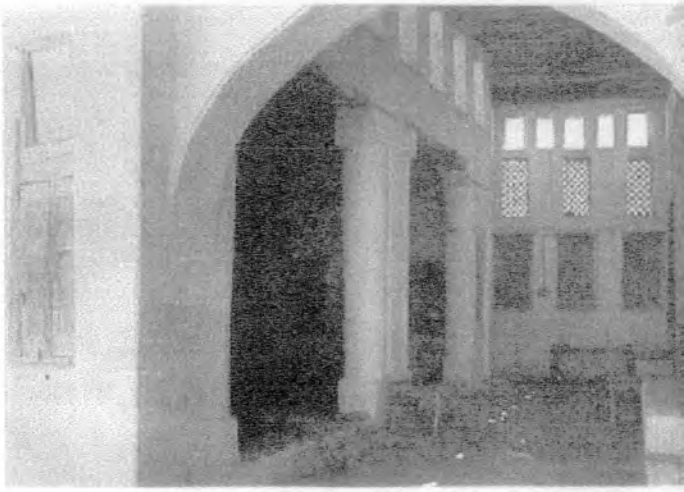
The plan of the rooms was in several instances found to be modulated on the dimensions of the Tihama bed - average 1.75 x 90 cms and 70 cm high. The compound walls are also quite high, averaging three metres and giving settlements a peculiar atmosphere with their long brick lined corridor-like streets, punctuated here and there by an elaborate doorway, the roofline frieze of a taller building and glimpses of the decorated facades to the court.



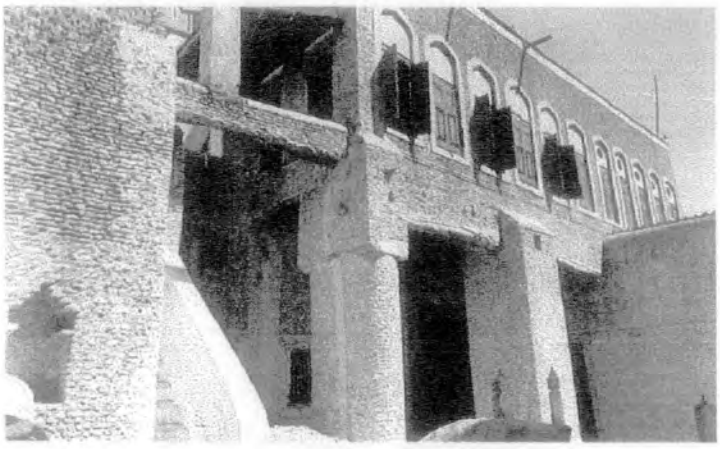


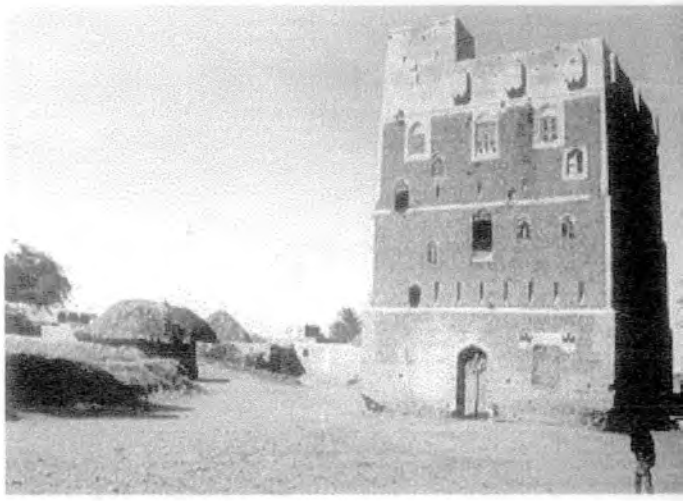
[7]North of Aden a similar type of houses is built with mud blocks and rendered with mud, external decoration consisting of occasional painting in colour of simple motifs or parts of the surface.

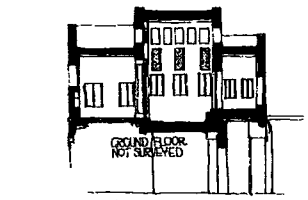
[8]*Sfaf* in Hays, *saqifah* in Zabid



Top and centre left - Central hallway and side view of house above cotton gin, Zabid (schematic plan, *opposite*); *centre right* - *Hakuma*, Al Jarrahi; *bottom* - Zabid







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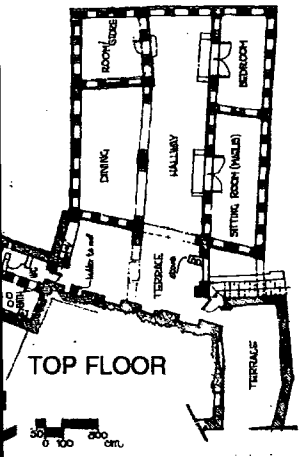


Variations of upper floors, accessed by external or internal stairs, were seen in Zabid and elsewhere. In Zabid, when the ground floor was used for non-residential purposes - perhaps a warehouse, shop or cotton gin - the residential part could be above it, accessible by an external stair and with the rooms opening onto a higher central hall with a surrounding clerestory admitting light and air. Another situation was exemplified by the buildings for the administrative or military representatives (*hakuma*) which were multi- storeyed brick structures with an internal stair, structurally similar to those found in the Mountains and generally in evident contrast with the civilian buildings around.

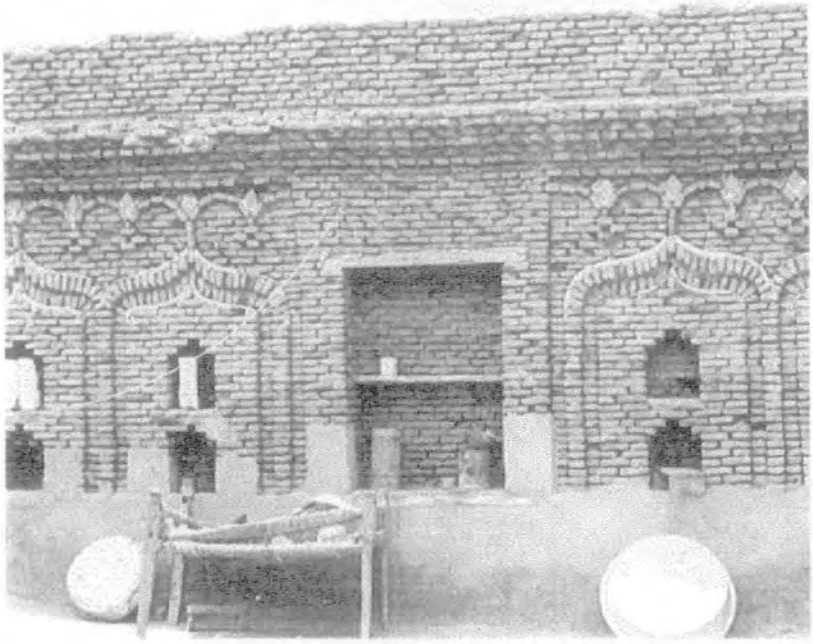
The outstanding feature of these houses is the quality and density of decoration of walls, ceilings and openings. Stylistic influences seem to be of two major origins - one, the erudite source, associated with Zabid and its importance as a cultural centre; the other, Indian craftsmanship, abundant on the coast until the 19th century.

The decorative possibilities of brick alone are fully explored in the treatment of walls. Except for a few cases found in northern Tihama, the external face of the walls is bare of decoration. Other than the compound entrance door and the top floor of two-storey buildings, openings exist exclusively in the elevations turned to the yard. Pointed arches, rather than the round arches common in the mountains, are used as structural features, for framing openings and as decorative devices.

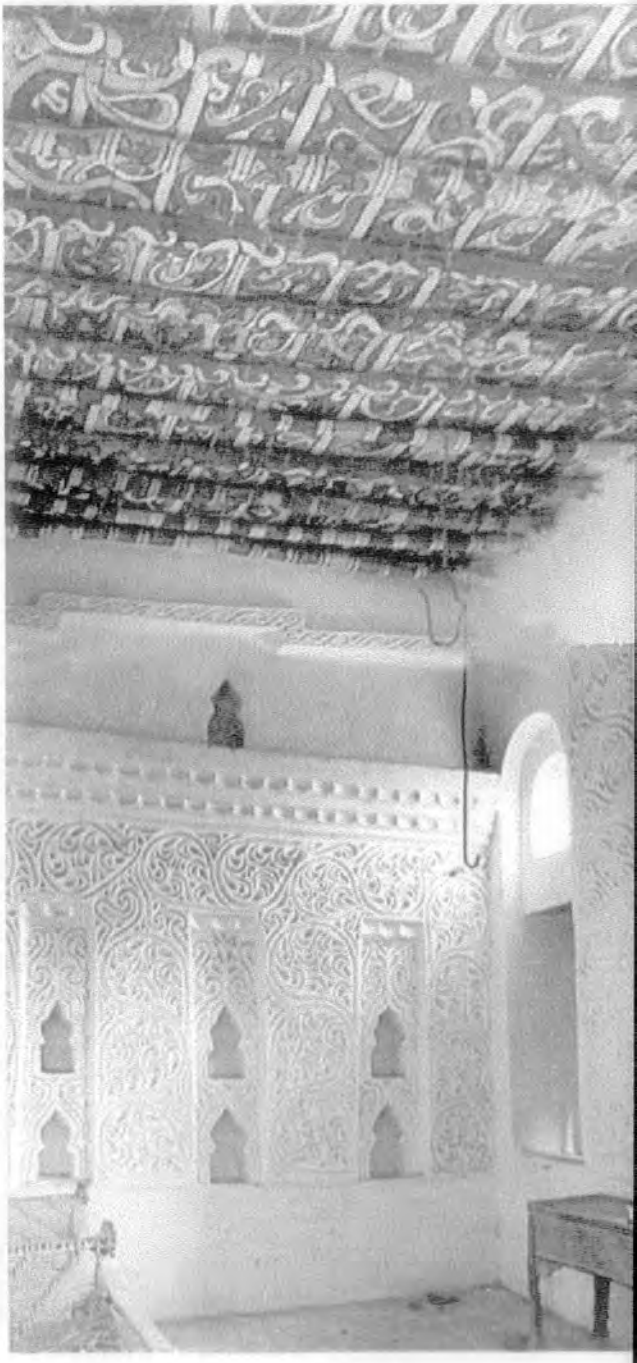
Ornamentation occurs in platbands, interiors and especially on the courtyard façades which can be completely covered. Brick designs may be left exposed as in and around Zaydyia or covered with a light layer of lime plaster as is more usual in Zabid. The decorative themes in both areas are subject to the geometry of brick laying but, elsewhere free form designs with stylized floral motifs, wheels, circles, spirals and so forth are carved on a thick layer of white plaster.

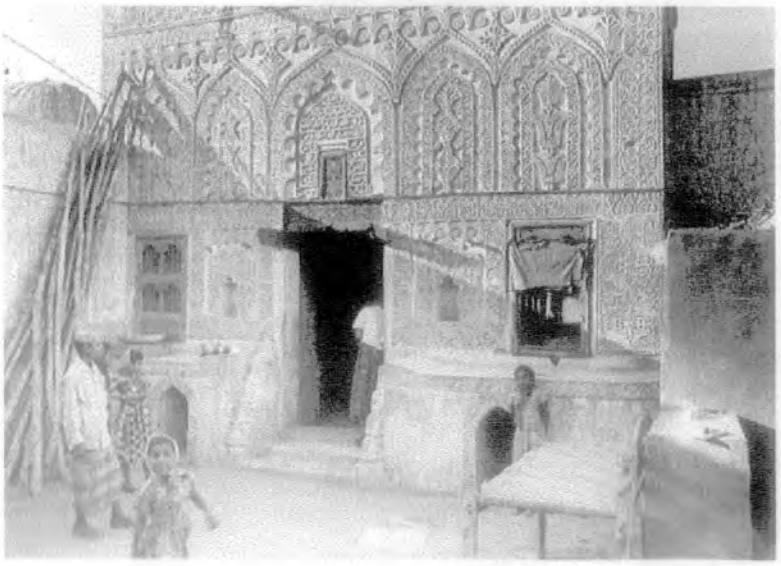
Doors and windows offer themselves to dense wood carving of panels, frames and brackets. Both have perforated or latticed ventilation panels on top complemented with lower panels for the windows. Coolness is also ensured, as in the reed houses, by wetting the floor each morning.

Interiors may display extensive plaster carving, with a considerable number or shelves and niches alternating with every conceivable opportunity for applied decoration and colourful accessories, such as enamel plates and Indian lithographs. Ceilings are often textured by the latticed pattern of the branches supporting the roof material. Boarded wooden painted ceilings are common with patterns seen with a higher



Top left- Dahi; *right and centre left* - Zabid; *centre right*-Al Mansuryia; *bottom left* - Bayt al Faqih; *opposite*, Zabid. The schematic drawings are of a house being built in 1976. Concrete beams and slabs were used, with traditional brick walls, arches and columns.Its owner, who had worked in Taiz, wanted a new style, excluding carvings, fitting niches with glass panes and using windows with coloured glass fanlights of the common Mountain type. The window backs were low (0,40 m) which meant that floor matresses, rather than "Tihama beds", would be adopted for sitting.

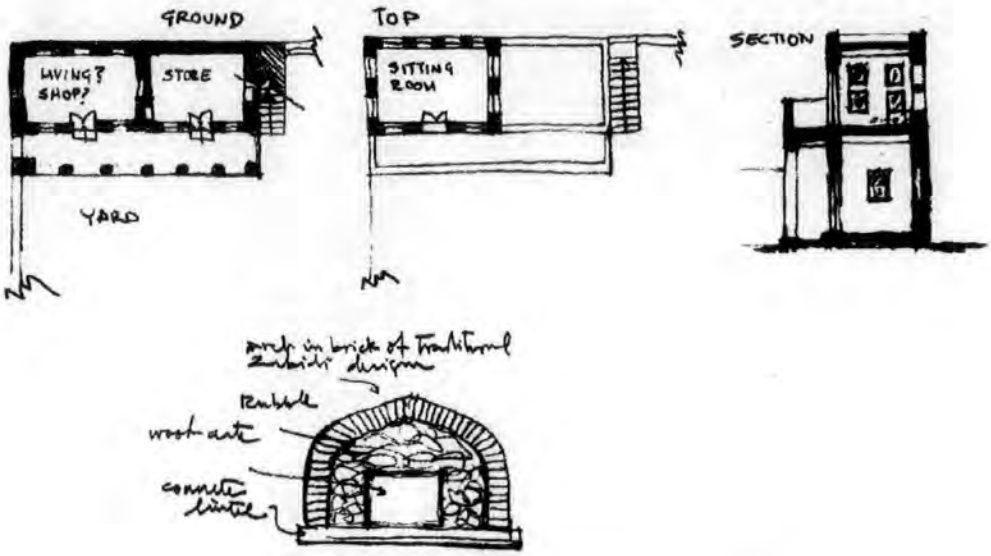


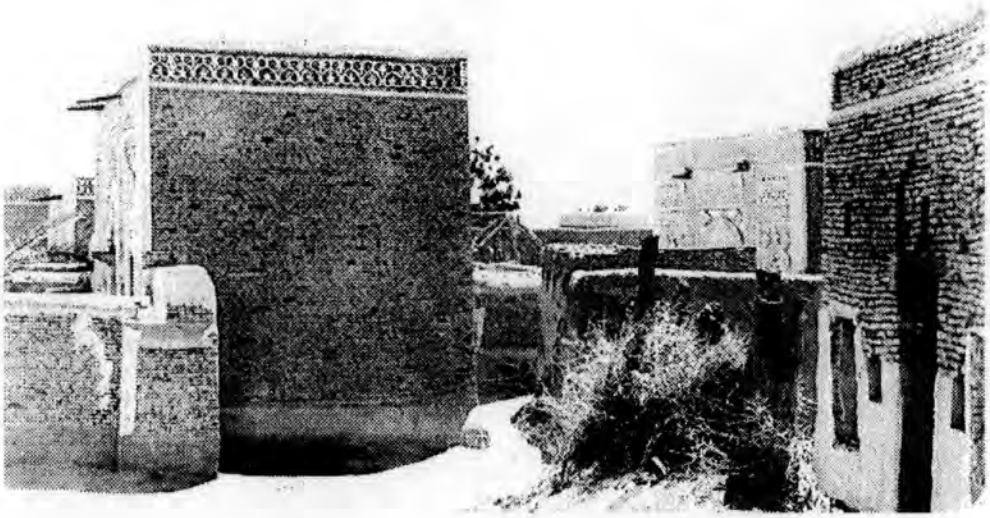


degree of refinement in the decayed examples of "Red Sea Houses".

In the mid 'seventies plaster carvings were being abandoned, not because of their cost or lack of craftsmen, but simply because they were considered old-fashioned.[9] At the same time a few examples were seen in which a similar technique was attempted using industrial cement, but with cruder results. On the other hand, the painting of ceilings based on traditional models remained popular, at the same time that painting of the interiors with bright imported colours was gaining favour.

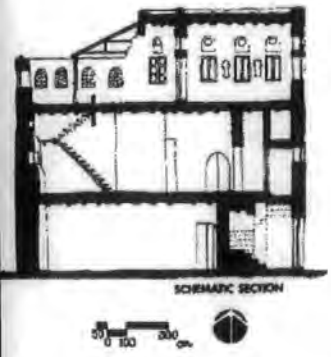
Stone, quarried in the mountains, and cement blocks were introduced at about this time and, with them, typological variations. In the areas of influence of the brick houses, the traditional spatial model has persisted but the use of cement blocks has become widespread.

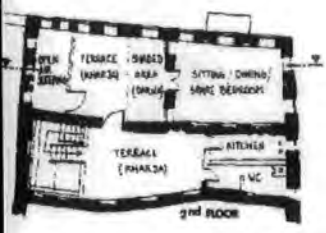


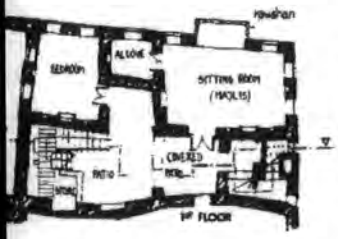


[9]Carving the inside and the outside of a room was estimated in 1976 at taking about 25 to 30 days and costing 25 riyals a day (approximately $5.00 US dollars)

Top left - Rhawshan, Hodeida; *right and opposite* - External view and schematic drawings of house in Hodeida (source Varanda:82); *bottom* - Bayt al Faqih and, *opposite*, Hodeida



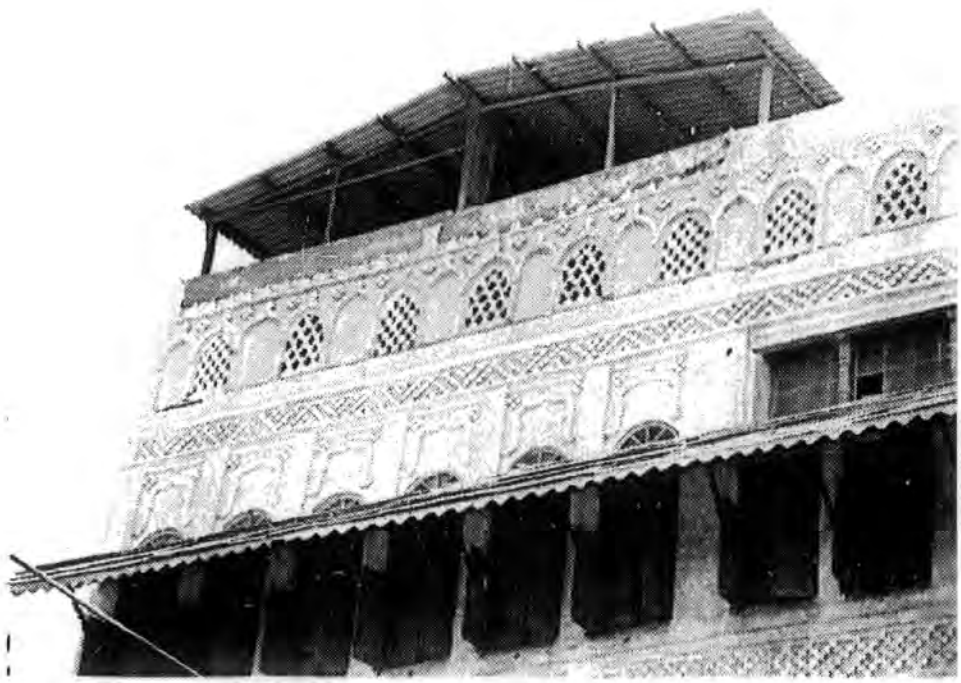




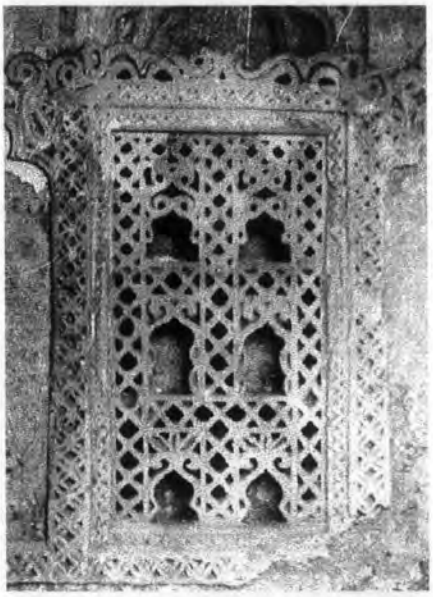
RED SEA HOUSES

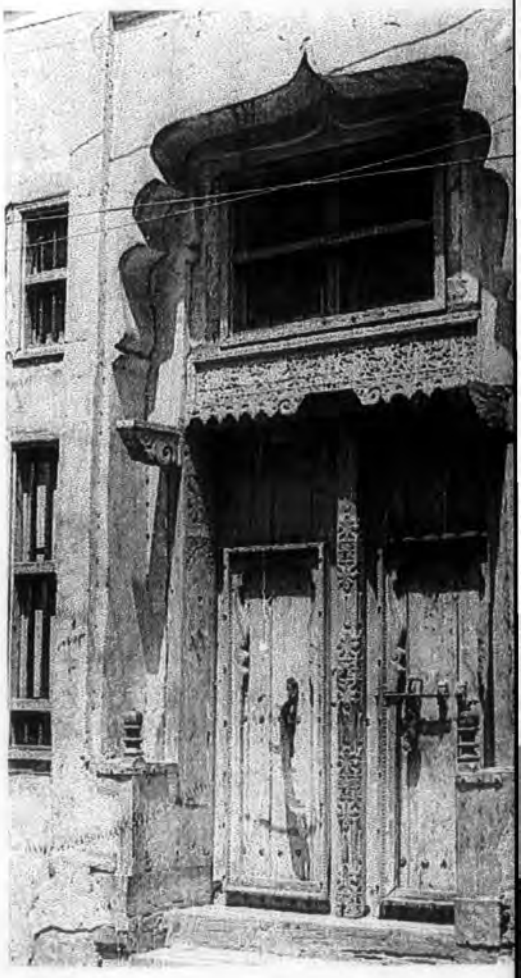
Spatially very distinct is the "Red Sea House" type. Known locally as "Turkish Houses", these houses were built in the once important ports of Mocha, Hodeida and Al Luhayya for merchants and administrative officers, particularly during the Turkish occupations. They are two to four storey structures, with an internal stair.

The ground floor is generally utilised for stores and shops which may have their own entrance and be unconnected with the residential part. The floor above contains the main sitting room (*majlis*), often with the characteristic wood latticed balcony known as *rawshan* or, colloquially, *taqa turki* (Turkish window) together with one or more sleeping/sitting rooms. A second floor contains private rooms and a semi covered court (*kharja*) with the stair to the floor or floors above. This stair is not necessarily the continuation of that from the ground floor and may be in wood and open to the sky. The uppermost floor characteristically has an isolated room preceded by a covered porch (*darwa*) and opening onto a roof terrace (also *kharja*), enclosed by plaster screens. Sleeping on this terrace is common. Additional areas of the terrace may be precariously roofed with thatched material or, more recently, corrugated metal sheeting. Kitchen, water rooms (where water for domestic consumption is stored) and bathrooms are located on the upper floors. Ventilation is achieved by the perforated high parapets of the terraces, latticed window and balcony shutters and perforations above the doors.



Top left - Al Luhayya. Notice sitting room opening onto the yard; *right*- Hodeida; *centre left* - Niche, Al Luhayya; *bottom* - Hodeida; *opposite* - House types in 1975, Hodeida (source Varanda:82)

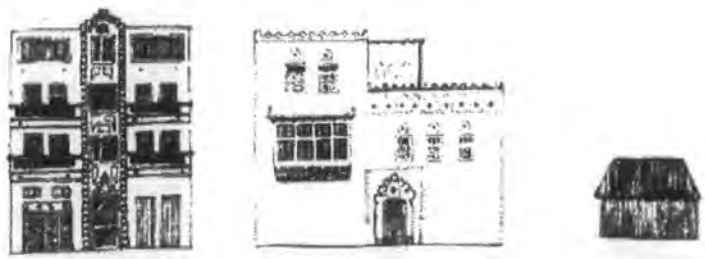


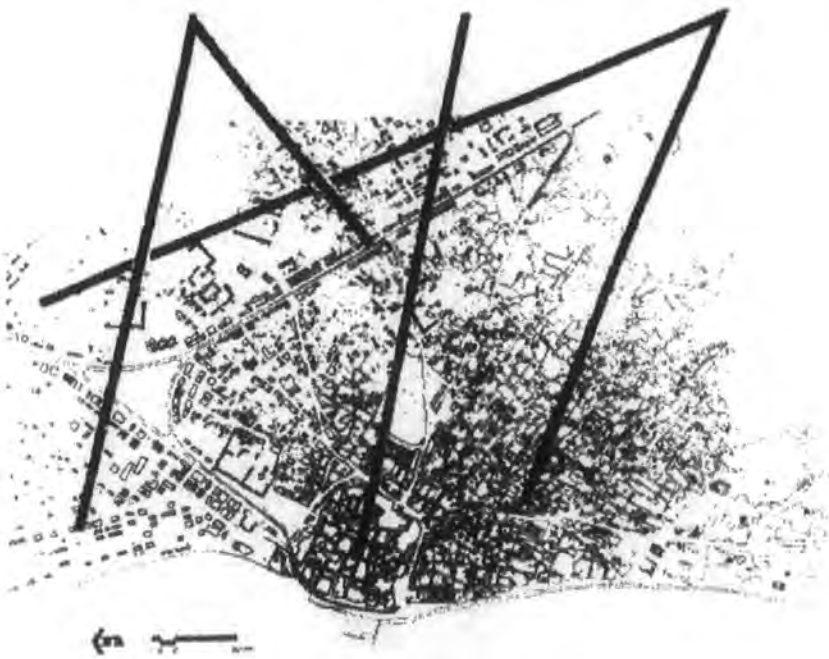


In Al Luhayya dilapidated examples were seen in which a sitting room with an arcaded porch at ground level opened to what was once a garden, a feature similar to that found in the houses of the garden suburbs of Sana'a.

This type, nearly extinct, reflects particular attention both to proportion and to decorative schemes. The walls are rendered with white plaster and friezes, parapets, and openings are decorated with brick or plaster carvings. Carved wood is widely used in doors, windows, latticed balconies and canopies. Wood ceilings are often painted with minute designs.

After the Revolution, western building types - flats and villas - were erected in Hodeida, where a building boom was mostly due to the new port, and soon extended to other areas. In Hodeida this meant the desaggregation of the reed house clusters and the accelerated decay of the "Turkish Quarter". One feels, however, that an alternative, popular, idiom was being experimented, as revealed in the somewhat whimsical treatment of the exterior of many buildings.





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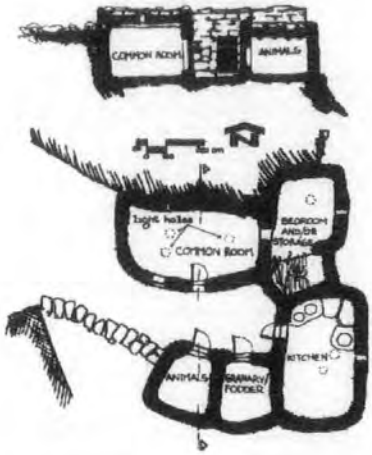
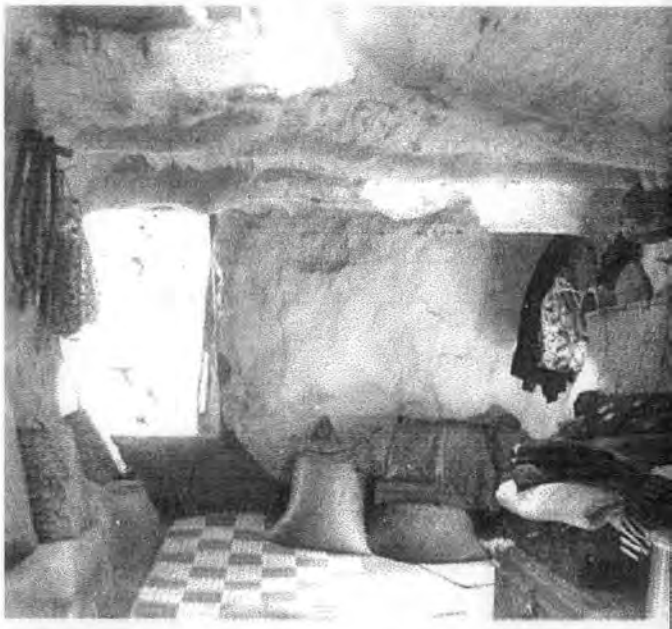




Top - "First setler"houses in Mithal, Al Hada (*left*) and Al Sabahi, Khubban (*right*); *centre*- Al Qafla, Shahara; *bottom* - Khawa, Al Baydha; *opposite* - Kitchen, Bayt Mahyidin, Khubban

2.2- The Mountains

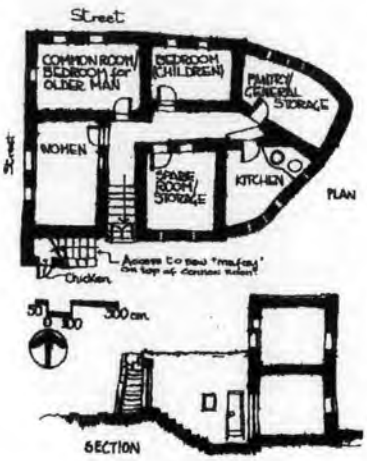
Three major types appear in the mountains: 1) Single storey houses, with no possible expansion in height; 2) Two storey houses, with an external stair but no further expansion in height; and 3) Multi-storeyed houses, with an internal stair, which, begining with one storey, commonly extend to four or five and occasionally more.

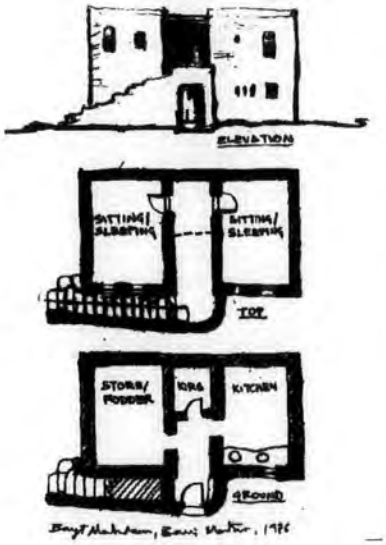
SINGLE STOREY HOUSES

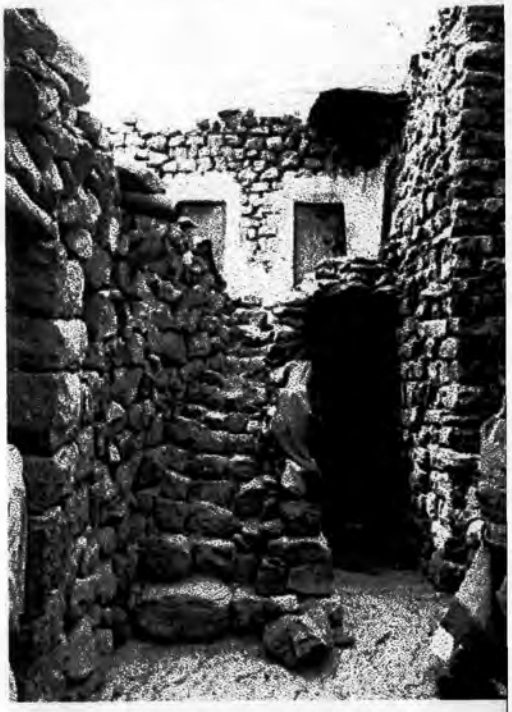
In the first type, the simplest units have either compact or U shaped plans. In the latter case one of the arms of the U is reserved for living quarters and the other for storage and animals. The embryonic court formed by this shape may or may not be private and enclosed. These units may exist in isolated form; as part of a larger cluster of the same type; or attached to buildings of a different type.

In this simplest form, illustrated by Al Janad at the beginning of last chapter, clusters exist in which each house is part of a beehive complex, occasionally with internal links. Reception and sleeping rooms tend to be located at the periphery, with storage spaces and kitchens at the interior. Light and ventilation originate from apertures in the roof which, being usually too fragile to be walked on, has no access stair.

A variation of this arrangement is typical of the examples seen in the southeast of the country, in which clustered units, with a basic U form, have elementary courtyard spaces with walk-on roofs sometimes connected by stairs and bridges. Top light apertures are common but simple shuttered window openings are also seen. Tall structures, with a combined use as surveillance posts and stores or housing, punctuate these clusters.





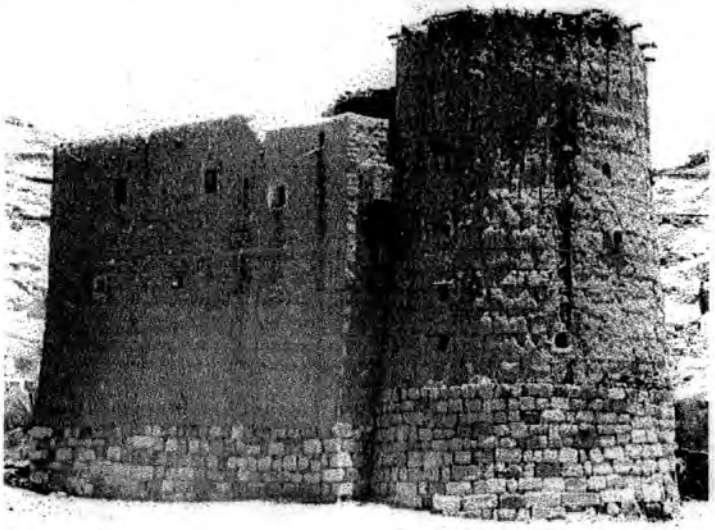


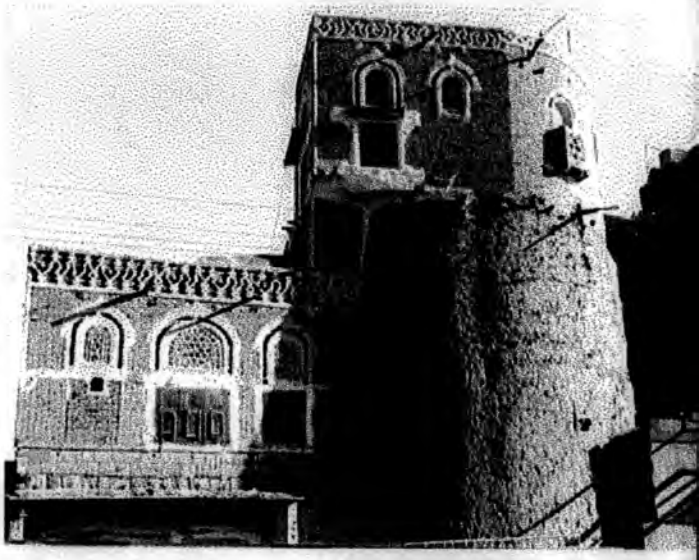
Top left - Single storey house with later addition of top room, Taiz; *right* - Two storey house cluster, Al Ajradi, Al Baydha; *centre left*- Bayt Mahdam, Bani Matar (writer's notebooks); *centre right* -Khamis al Madyur; *bottom* - Dharahan and Manzil, Yarim; *opposite*- Rubat al Qala, Yarim

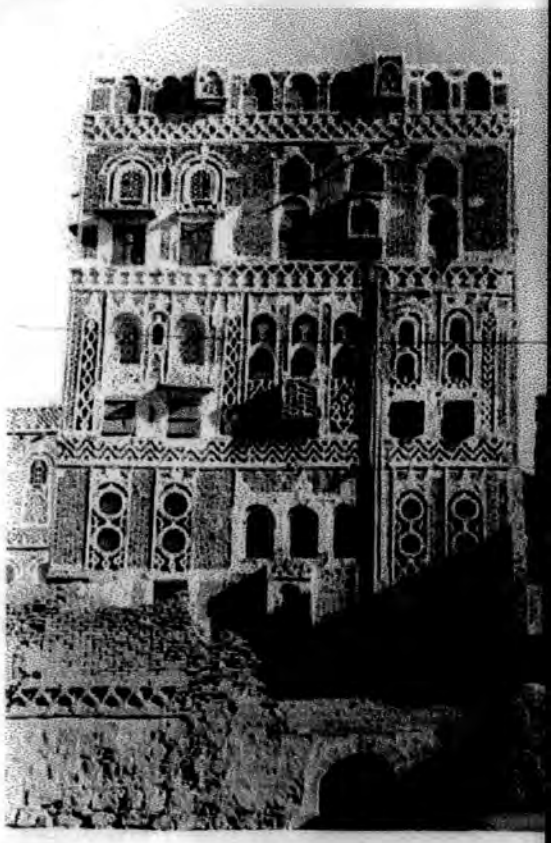
TWO STOREY HOUSES

If a roof can be walked upon a room can be provided above it. A natural sequence to the single storey form is represented by a type constituted by two-storey roughly quadrangular buildings with an external stair. The lower floor, with minimal doors and ventilation slits, is reserved for animals, storage and possibly cooking. The top floor, containing the living quarters, has windows, which may be somewhat elaborated with a lower section having opening shutters, topped by a fanlight of thin alabaster or a more recent alternative of coloured glass set in gypsum tracery. This type was seen in the Highlands from Hayma and Bani Matar through Yarim to Al Baydha, both in isolated houses and settled communities where it may either predominate or form part of a group with tower houses.

In neither of these two types are sanitary facilities incorporated in the house. Water for household consumption is stored either in the kitchen or in its vicinity.







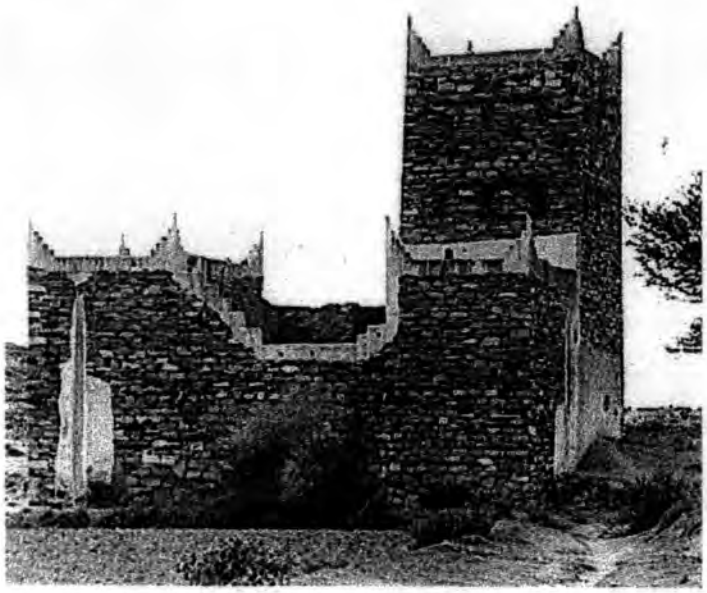
Top left - Jabal Sabr; *right* - Al Zahir, Al Baydha; *centre, left* - Al Ghurass, Bani Hushaysh; *centre and bottom right* - Sana'a; *bottom left* - Scheme of house in Ibb; *opposite* - Schemes of houses east of Huthand Khawlan (writer's notebooks)

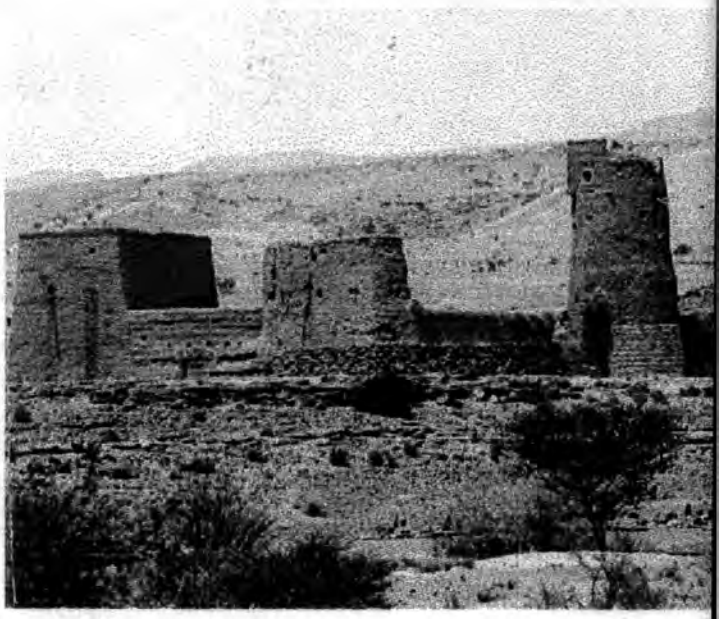
MULTI-STOREYED HOUSES: THE "TOWER HOUSE"

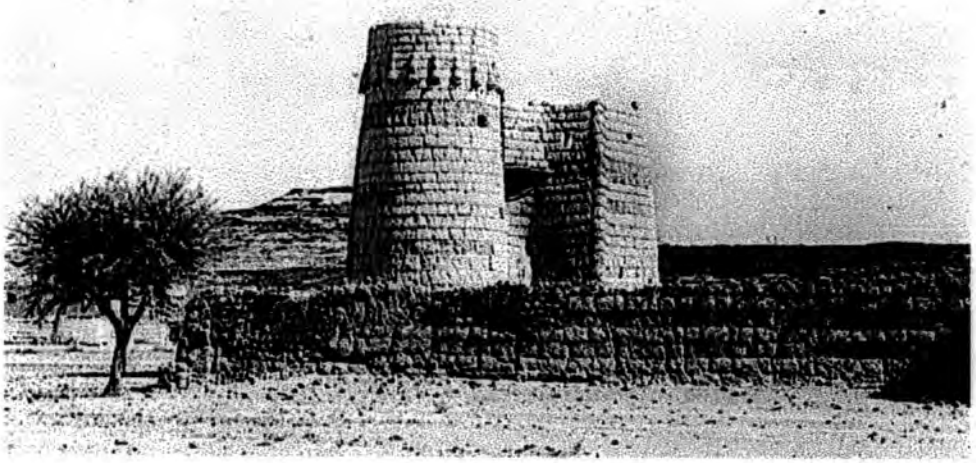
In the third type the various floor levels are articulated around the structural element of a continuous staircase, running from ground to roof top. The house grows in height as the family increases. The houses of this type, the most common everywhere in the mountains, are known as "Tower Houses" - a designation adopted for the obvious similarities with the watch towers that exist all over the mountains. The characteristic machicolation controlling the access to the watch towers continues in the fully developed house forms where it finds various applications. In the central and northern highland plateaux the "Tower House" plan may be round or quadrangular; elsewhere the quadrangular plan predominates. In some situations particularly in the northern Sana'a valley, the round tower is topped by one or more quadrangular rooms, indicating an extension or elaboration of residential use.

The arrangement of space in tower houses, to be subsequently detailed, consists basically of three superimposed zones. Space for animals and bulk storage is on the ground floor with granaries and household storage at the first floor or mezzanine level. Reception and large gatherings are on the floor above which occasionally incorporates family quarters. Finally the upper floors are the family quarters proper with in many cases a small receiving room for the houseowner at the roof level. Kitchens and sanitary facilities tend to be at the higher levels but may be repeated at other floors, depending on the number of related families living in the same house. Yards of variable sizes may be included within the house curtilage, but dwellings are usually packed in tight clusters with little, if any, open space allocated for individual houses.

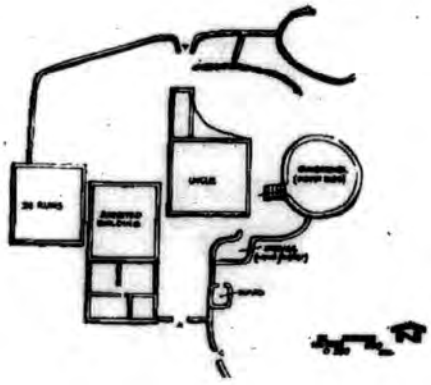
At the lower floors openings are usually limited to ventilation slits, which become larger and more elaborate as the building height increases. Windows are normally formed by an opening lower section and a fenestral made, as in the previous type, by alabaster plates or gypsum tracery and coloured glass. It is in this type that windows become a major pretext for enrichment of elevations and interiors.

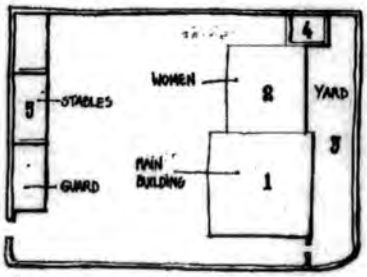


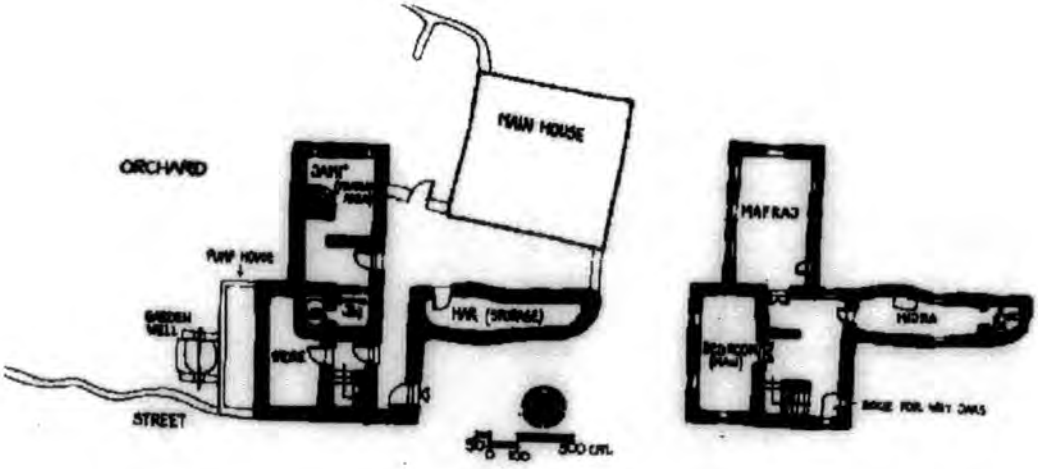


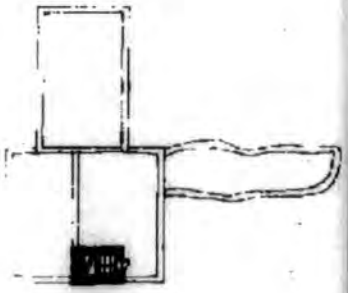


Top left - Khawa; *right* - East of Huth; *centre* - Near Al Safra, Sa'da; *bottom* - Compounds at Suq al 'Ainan, Barat, and Kawkaban and, *below,* annex for male visitors and guests, Al Sirr, Bani Hushaysh; *opposite*- Sa'da







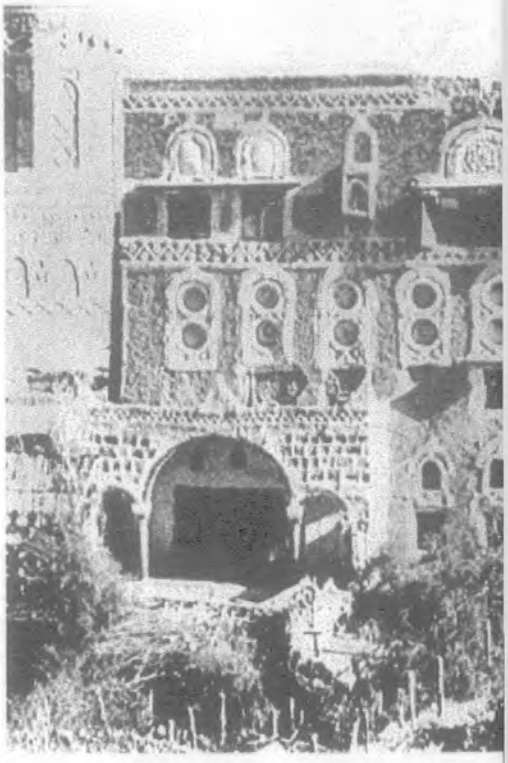


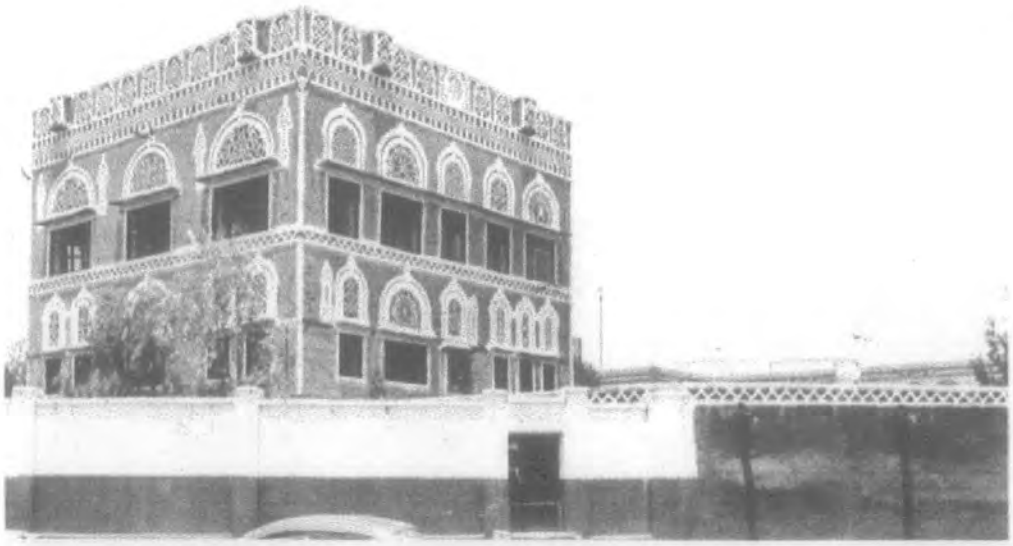
Variations of this model were seen in the eastern part of the central Highlands and in the eastern slopes (*Mashriq*), where single-storey mud structures are equipped with an internal stair to the roof which may suggest a provision for potential growth. Buildings may appear in pairs, separated by a yard with its own door. Expansion may stop at the second floor in both buildings, as seen typically in the settlements of the Mabar plains of the central Highlands. Otherwise, as was seen in the eastern fringes of the northern Highlands and in the Eastern Plateau, the oldest building is a tower. The lower building may be used as separate living accommodation for women and children,[10] or else as ancillary spaces. Because buildings can grow vertically as the need arises a dwelling may eventually consist of twin towers separated by a high walled yard with the main gate. Living quarters, usually destinated to door keepers or guards, may exist above the gate.

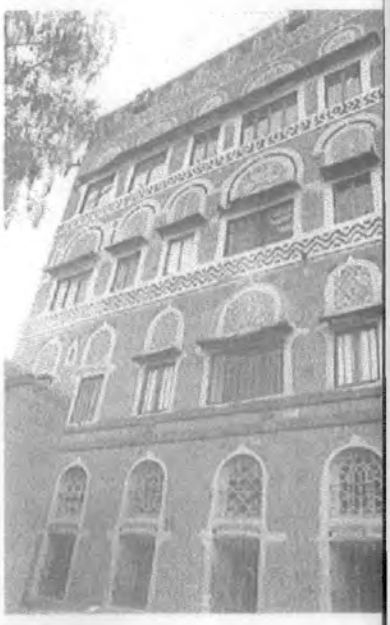
Other examples were seen in a provincial context, including Sa'da, Khamir, Kawkaban, Dhawran, Barat, in which buildings shared an enclosed yard, but not always in the compound concept as it was understood in the Tihama where the various buildings sheltered different functions for the same household. Two or more related families in their respective buildings could share a common enclosed open space containing as many ancillary features - a cistern, stores, kitchens and guard houses - as might be justified by the families' size and importance.

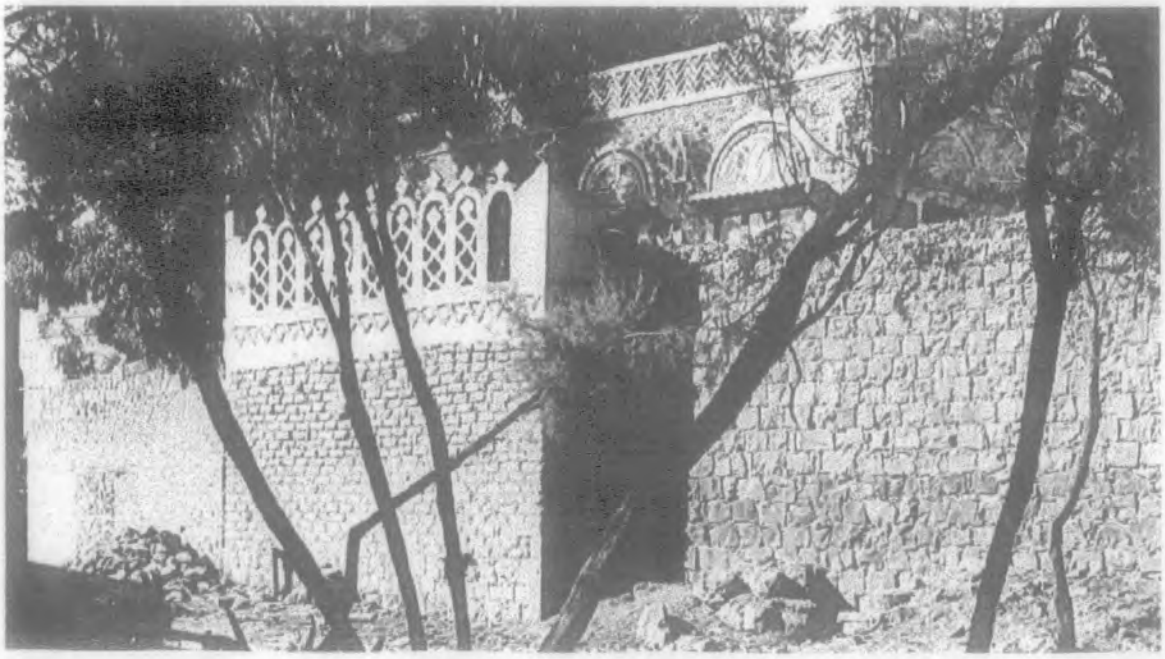
These units appear independent enough from communal spaces and supply to be able to stand siege.

[10] This reflects the spatial arrangement of sexual segregation that is more apparent in the eastern regions.



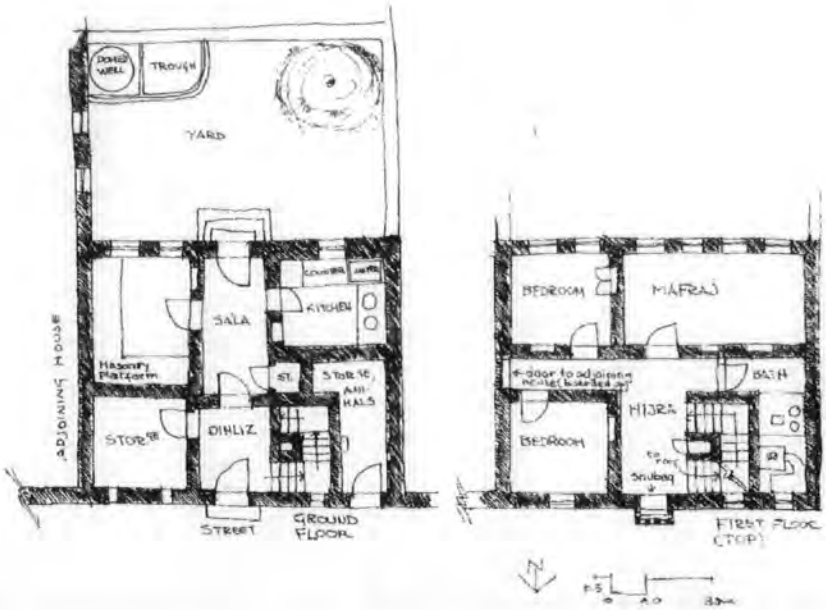


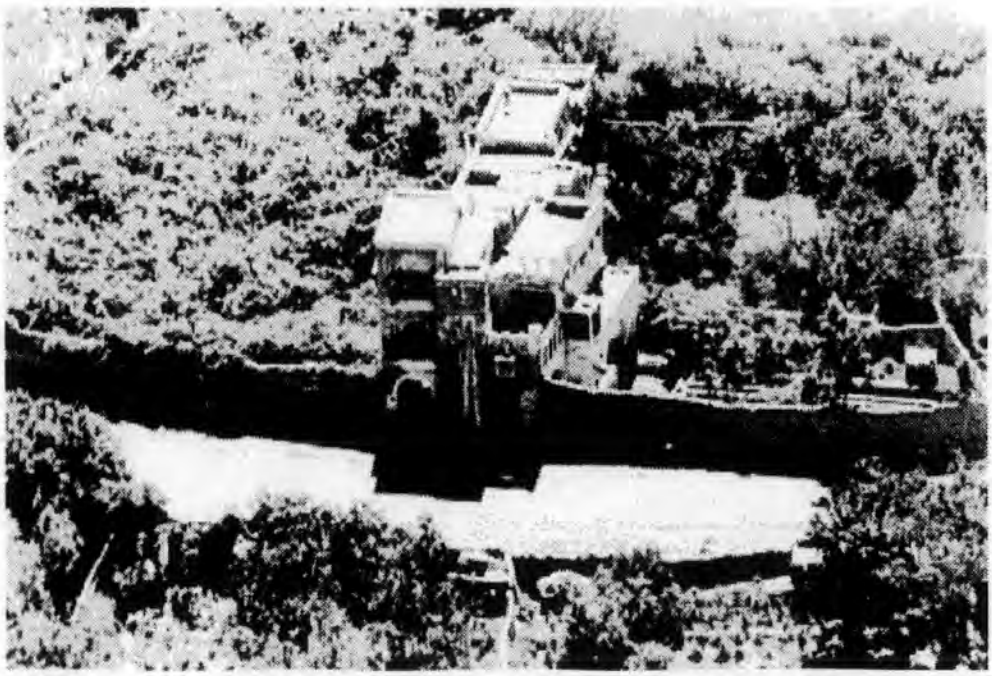


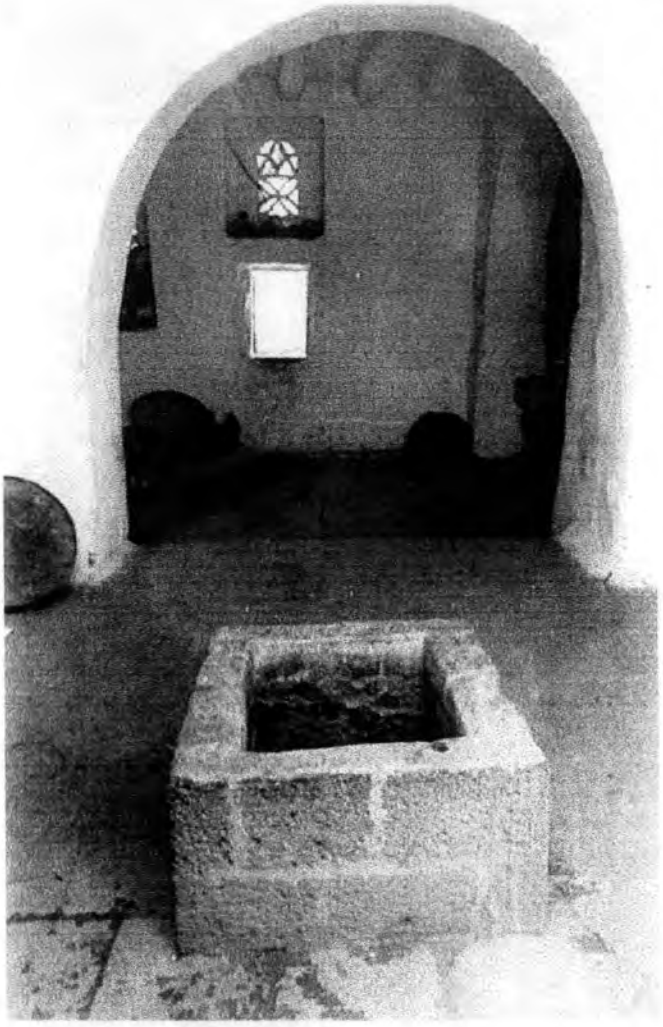


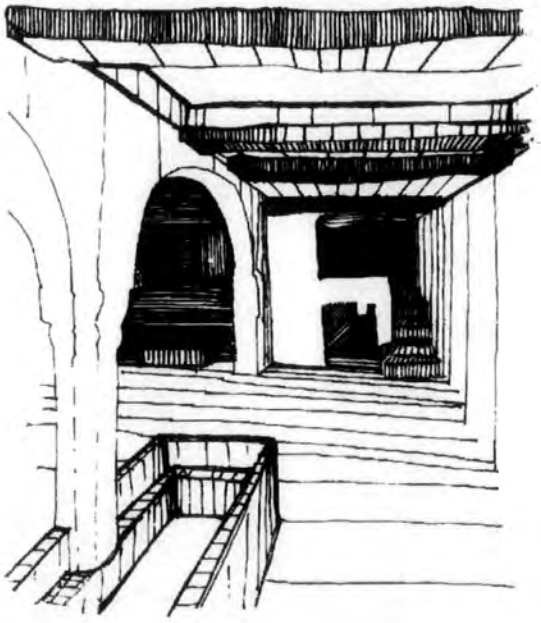
Top - Al Rhawda; *cent left*- From Nasser St., E al 'Azab, Sana'a; *righ* House built in the 'fortie Bir al 'Azab. Notic windows of livin quarters on the grou floor; *bottom* - Enclosu of garden for ground flo reception room, Bir 'Azab; *opposite top* Plan of house, Bir 'Azab, Sana'a; *botto* Wadi Dar

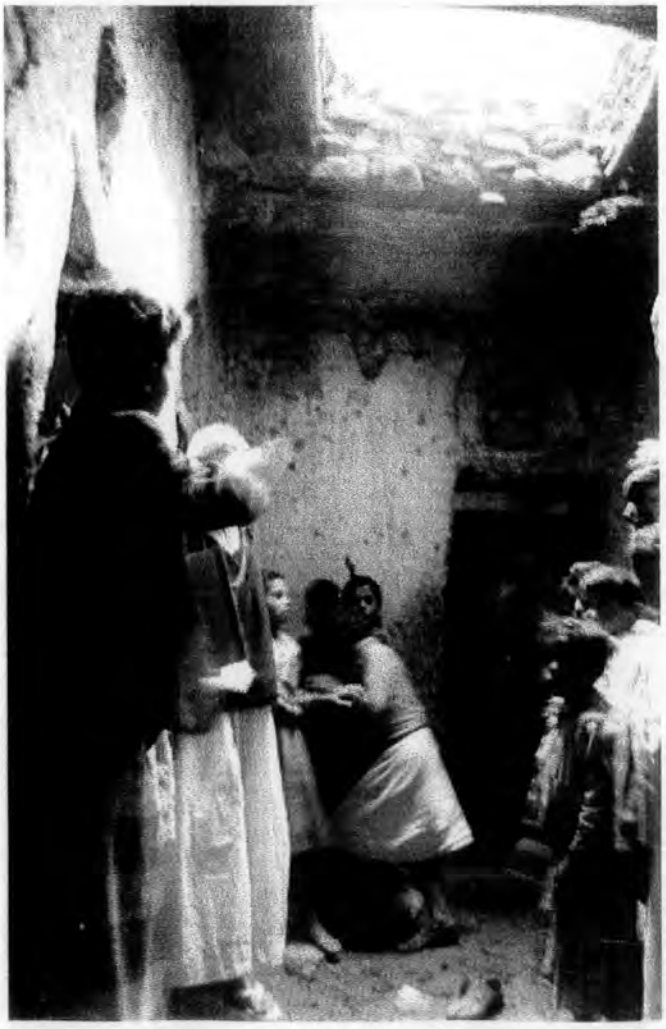
In Sana'a a variation is peculiar to the garden suburbs (such as Bir al 'Azab and Bir al Shams) and the neighbouring villages of Al Rhawda and Wadi Dar, which were areas favoured for country houses by the former Turkish administration and wealthy Yemenis. These houses, although structurally of the "Tower House" type, tend to have fewer floors - often not more than two - and quite large gardens and yards. The ground floor can be used for living accommodation, with a kitchen and living rooms. A large reception room often exists, with an arched porch, opening onto a pool with a fountain set within an arcaded enclosure in the orchard. This is similar to a characteristic pointed before in "Red Sea Houses".



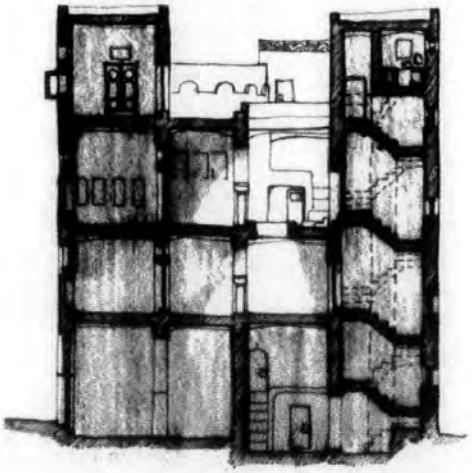








Top left and right, - Lightwells at Mithal, Al Hada and Talh, Sa'da; *bottom left* - Jabal Sabr; *centre and bottom right* - Rendering of top floor and section of house in Dhamar (drawing J. Lebre); *opposite* - Plans of ground and top floor and view of light well of the same house , Kawkaban

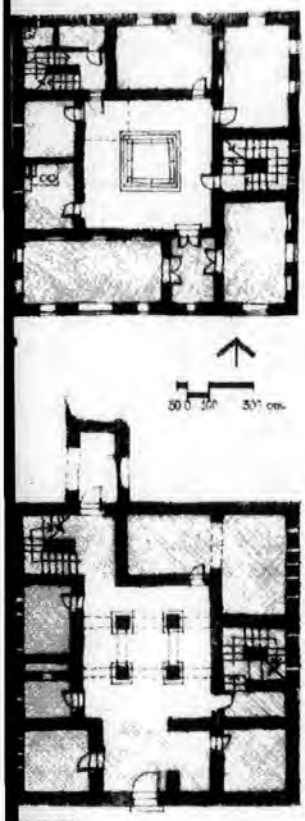


"TOP COURT HOUSES"

Last but not the least is a variation, of which scattered examples were surveyed, named by the writer, for want of a better expression, as "Top Court Houses". The houses of the Jewish Quarter of Sana'a would qualify as scaled down members of this particular group.

The top court houses differ from the prototypical tower house in that at the uppermost level the rooms are arranged in courts on the roofs with light wells (*shamsia*) for the circulation areas in the floors below. The last flight of stairs, serving the top court rooms, is often positioned off-centred to the vertical axis of the main staircase.

The light well was seen at Kawkaban and at Thula as a small arcaded gallery surronding a central open shaft going from the top to the ground floor. At Thula, where these examples are associated with "old houses", other cases appeared with more than one light well. At Dhamar a gallery existed at the top court with lightwells in the floors below becaming smaller from floor to floor. Elsewhere, at Sa'da and Talh, Jabal Sabr, Rada' and Al Hada, enlarged light holes in the roof court corresponded with smaller ones in the circulation floors of the upper storeys. Althought examples appeared more concentrated in the regions of Thula/Kawkaban and Dhamar/Al Hada,[11] no systematic survey was made to establish the wider regional occurrence and accompanying historic connotations of this type.



UND

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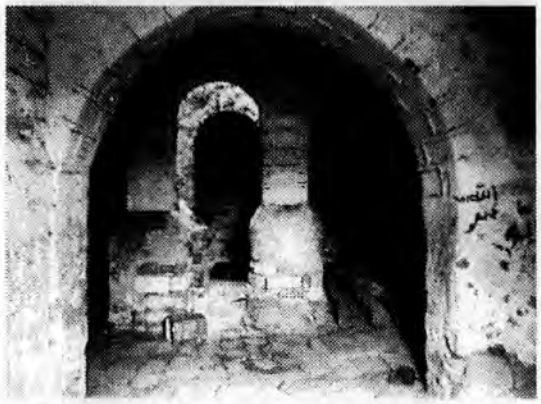
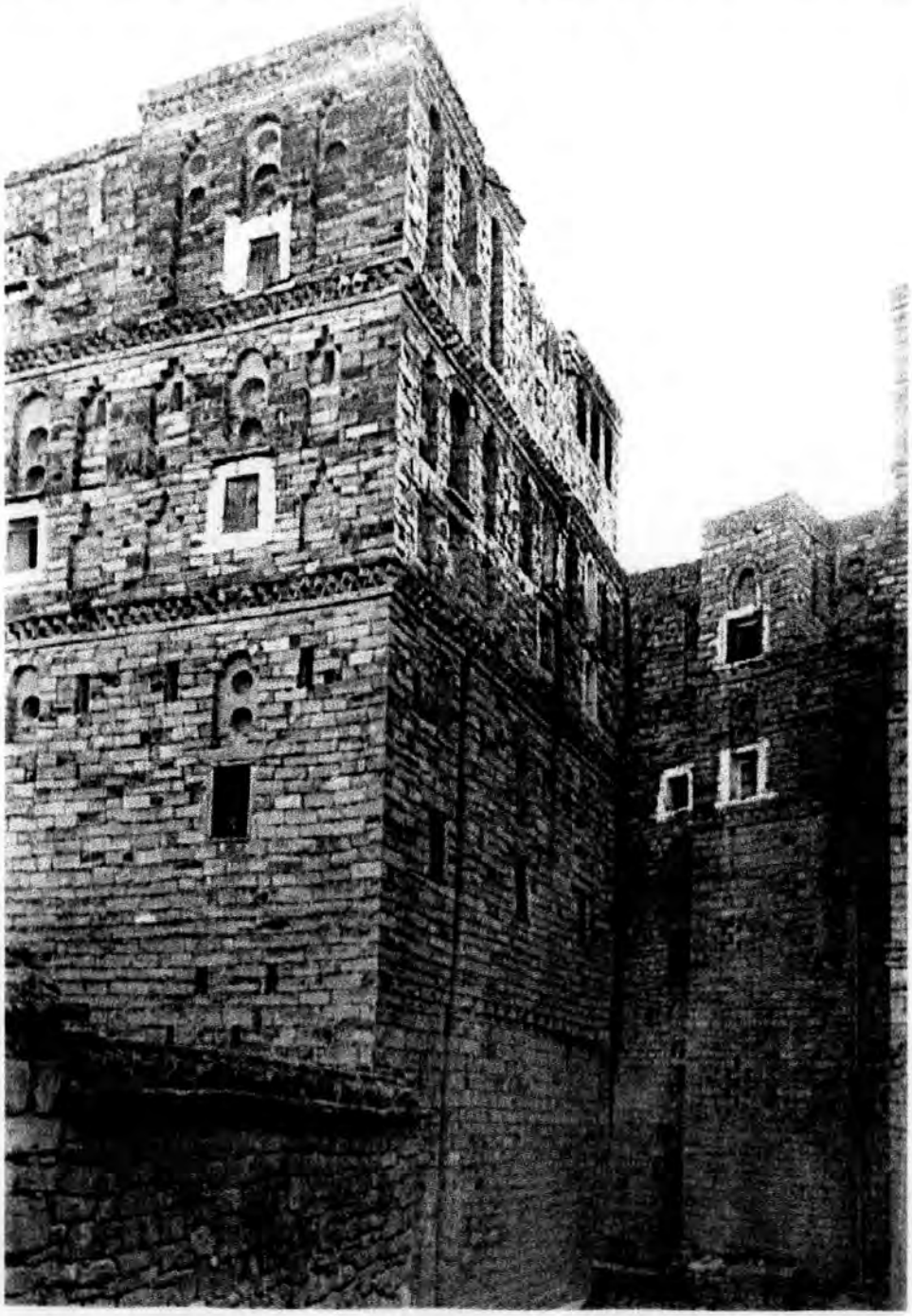
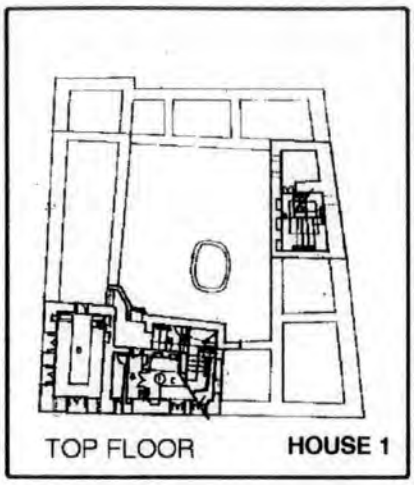
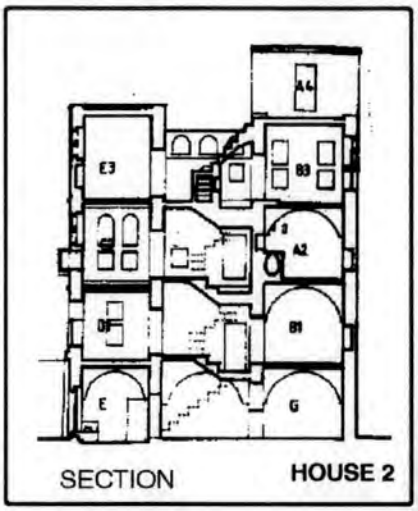
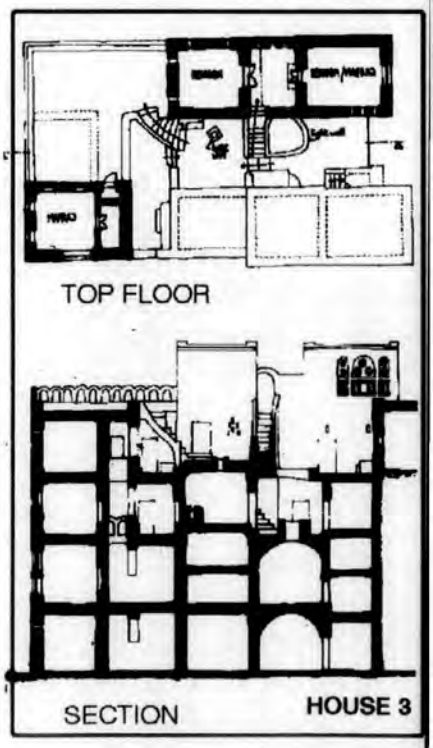


[11]Photos were shown to the writer of similar cases in the Hadhramawt









Right, top and bottom - Top court houses Thula; *left from top to bottom* - Top floo plans and sections of three houses in Thul (source Golvin:84 for house 1 and 2 Varanda:82 for house 3)

Carl Rathjens classic study[12] on the houses of the Jewish Quarter (*Qa' al Yahud*) of Sana'a advances some theories on the basic difference between Jewish and Muslim houses presented by the existence of an open court (*hijra*) on the uppermost floor around which various rooms were grouped, unlike the tower house form where only one room - the *mandhar* - exists at roof level. The explanation is offered that "*the Jewish houses in the High Yemen were modelled after the ancient Sabaean houses of the Hellenistic and Roman times, while the present day Yemenite Muslim many storeyed fortress houses, which accommodate a whole clan and are therefore suited to the exigences of tribal warfare, were introduced in South Arabia by the North Arabians. The atam, the castles of North Arabia, ... are basically of the same type as the fortress houses of contemporary Yemen.*"[13]

Although Koranic law prescribed that the houses of the non Muslims could not be higher than those of the Faithful, this was apparently not always enforced in the Yemen, and instances are reported from several places including Sa'da, Shibam, Kawkaban and the former Jewish settlements within the walls of Sana'a, which suggest that the Jews lived in houses several storeys high. In the late 17th century, the Jews were forced to leave Sana'a, but after a stay in the Tihama at Al Mawza, were allowed to return and settle in a flat area, henceforward known as the Qa'ah al Yahudi, two kms outside the walls of the city's western gardens. Their settlement was confined by walls and gates that closed at night, and their houses were limited by what amounted to two or at the most three full storeys.[14]

Modifications were made to increase the usable floor space bearing in mind that, unlike their Muslim counterparts in trade and commerce, the Jews could not use the market's facilities and had to keep their goods in their own stores and warehouses. Thus an ingenious system was developed of intermediate storeys with low ceilings serving as stores and service areas. The ground floor was sometimes partially sunken and often extensive interconnecting cellars were developed, to allow refuge and escape from "occasionally hostile Muslim neighbours".[15] For similar reasons the entrance to the house was separate from that of the shops and stores. The top floor - equivalent to the second floor - consisted of rooms opening onto a court (*hijra*) reached directly by the stair.

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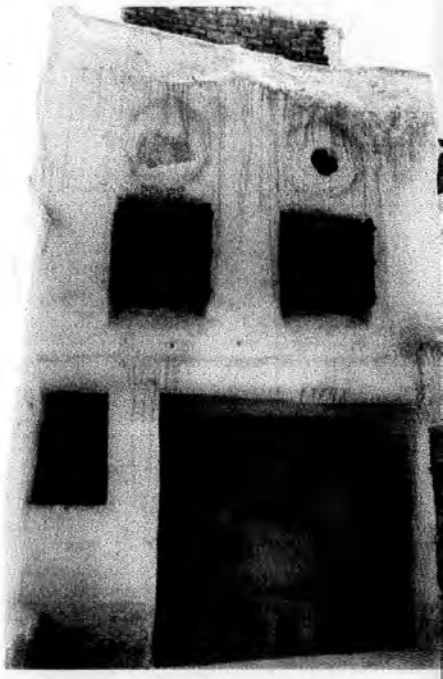
[12]Rathjens:57. See alsoShivtiel et al.:83, p 391, 430

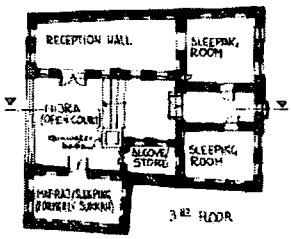
[13] Rathjens:57,p 7

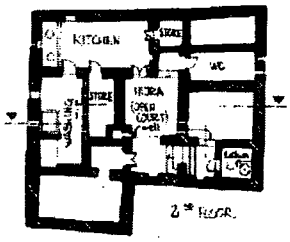
[14]Shivtiel:83, p 430

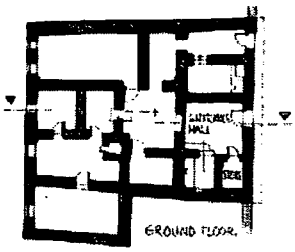
[15]Rathjens:57, p 15

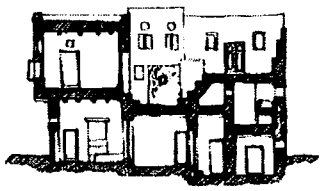
Top and opposite -Al Qa'a, Sana'a: section of Jewish house (after Hirshi); plans and section of another house (source Varanda:82): *centre left* - Street in Al Qa'a. Notice *hijra* at the middle of the photo; *right* - View from the *hijra*; *bottom right* - Former *sukkah*, the room designed for the Feast of the Tabernacles. Notice the built-in ceiling fixture to hang the tabernacles; *left* - Stair opening onto the *hijra*











Additional height could be gained at the back of the house since it was not seen from the street.

The Jewish quarters in various Yemen towns were taken over by the Muslim population after the departure of the Jews in 1948 and, have consequently suffered many changes. Not only have new buildings been erected over the ruins of the old but also the layout in those that were adapted has been transformed. The writer was therefore unable to trace paralels between the the best preserved example of Sana'a and other enclosed neighbourhoods that were once exclusively Jewish. In Dhamar for instance, top courts were more evident in the area surrounding the market than in the confined Jewish quarter.

Little remains known about the ancestry of the tall buildings of North Yemen; Lewcock[16] refers to a Himyarite inscription in the Taiz Museum which mentions a house with "six floors and six ceilings", and a graffito of a nine storey house in a stone of unknown provenance. There is of course the fabled Ghumdan palace in Sana'a whose height and splendour varied with the literary fancy of the chroniclers. The French archaeological mission has reconstituted examples of domestic architecture in the pre-Islamic South Arabian kingdoms and states that "*the inscriptions and the comparison with traditional Yemeni houses suggest that (pre-islamic houses) must have been high buildings, with a reception room on the uppermost floor* ". The ground floors were built of stone on which were superimposed several storeys built of unburnt brick within a wooden framework.[17] It is not clear however what form those buildings might have taken in their evolution or even if there was evolution rather than rupture with pre-Islamic models.

New house types have been introduced since the Revolution which will be the object of extended comments in chapter 5 .

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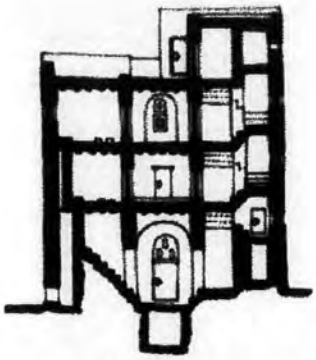
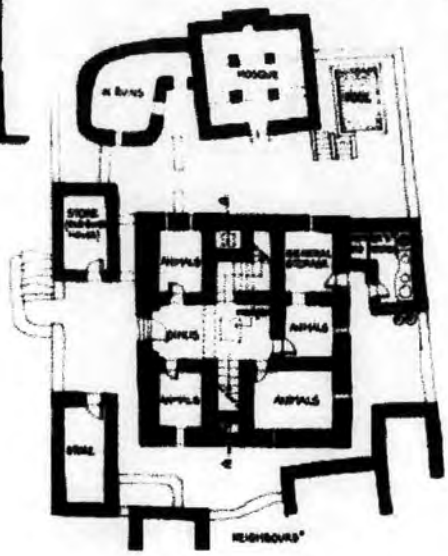
[16] Lewcock:76, p.15. Lewcock also explains the more than 30 metres tall buildings of Shibam in the Hadhramawt with the 15th century floods and the subsequent shortness of land on which to build. See "Yemen Update",#30/31, p. 31

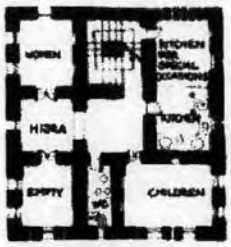
[17] Audoin, Breton & Robin:88, p 77. Breton:88, p.111, states that as result of extensive research into the distribution of the house type found in Shabwa, Hadhramawt, he has come to the conclusion that "*these towers are characteristic of the Yemeni towns on the edge of the desert and of the settlements in the Yemeni Highland.*"



SECTION



1st (GROUND)



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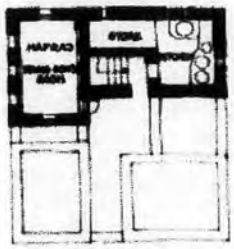

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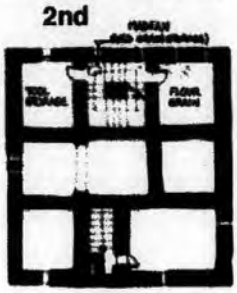

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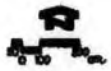
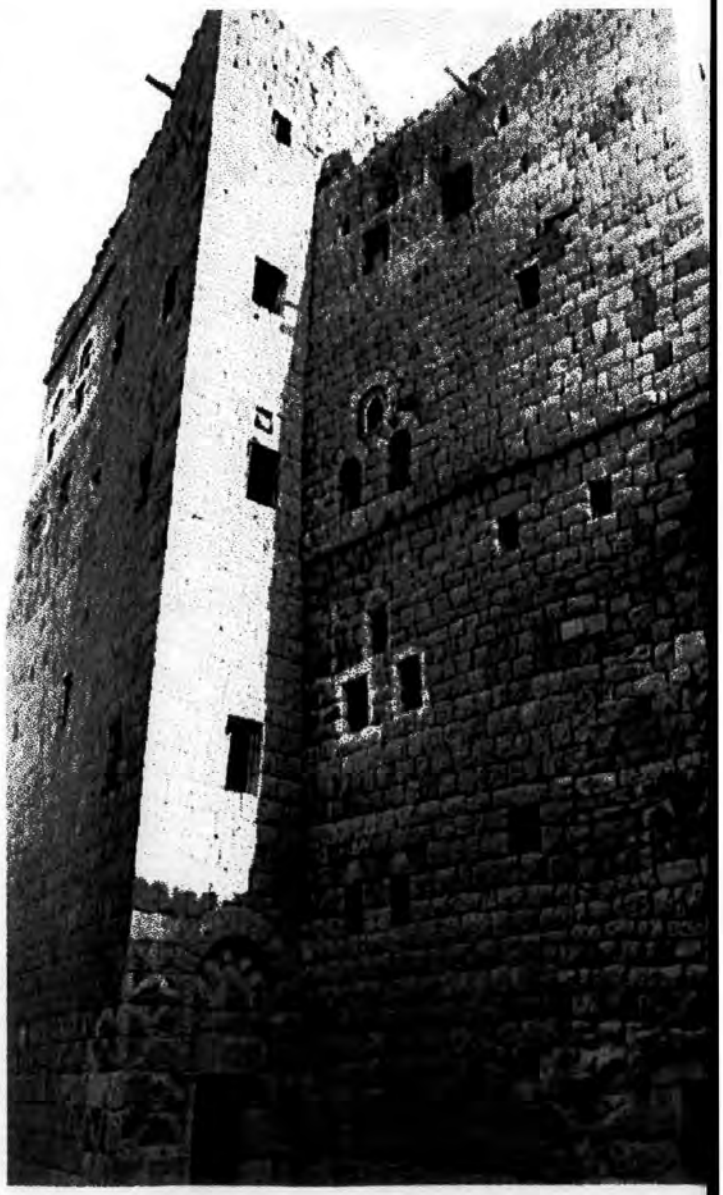


Top - Shaykh's house, Al Sabahi , Khubban; *centre* - orchard gate; *bottom left* - Entrance of house, Barat; *right and opposite* - View and plans of house in Al Hajjra, Haraz



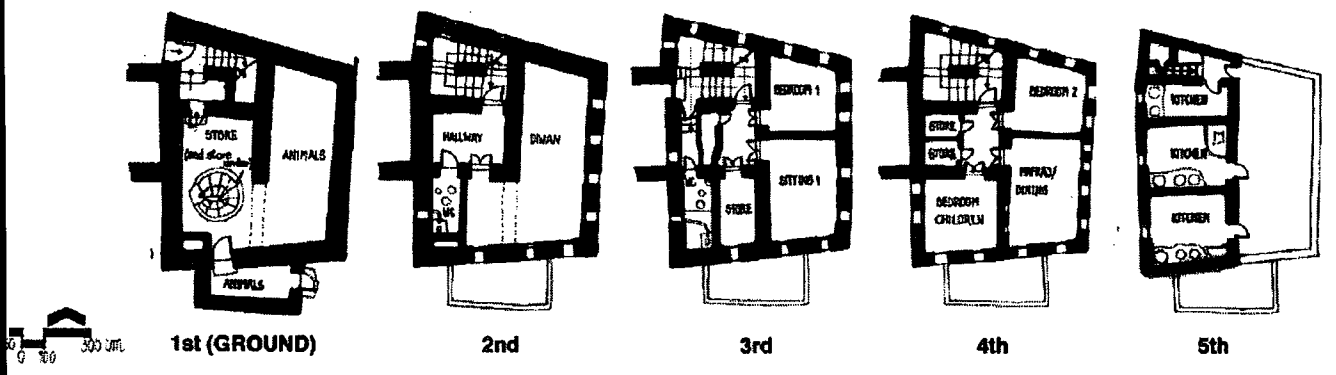
Section 2 - Space utilization

The spatial organization of the various Mountain house types is basically contained in the "Tower House". In the Highlands the prefered orientation is north for the circulation and service areas and south for the habitable rooms. For obvious climatic reasons, this is reversed in the subtropical southern and southwestern slopes and in the Tihama. In large houses the use of the rooms may vary with the season, the warmest rooms being used for sleeping in the coldest weather even though used differently during the remainder of the year.

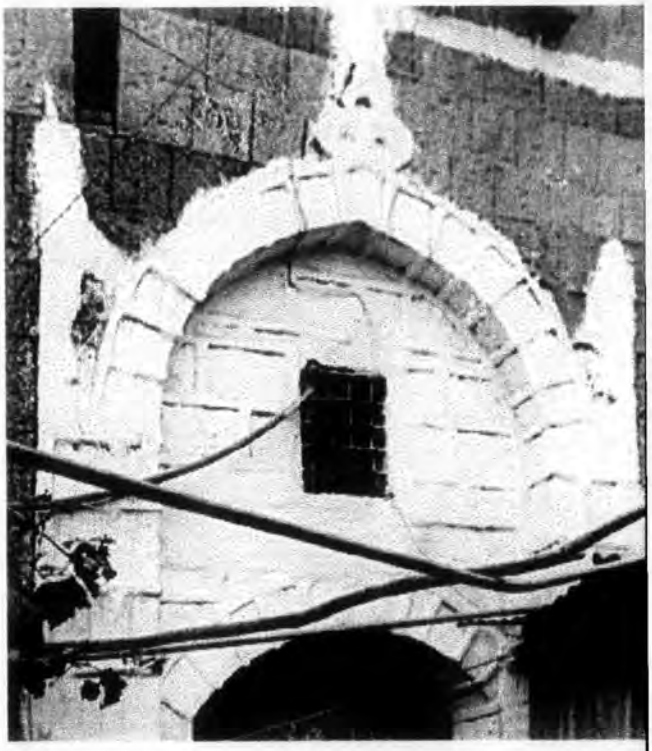
The hierarchy of spaces within the house is expressed not only in the way walls and ceilings are finished, windows and doors designed and decorations applied, but also by the treatment given to the floors, regardless of the material in which the walls are built. Stables and stores on the ground floor are often left with the rock bed exposed or covered with packed earth, particularly in rural areas. Circulation and service areas are paved in stone. Living room floors may be surfaced with a mixture of plaster, charcoal and alabaster powder (*qaddad*), sometimes finely polished, to be covered with straw mats and rugs. Linoleum became a popular substitute in the years following the Revolution. Roof terraces are often left with the construction material (packed earth) exposed but may also be rendered with water-resistant lime plaster. Circulation and service zones, where footwear is worn, and living/sleeping rooms, where one goes barefoot, are also differentiated by raising the door sill which provides a precise separation between the respective floor materials.

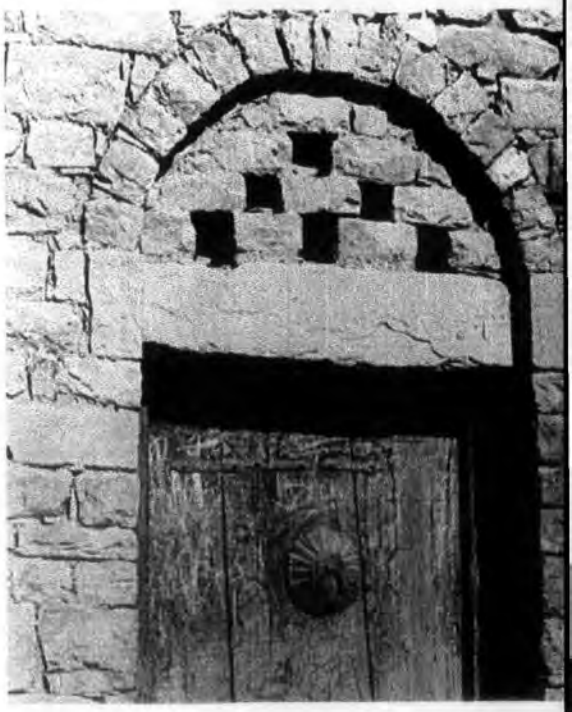
Interior doors are low, seldom exceeding 1.7 metres and thus one must bend upon entering or leaving a room. Symbolic meanings have been attributed to this, but the writer is not sure of whether this is not, as elsewhere, a reduction acknowledging the limits of function (Yemenis are generally small of stature).

The main door may open directly to the street or to a front yard, often quite small, where a well may be located. It generally is the object

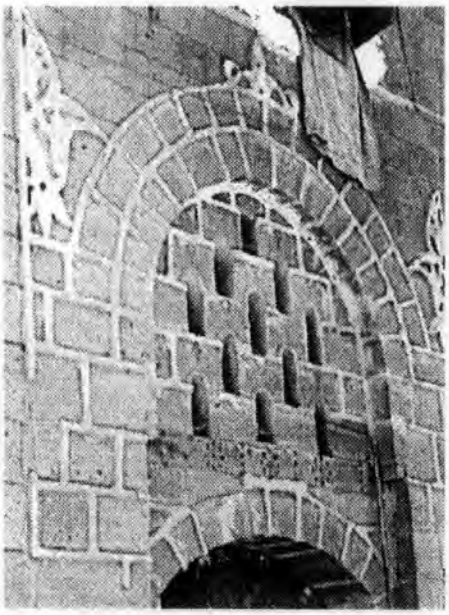


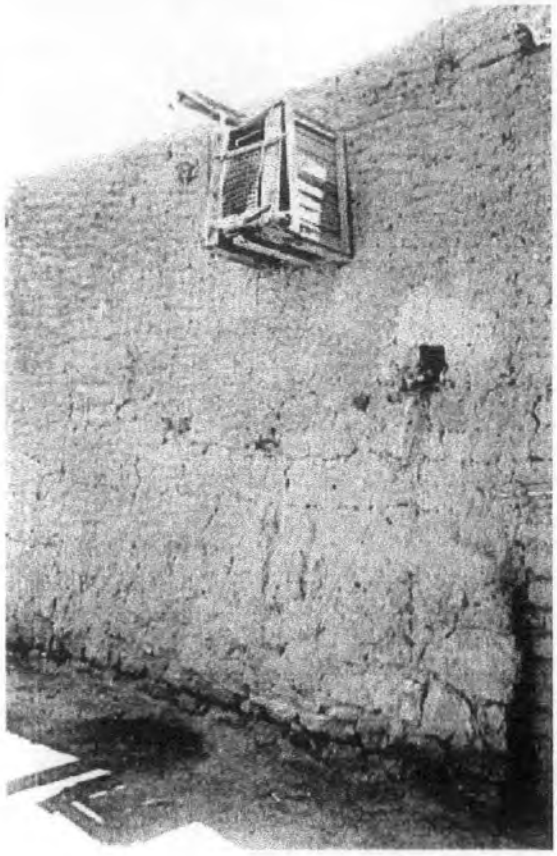
Top left- Al Masna', Ans; *middle* - Al Khawl, Al Baydha; *right* - Madinat al Jawza, Sinhan; *centre left* - Bani Habash; *right* - Sana'a; *bottom left* - Amran; *right* - Thula; *opposite, left*- San'a (*top*)and Sanaban (*bottom*); *right* - Sana'a

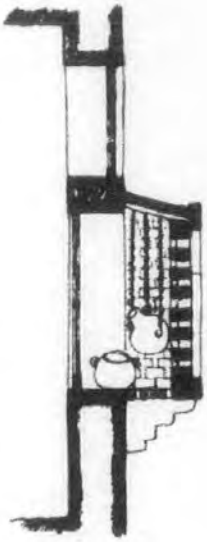


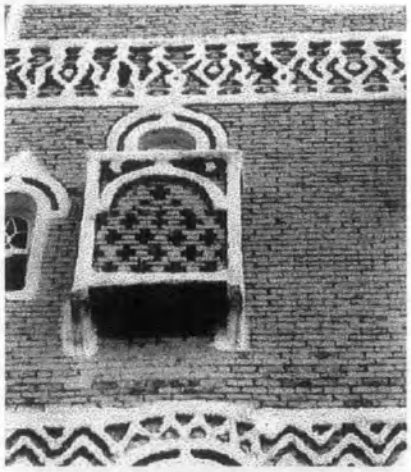


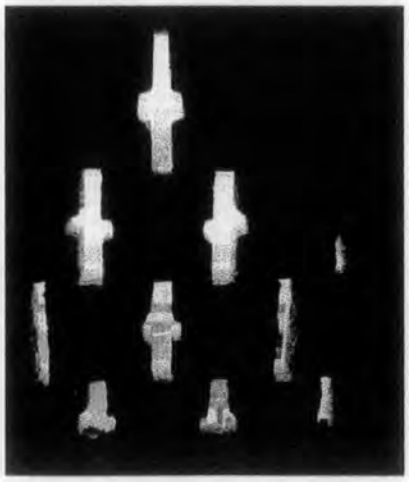
of particular attention both in the way it is framed and to the material of which it is made. Stone buildings set a basic model in which the door is set on a high frame topped by an arched tympanum, which may be blind but usually has one or many perforations, made with staggered blocks. This allows ventilation and a little light into the entrance hall and in doing so the opportunity is provided for some form of restrained decoration. The whole door may be wide and high enough to allow the passage of loaded animals, with a smaller inset panel opening separately for the passage of people. Moderately carved jambs and panels are usual. Metal door knockers are similarly adorned with simple designs.



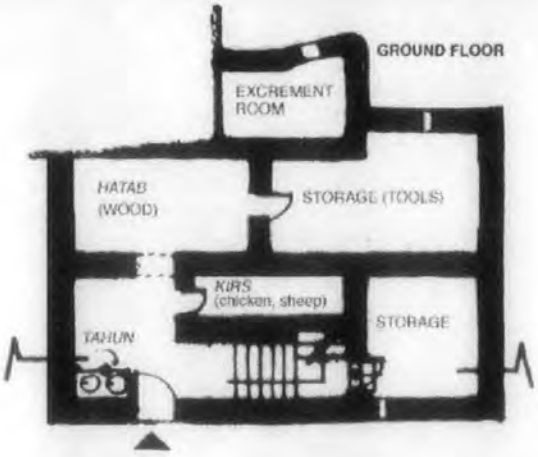








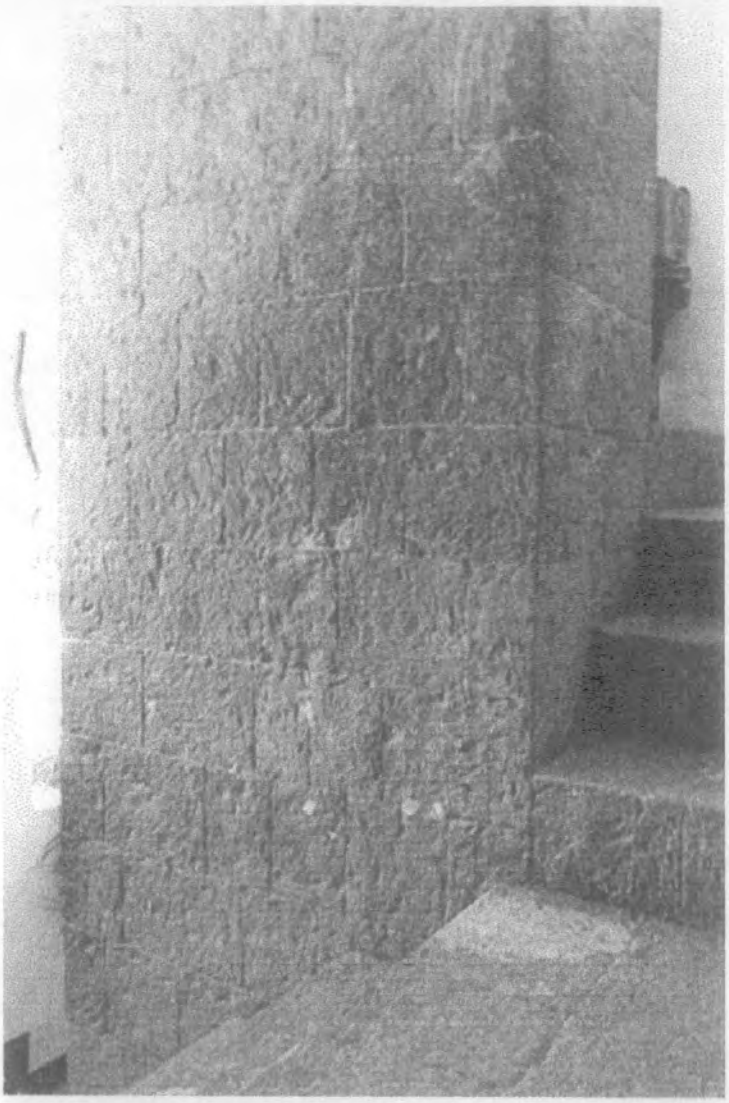
Top left - Al Sirr; *right* - Al Qa'a, Sana'a; *centre* - Sana'a; *bottom left* - *Dihliz* al Tana'im, Sinhan; *right* - Ground floor plan of house, Yarim; *opposite* - Grinding mills, Thula and Al Hanakha, Rada'a (drawing J. Varanda)

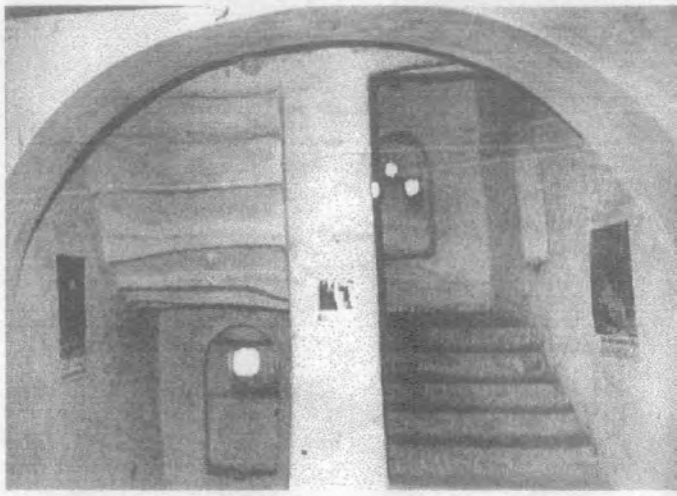


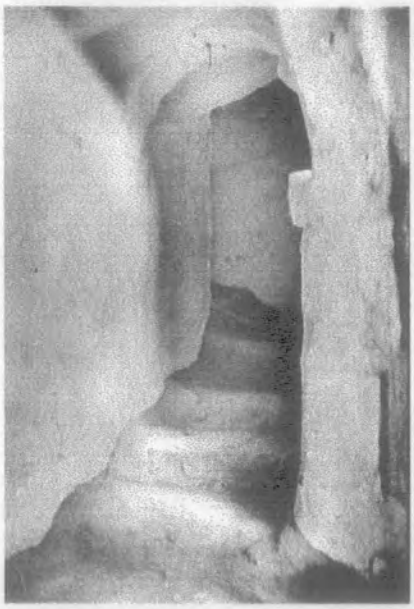
A distinctive feature already referred is the machicolation-like projection that occurs above the doors and elsewhere, principally to allow seeing without being seen from the hallways and terraces. This is also associated with other functions, such as cross ventilation , and as a cool box for water and food. This feature takes a variety of forms depending on the materials in which it is built, usually stone and brick but also of mud and latticed wood. It is also variously named according to the functions it performs and to the region s in which it is found. The most common name is *shubaq* (window in classic Arabic, but in Yemen designating only this particular feature, the local word for window being *taqa*). It is also known by descriptive expressions relating to coolness and water, such as *bayt al shurba* and *bayt al myia* (Sana'a) *barrada* (Ibb) *shuqada* (Al Baydha) *mattal* (Rada') and others. The word *mashrabyia* is rarely used, except by foreigners, or sometimes to describe the wood lattice versions.

The house is entered through a lofty hall (*dihliz*) onto which stables and storerooms (*har, hatab*) open . A small pen for sheep or a chicken coop (*kirs*) may exist under the staircase. The *dihliz* could contain grinding mills, platforms for loading and handfeeding animals, and buried grain storage pits (*madfan*). The ground floor also includes a chamber for the accumulation of human feces from the latrines above, which may be collected from within the *dihliz* or from a separate opening outside the building.

In an urban context this layout may change, with the space allocated for the needs of farming replaced by shops or warehouses (*samsara*) for goods to be sold in the market or supplies received from estates in the countryside. In larger houses, having powerful owners, the ground floor may provide accommodation for anything from one or two guards up to a small garrison.







Top left and right- Sana'a *centre*- Dhamar *bottom* - Diwan, Rada'a

The stair leaves from the *dihliz* and winds to the top around a vertical structural element - the *qutb* - having usually one or more intermediate landings. Stairs may be surfaced in stone or in mud, independently of the material in which the main walls are built. The size and regularity of the steps varies; they may be very regular (e.g. 19x25 cm, 25x25 cm or 20x30 cm) as in the Sana'ani houses, or, in the countryside, they may be so irregular as to give the impression that the very mountain track that reached the house door continues through a dark climb to the open light at the roof. Most stairs are lit and ventilated by reticulated openings which, with the *shubaq* at the hallways, constitute a major component in the house's ventilation system. At each floor there is a wide landing which may be contiguous with circulation areas or separated from them by a door.

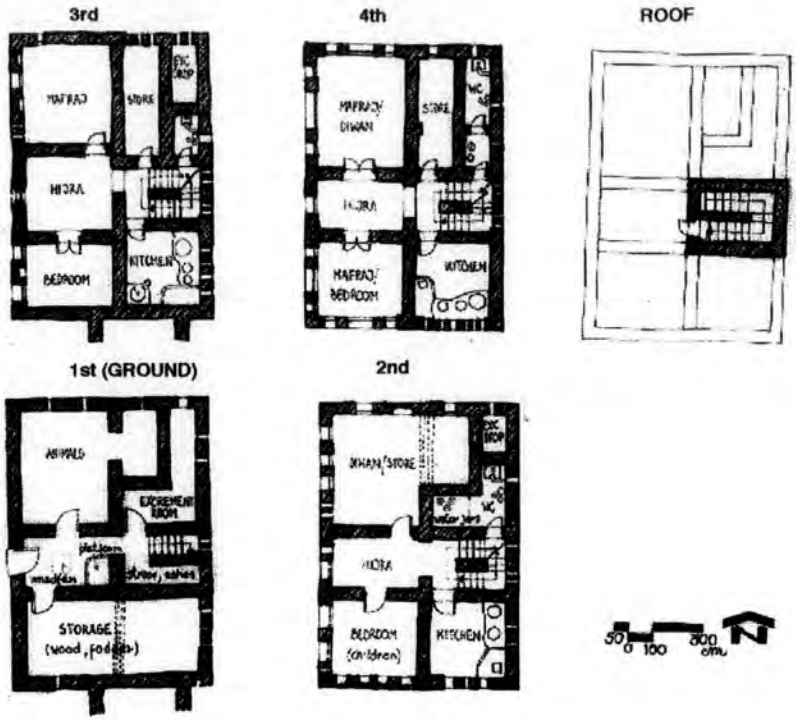
Grinding mills (*tahun, mathana*) which were once an active feature of the house until the arrival of mechanised commercial mills, were seen to be located at the *dihliz*, or in the kitchen. Usually, however, they are included in the floor above which, in Sana'a, may be a mezzanine, where grain and fruit are stored in rooms with masonry bins (*tabaqa, tabaqa al hab*). The same floor may also contain general purpose storage rooms for household goods or for the products to be sold in the shops.

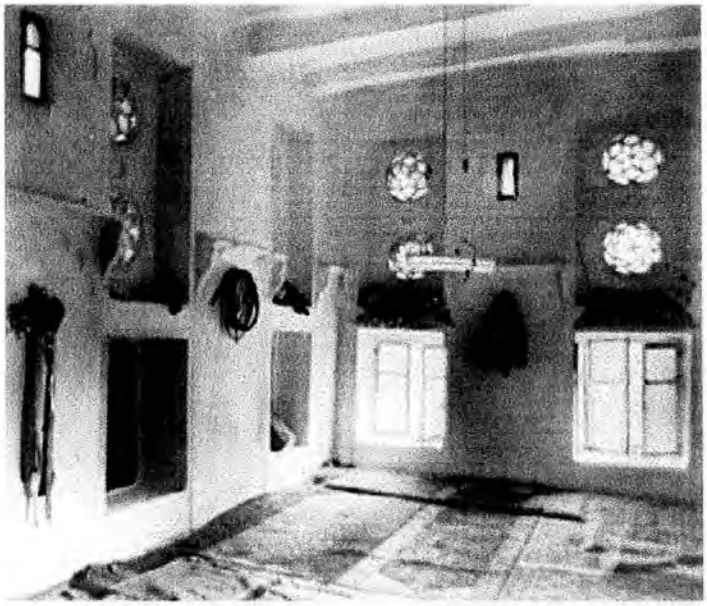
Additional storage space may be created by lowering the ceilings of service areas in the rest of the house - bathrooms, kitchens, stair case. Secret storerooms, where food and valuables are hidden, may be concealed between two floors and accessed by trap doors.

In smaller houses the reception room (*diwan*) for formal occasions and large gatherings may exist in the first floor. In larger houses the *diwan* is located on the next floor, the first two floors being clearly defined as service and storage areas.

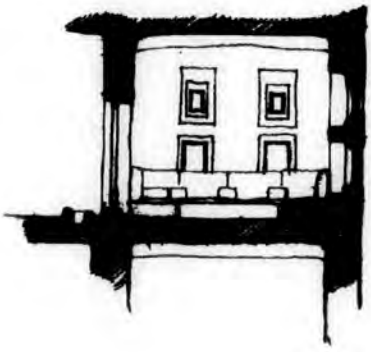
The *diwan* is the largest room of the house. Its width is limited, as in the other rooms, by the span of the three to four metres long wood beams normally available; but its length may be that of the house, possibly 12 metres or more. It is the room used for the principal events of the family's life: weddings, births and funerals. It is also the room where the shaykh receives his tribesmen to deliberate and occasionally hold court.

Large houses may have more than one *diwan*; and when not in use for its intended purpose, it can double as a household storeroom or seasonally as a sleeping room. Spare rooms, a bathroom and even a kitchen may exist in the same floor as the *diwan* and be reserved primarily for guests.





Top left - Plans of house in Sadda, Wadi Bana; *right* - Looking toward *hijra*, Sana'a; *centre left- diwan*, Sana'a; *right - ghurfa al istiqbal*, Sadda; *bottom left* - Sitting room with built-in mud benches, Al Baydha (writer's notebooks); *right - mafraj*, Al Hanaka



The most private part of the house is from the level of the *diwan* upwards, where sleeping and sitting rooms, dining areas, kitchens, pantries and bathrooms are located. The custom is that when male guests climb the stair they must be preceded by their host or, if alone, they regularly exclaim, "Allah, Allah" as a means of anouncing themselves.

Each floor has an unfurnished hall or lobby onto which the rooms open and which may be just a wide landing on the stair or separated from the landing by a door. This hall, normally equipped with a *shubaq* and often carefully although not obstrusively decorated is the *hijra* [18]or *sa'la*, being the intermediate area between the stair, where both sexes circulate[19] and the private rooms, where women, children and only the men of the family are allowed. The same designation is applied to a small ante-chamber existing in some living rooms, where the shoes are taken off and the waterpipe prepared. The *hijra* or *sa'la* may double as the place where meals are taken, the word *sa'la* appearing to be more consistently applied to the hallways where this was habitual.

Sleeping rooms also double as sitting or dining areas. In general no room is solely designated for meals, which may be taken by the family in any room, hallway or pantry - but never in the kitchen. Small formal parties of guests may eat in the main sitting room; large parties eat in the *diwan* and hallways.

Couples may share a room but it is common for a woman with children to occupy a separate room from her husband. In a polygamous situation each wife has her own room and sometimes also her own kitchen. The eldest man and woman have the best and second best rooms for their personal use and as their private receiving and sitting rooms, although children sometimes take precedence.

Family sitting rooms are known in different regions as *ghurfa al istiqbal, ghurfa al majmu'a* or, commonly in Sana'a, as the *mafraj*.. *Mafraj* and *mandhar* are both words used to designate the uppermost isolated room, with the best view.[20] Whatever it may be called, this room usually is the realm of the oldest man and has the most decoration, the finest coloured glass fanlights and the best objects displayed. It is the room

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[18]*Hijra* is, as seen before, the name given to the open court of the "top court houses" and the Jewish houses of Sana'a. Rathjens establishes a common ground between the three concepts associated with this word, namely the open court of the Jewish houses, the hallway just described and the towns under a special status of peace-keeping. The inferrence is that in all cases the notion is present of a neutral ground and a place of peace for all the users of that space.

[19]Examples were seen, particularly in Kawkaban and Tawila, with separate stairways for men and women.

[20]Although both words appear to be used indiscriminately at the present, it seems that *mafraj* meant any larger sitting room on the upper floors and *mandhar* was exclusively used to designate the small room at the very top, with privileged views. *Mafraj* was also used in alternative to *diwan* to indicate the ground floor reception room characteristic of some suburban houses of Sana'a.

Top - Chewing qat, Sana'a; *bottom* - Tea for guests, Al Hajra, Haraz

especially chosen for qat chewing by small parties .

Although qat can be chewed anywhere - working in the shop, walking, even driving - the preferred place is the *mafraj*.. The afternoon is spent talking, listening to music (cassettes, except for special occasions, have replaced live musicians), smoking the waterpipe (*mada'a)* [21] and gradually letting oneself be overcome by a reflective mood, the magic of wide views and the way the changing light multiplies the patterns on the colourful tracery fanlights. Whether the mafraj suggested itself as a favourable place to chew qat, or qat influenced the design and ambience of the mafraj is an open question. The fact is both are now inextrincably linked.

Qat chewing, more than a mere habit, is a powerful element of social bonding and exchange. Qat chewing sessions are still the best opportunity to present one's case to a decison maker or to discuss problems that go beyond normal social intercourse. Qat is chewed from after lunch until early evening, except during Ramadhan when it is chewed after the sunset meal, and is the pretext for intense socializing. The evening prayer call used to signal the conclusion of the sessions, but today they tend to last much longer.[22]

It appears that in pre-Revolution times the owner of the house would provide the qat for his guests; in the 'seventies, however, the custom was that the owner of the house provided the room and the drinks, usual guests being supposed to provide their own qat. Later, a common sign of changing times was that a guest brings his own bottle of water.

Much water is drunk while chewing qat. Water used to be served in clay jars and scented, frequently with Arabian gum. In the 'seventies the use of thermos bottles was general but the water was still scented. Water was drunk by the ladle or in tiny cups, even smaller than the small china cups for tea or *qishr*.[23] One can ask for water from the person sitting closest to it by saying "*Sahha* ", meaning "Health". Bottled mineral water and soft drinks are usual today.

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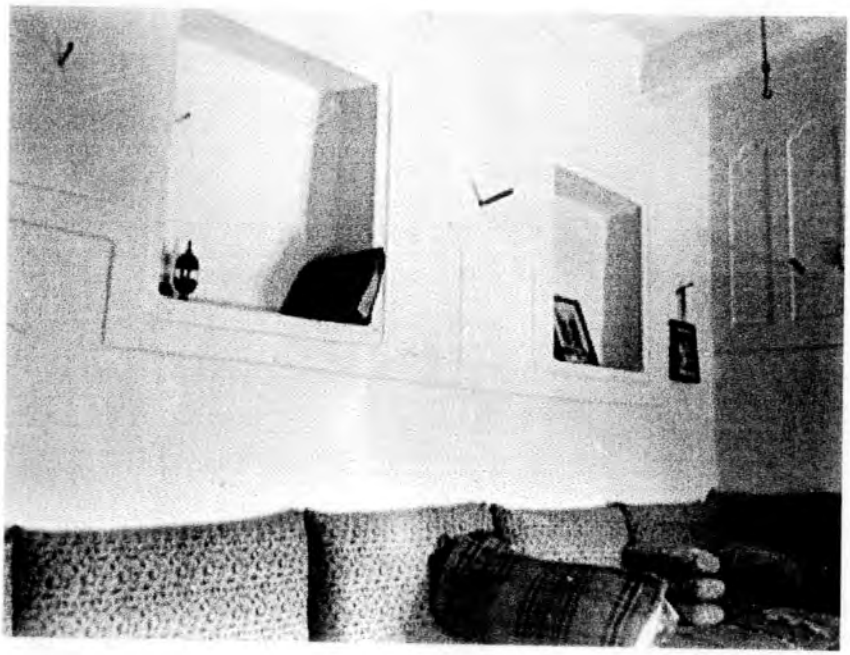
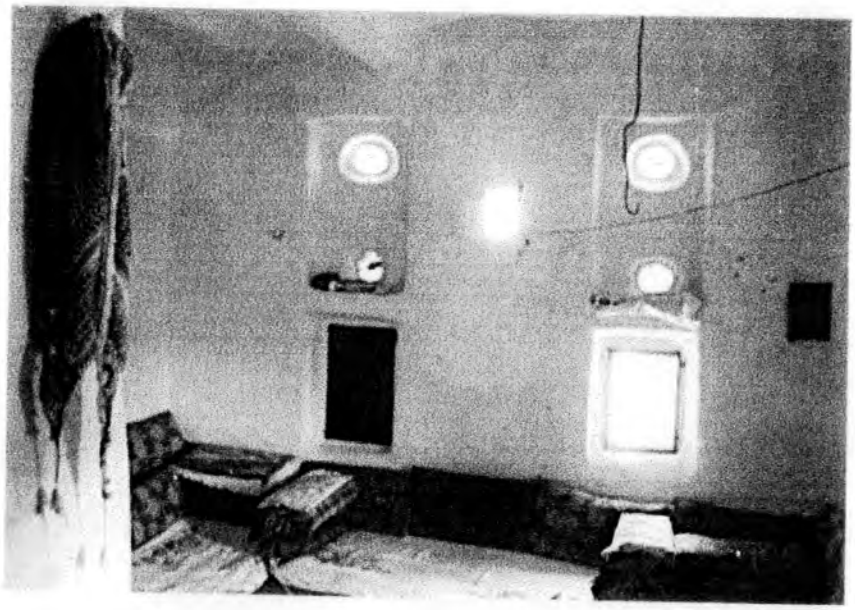
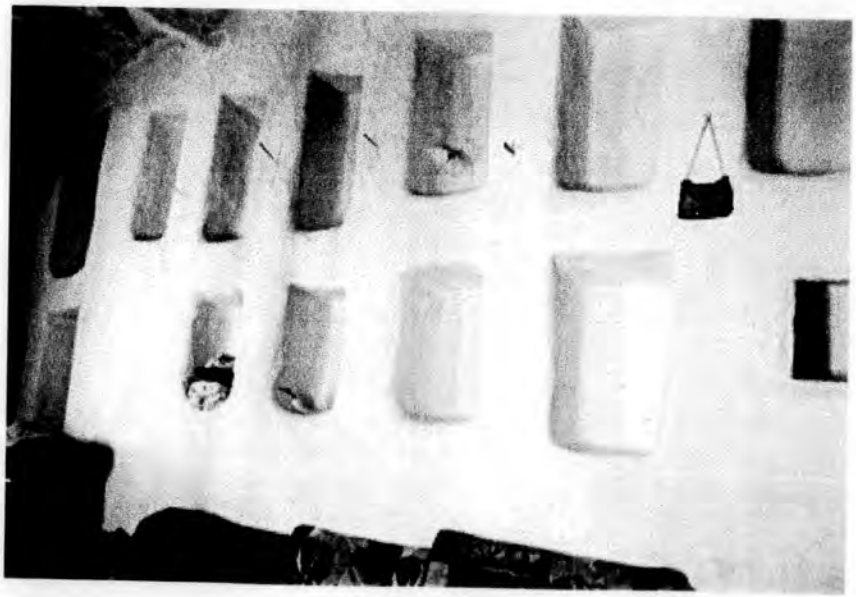
[21]Cigarette smoking is making waterpipes but a decorative fixture in many houses.

[22]Apparently one local reaction against frequent and large qat parties comes from modern day housewives who do not feel they want to put up with the added domestic work load that they usually involve.

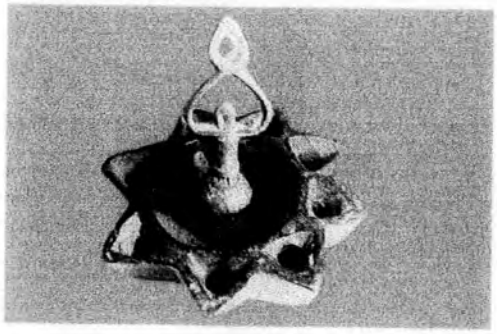
[23]Infusion of coffee husks to which ginger root and other herbs may be added, which is particularly commom in the Central and Northern Highlands where it is also known as *qahuwa* (coffee). "Black coffee", made with the roasted kernels, takes the form known in the West as "Turkish coffee" and is known is this area as *bunn* (which the Yemenis make a point of calling "*Bunn Yemeni*" rather than "*Bunn Turki*"). It is not, in the writer's experience, a common social beverage in the house.







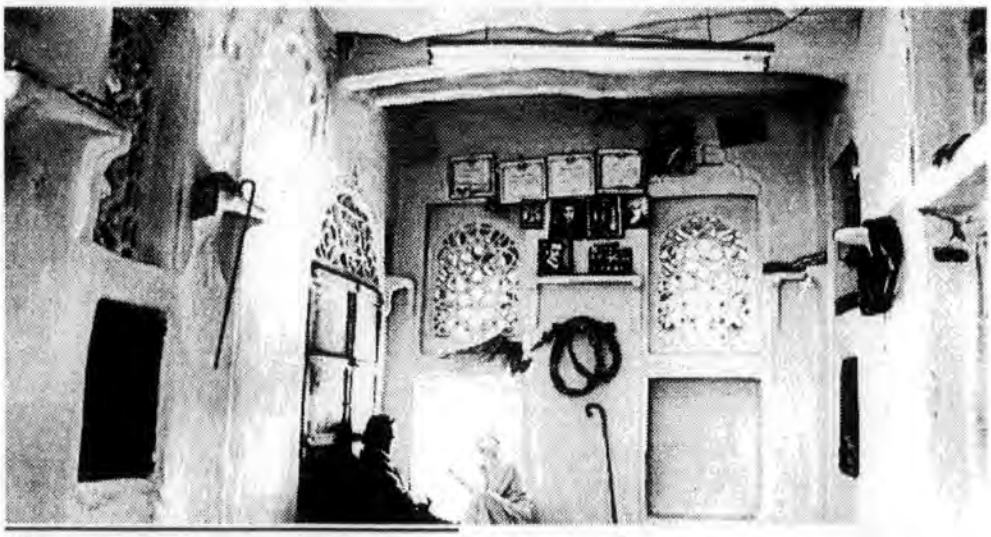
Left, from top to bottom - Sitting rooms at Mithal, Suq al 'Ainan and Dhamar. Notice hooks for lamps; *right* - Stone oil lamp, Sana'a (source Varanda:82) and brass oil lamp, Thula; *opposite* - *mafraj*, Al Qa'a, Sana'a



Spittons are another essential part of the paraphernalia of qat[24] since chewing involves a lot of spitting. Some are quite elaborate, in embossed or carved brass, but the most common are simply aluminium. At the end of the session, the chewed leaves are spat out and the mouth rinsed into the spittoons or, now more often, in the bathroom. Tea or *qishr* is served then. Nowadays whisky, although forbidden, is commonly drunk, especially in the towns. The qat session may therefore extend into the evening as a drinking party .

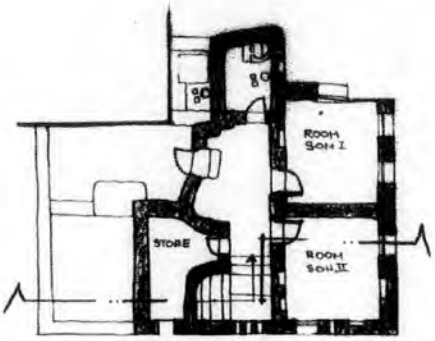
Rooms are consistently furnished in the same way. "Built in" features include niches (*mugharaf*) with or without doors and plaster shelves (*sfaf*), where useful and decorative objects (trays, brass lamps, parfumers, incense-burners) are displayed. In some cases there are masonry platforms to sit or sleep on, such as those seen particularly in the south and southeast and in the ground floor sitting rooms of some houses of the garden suburbs of Sana'a. Otherwise there are wooden pegs on which to hang clothes, daggers, guns or even the water pipe.

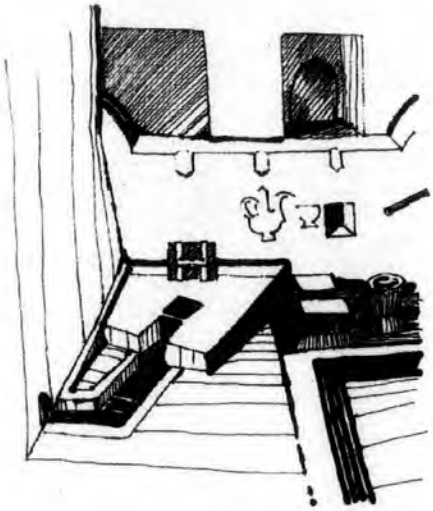
Movable furniture (*mafrasha*) consists of rugs, mattresses along the walls (*farsh*), hard cushions for the back (*'usada*), arm rests (*madka*) and smaller soft cushions (*mukhadda* or *bint al 'usada*) placed on top of *'usada* or the *madka*.[25] Clothes and personal effects are kept in trunks and chests. Low tables and tray stands are sometimes part of the furniture. Rooms used to be lit by oil lamps, often of alabaster or stone, hanging from the ceiling. These have become market commodities for foreigners, electricity or at least Primus lamps now being widespread. Electrical fittings usually have consisted of naked light bulbs or neon

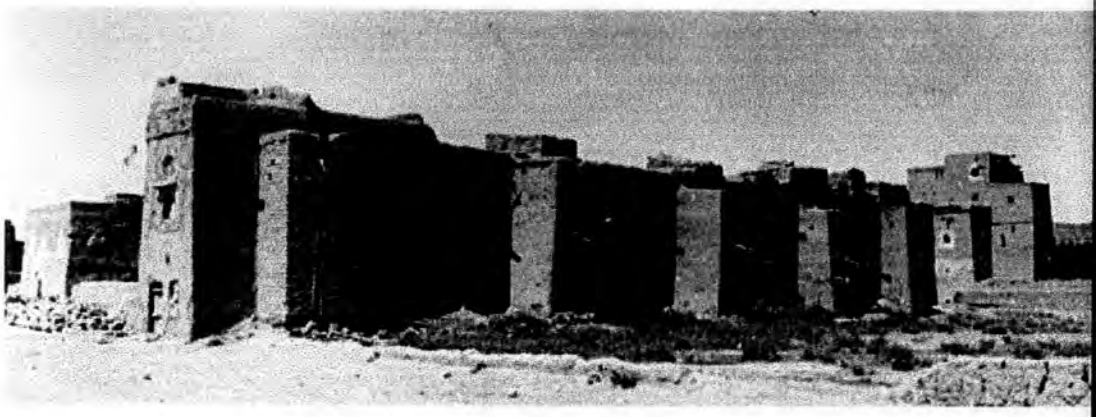


[24]Spittoons, clay water jars, thermos bottles, ashtrays, brass trays for the water pipe, water pipe, tray stands for the water cups, ashtrays or tea-cups, ladle, brass tea or coffee pot and thermos for qishr or tea.

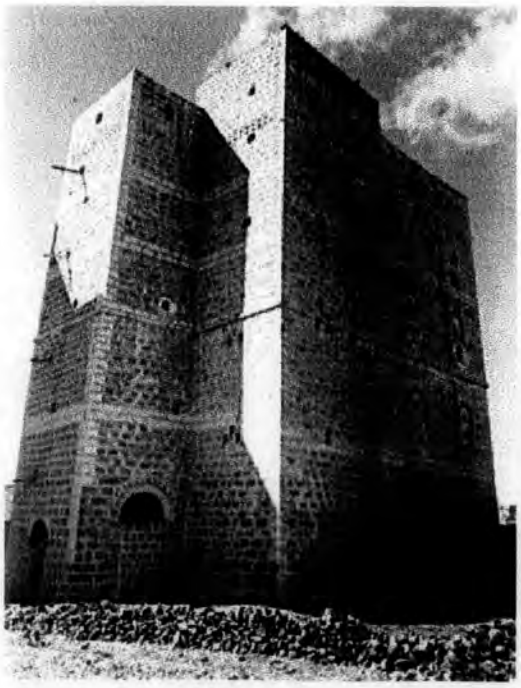
[25]Approximate dimensions: *farsh,* 190x90x7 cm; *'usada*: 72x52x15 to18 cm; *madka*:, 44x24x24 cm; *mukhadda*:, 50x30 or 55x35 cm.

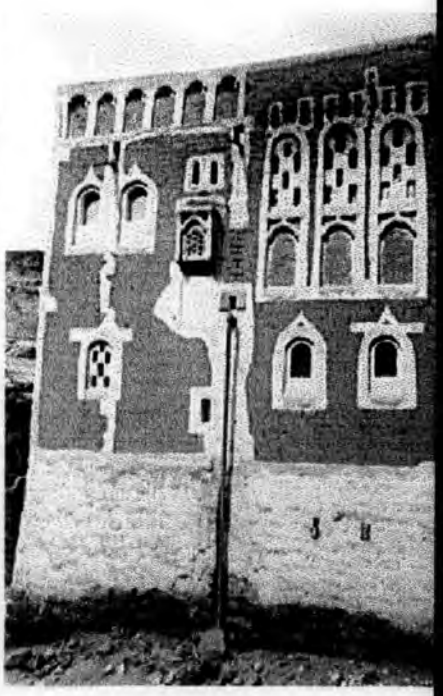




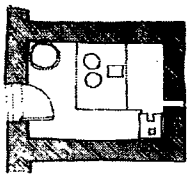


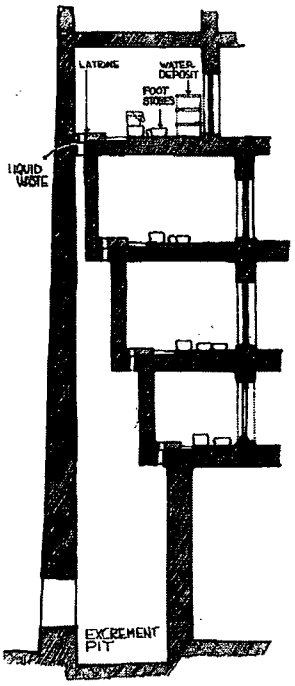
Top, from left to right - *Masfa* and bathroom on top floor of house in Yarim ; bathrooms at Sana'a and Dhamar (drawing J. Lebre); *centre left* - Al Baydha; *right* - Al Wasta', Ma'bar; *bottom from left to right* - Barat, Hujjaryia and Wadi Dar; *opposite* - Schemes of toilet and latrine drop (source Varanda:82)





light tubes.





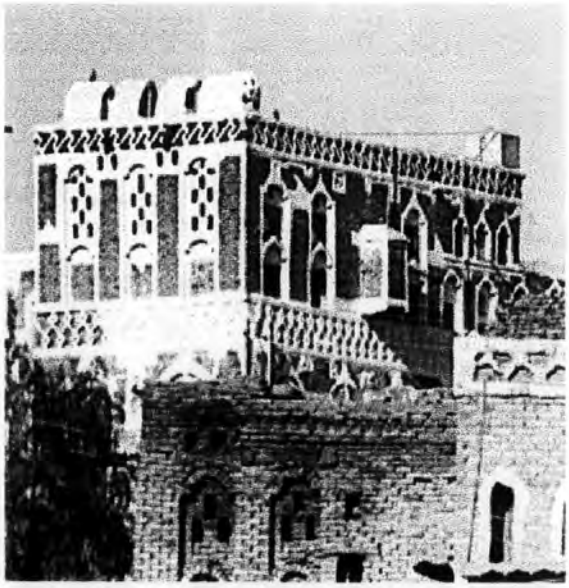
Ablution places (*masfa*) or complete toilet/bathrooms are usually available near the receiving rooms. In the countryside *masfa* were seen at one end of the *mafraj* in the northern and northeastern Highlands, at the *mafraj* antechamber in the southern and southeastern Highlands or on the roof in the central Highlands and elsewhere. Some *masfa* have an adjoining place for prayer.

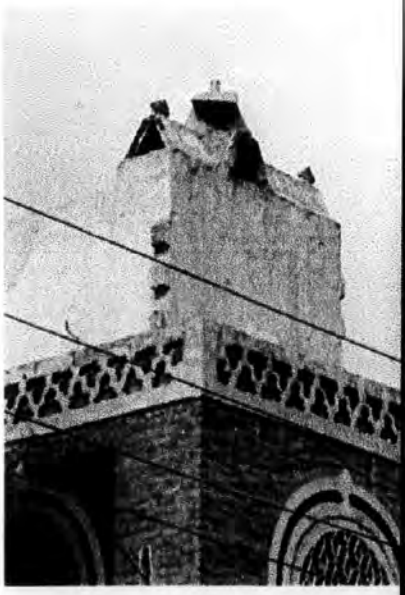
Bathrooms (*hammam, bayt al ma*) consist of a stone or mud latrine and a washing area with a shallow trough channeling liquid waste outside. Washing is done squatting with the feet positioned on two small quadrangular stones in front of which there is a higher cylindrical stone for the water basin. The washing area is either surrounded by a sill or slightly sunken so that the water runs to the hole from which urine is also drained out. A large container of water is also stored in the bathroom for the day's needs . Water proofing with a skirting of polished lime plaster is frequent. Sometimes this surface is decorated with simple paintings or carvings, occasionally relating to the objects for ablution, such as pitchers.

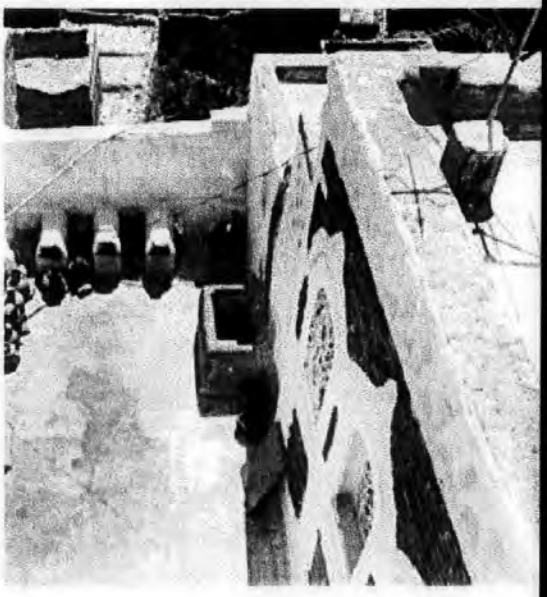
In low houses, like those of the garden suburbs or the Jewish quarter of Sana'a, waste went to a pit below ground level which had to be periodically emptied. In multi-storeyed houses, bathrooms are located as high as possible and, when there is only one, it may be on the roof itself. The reason lies in the waste disposal system adopted. This consists of separating liquid from solid waste, the former going directly to the outside through a drain hole, either running down an impermeable surface rendered with water resistant lime mortar or, particularly in mud houses, a drainpipe jutting out of the wall. Solid waste is dropped through a long shaft to a chamber in the ground floor where it dries and is collected as fuel for the public baths which when reduced to ashes is used as fertilizer. Additional bathrooms have parallel shafts to the same chamber. In the east and southeast solid waste may fall down an inclined stone to the outside or a shaft not extending all the way to the ground floor, into an open container where it quickly dries. The form, position and volumetric importance of toilet shafts are important in the identification of regional architectural variations. The longer the drop the safer the process, which worked very well in the Highlands climate at the population densities of pre-Revolution times. It is also true that it depended on the existence of lower social groups for the collection of waste.

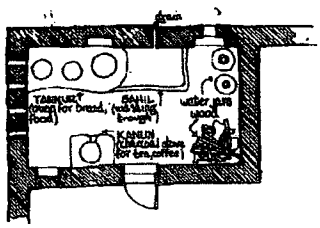
Excess of water ruins the system, and so the introduction of a domestic piped supply caused its demise. Western type sanitary equipment with flush toilets has become fashionable even in the countryside and many old houses have adapted their traditional bathrooms to accommodate these

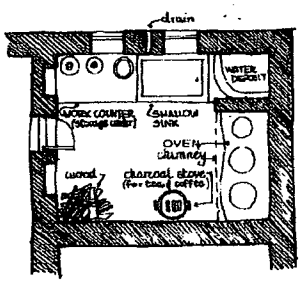
Top - Kitchens in Thula and Wadi Dar; *opposite* - Scheme of kitchen (source Varanda:82); *centre* - smoking holes and chimneys in Tana'im *(left*) and Sana'a; *bottom* - Roof terraces at Talh (*left*) and Sana'a











fittings.

Surprisingly, kitchens (*matbakh, dayma*) are the least attractive part of the house, being smoke-blackened rooms, bereft of comfort, poorly lit and ventilated. They are often located on the top floor allowing direct ventilation and smoke to escape through holes or simple rooftop chimney pots. Ventilation holes on the walls otherwise fulfill this purpose. In some examples a whole part of the wall is multiperforated with staggered stone or earth blocks, thus creating simultaneously a strong design element in the facade. Windows, where they exist, are usually very small. Chimney pieces and flues are rare.

Cooking is done in a mud oven lined with baked clay cones, open at both ends, accessed through the top and having a lateral hole at the bottom to withdraw ashes (*tannur*). Both wood and dung cakes (*tikha*) are used as fuel. Food is prepared on a masonry worktop or on the floor. Washing is done in a shallow trough (*sahil*) lined with stone or lime plaster which may be raised but more often than not is at floor level. At one end of the *sahil* there is a large ceramic water jar or deposit waterproofed with lime plaster, which during the last 20 years have been replaced by metal tanks. Tea and coffee are prepared on a small portable or built-in stove (*kanun*), which also provides charcoal for the waterpipes. Branches and twigs for fuel are stored at one corner of the kitchen. Utensils are kept in niches in the walls but food is not stored in the kitchen. In large houses the water supply for the kitchens may be from a well, up through a built in shaft in the wall sometimes running the whole height of the building.

Roofs are part of the effective area of the house, being often its only open space. Roof spaces are used to store wood, dry clothes, fruit and grain and, in both the Tihama and in the subtropical areas of the highlands, for sleeping during the hottest months. Regional variations occur with or without parapets; when these exist they may take the form of blind walls up to 2 metres in height, with machicolations, and sometimes shooting holes. Arcaded parapets or scalopped roof lines generally imply a higher standard of house construction. Some houses have parapeted roof terraces at more than one level, used not only as service areas but also as recreation spaces for children.

Top - Yarim; *bottom* - Qihlan, Al Hada; *opposite* - Huth

Section 4- Mimesis

A note should now be made about the mimetic character of the Yemen house as regards its spatial organization.

It was seen that, in elementary houses in the mountains, visual mimesis appeared to serve the intention of neutrality or the absence of provocation in the face of enemy threat. It was also seen that this was also present in situations where active strategic siting was combined with the inter-relationship of materials - stone houses in rocky areas, mud houses on the alluvial flats. Finally, analogies were obvious such as that in the continuously flat country of the Tihama the house expands horizontally and that in the mountains the dominant model expands vertically. Other factors however call attention to the mimetic component in terms of functional purpose.

Analogies are evident between the spatial arrangement of the house and land-use in the Mountains. In both cases a layered order is apparent, and if levels are compared, from bottom to top, we have a lower level of fields (supply), a mid-top level of villages (everyday living) and at the uppermost, the privileged vantage point of the shaykh's house, or government/army castle. This corresponds in the house to a lower level for animals, fodder and granaries (supply), a mid- top section of family living quarters and a top isolated room, the *mafraj* or *mandhar* , for the head of the house .

Another analogy concerns accessibility . A common pattern is that at the base level are markets and mosques, accessible to all and, at the middle level, villages, where strangers are not allowed, but through which one passes to reach the shaykh's house, at a high point, accessible by invitation. The house reflects this, with the *diwan* being the general receiving room, the living quarters, above it, being entirely private, but allowing a passage to the *mafraj*, at the top, where the owner receives selected guests.

Thus construction in height in Yemen appears functionally to reflect the environment in which the building is set, even if it may also be a method to increase the floor-area ratio determined by the constraints of land availability.

Western Uplands: unidentified village (top) and Mahabisha (bottom)

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Top left - Children's construction, Wadi Dahr; *right* - Plasterer and helper; *bottom left* - Cantilevers and wood brackets in Thula; *right* - burglar bars as formwork

CHAPTER 4- THE ART OF BUILDING

Section 1 -Attitudes and Procedures

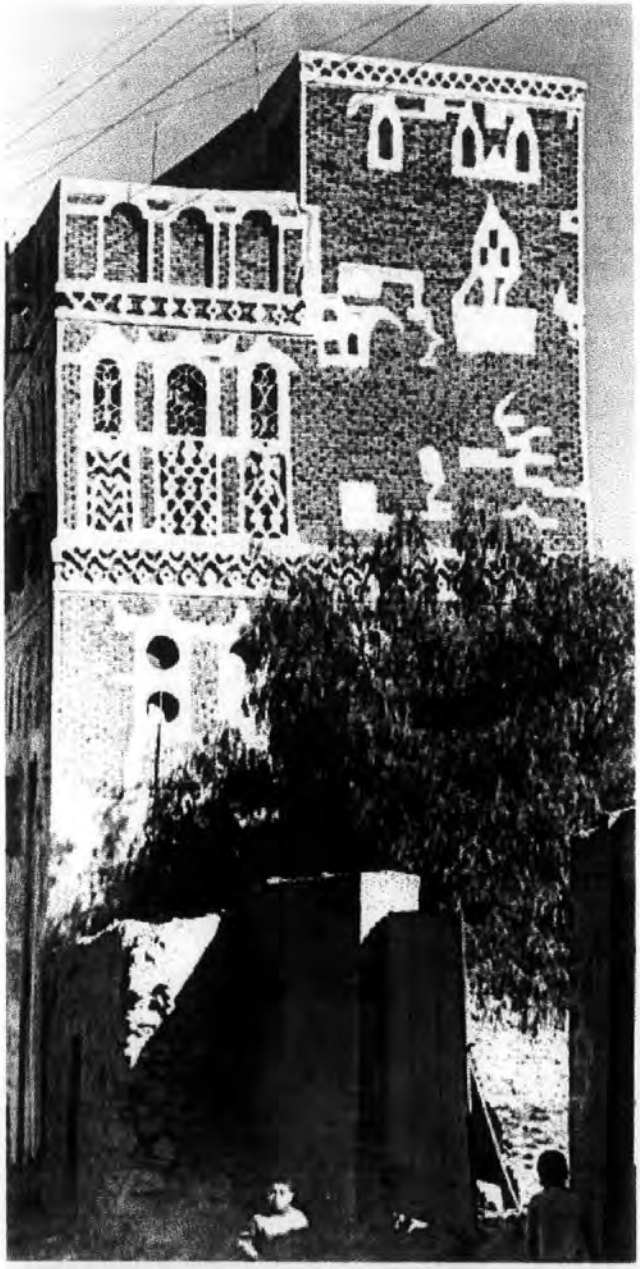
The farmer is also a builder and the ability to construct appears as part of everybody's natural experience, as it was vividly illustrated to the writer when he saw children playing at "house building" with miniature mud blocks made by themselves at Wadi Dahr.

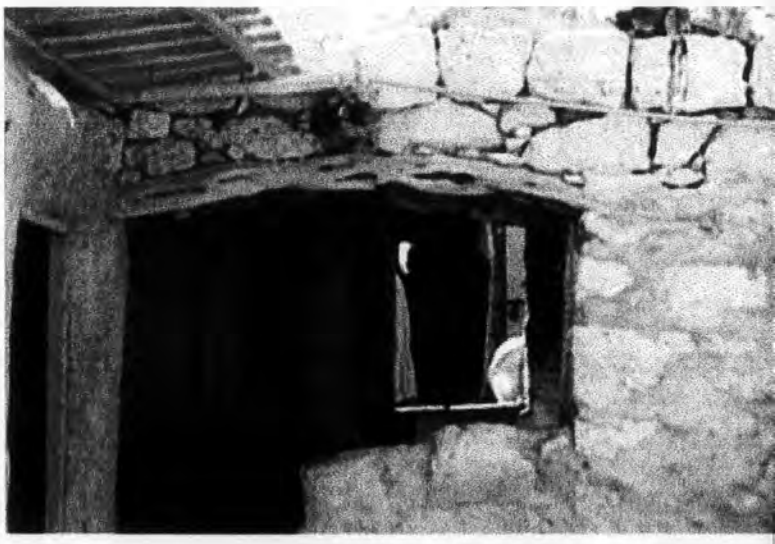
The tools required for building operations are small and simple: wood forms and paddles for earth construction, hammers, chisels and steel squares for stone masons and carpenters, floats and knives for plasterers and plaster carvers. Scaffolding is not erected; workers use the stair which grows with the building and the tops of the walls to circulate. If decoration or repair work needs to be done on the walls the artisans work from ladders or platforms suspended by ropes from an upper level supported by the muscular strength of helpers. The emphasis throughout is on intensive human participation.

The overall process appears to be guided by constructional directness and economy of resources. A case in point is the frequent setting of door and window frames as the wall is built so that not only the perfect fit between jamb and wall is immediately ensured, but also a base is provided with the door or window head to support the formwork for the arches above. Similarly, metal grills for windows, pre-cut as a semi circle at the top, may be used for the same purpose.

Methods appear also to comprehend a degree of risk and carefree casualness. Looking at certain construction details one might say that the principle is "if it holds it is sound", such as when a floor landing is seen supported by the apparently frail arcade of a parapet. Likewise the surroundings of an opening may be whitened by merely splashing plaster from the inside as far as the arm can reach. Rooflines may be left "unfinished", suggesting that the building is to continue or else that it should have continued a long time ago and that its stopping at that point was just the same as having it finished.

"Serendipity" would be a good word to describe how the formal inventiveness of the buildings is often left to accident. This is apparent in forms relying on natural characteristics for their existence but also when solutions are found that profit from the natural shape or fortuitous positioning of the materials. For instance tree trunks are used for roof joists as twisted as they come; the natural result is the highly sculptural





Top left - Sana'a; *right* - Al Nadhira, Khubban; *centre* - Mithal, Al Hada; *bottom left* - Thula; *right* - Al Qa'a, Sana'a

quality of many ceilings. Yet it is also true that design as a statement of purpose plays an important part in the formal language of building in Yemen. Hence the concurrent appearance of adapted accidents and strict proportional and geometrical principles not only in the shaping of particular elements but also in the whole volume of the building.

Building in pre-industrial Yemen had little dependence on administrative procedures. In the villages, building involved authority from the village head or shaykh; in the towns, permission to purchase land and build on it was needed from the neighbourhood chief (*amin al hara*).

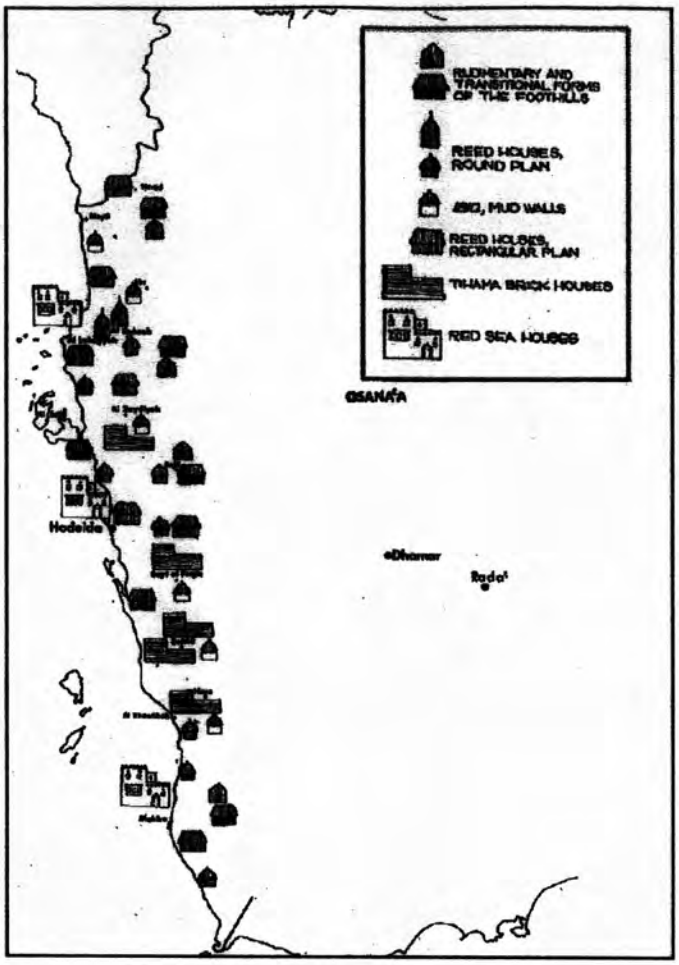
Farmers built their houses with the help of their family and neighbours; tribesmen assisted in the erection of their shaykh's house. Outside help was called in for specialized details such as wood or plaster carving and, more recently, plumbing and electric wiring. In the urban context the construction of the house was entrusted to professionals, involving a wide range of craftsmen, organized in guilds with varying degrees of prestige, the passage from one guild to another being difficult.

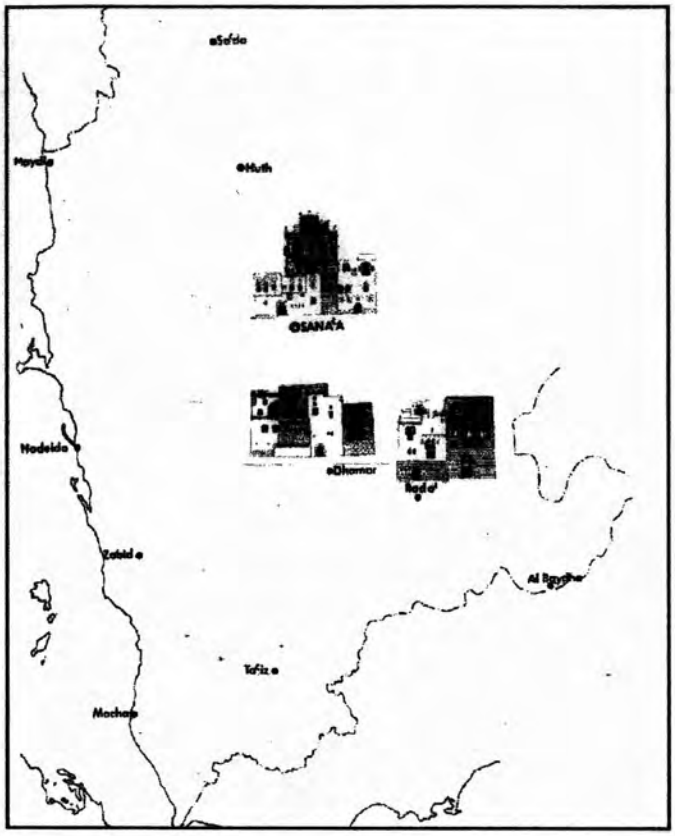
Responsibility for the whole building remains with the *'usta* - the chief mason and contractor. He works for the owner of the building either on a weekly wage basis (*ujra*) for himself and his workers, or as a contractor (*muqawil*), for a lump sum. The title of *'usta*, the highest in the hierarchy, is not always hereditary and, to obtain it, the patronage of a qualified *usta* is required as well as practical experience. Several years are spent by a young mason (*tilmidh*) under the guidance and name of his master (*muallim.*), who may be a parent or patron, until he can work independently and be allowed to engrave his name on a building.

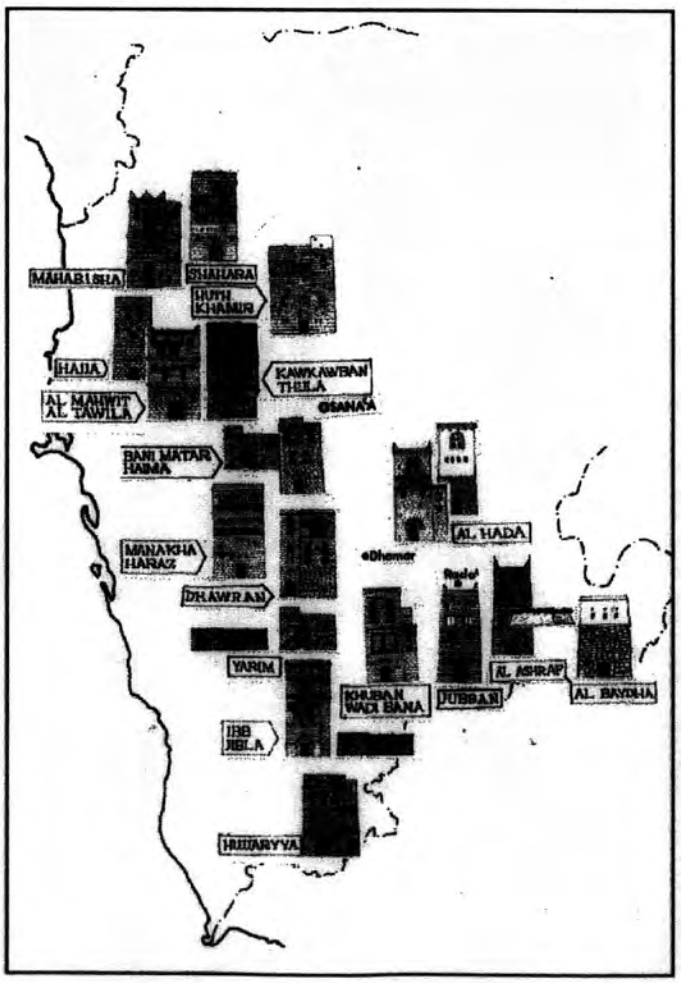
To have a house built, the owner approaches the *usta* and tells him the kind of house he wants, perhaps using as reference another house by the same mason or that of a neighbour. The *usta* then marks out the floor plan on the ground and explains how the rest of the house is to be developed. Adjustments are then made and after obtaining the owner's approval, the building proceeds to the first floor. Thereafter the same procedure is repeated at each subsequent level.

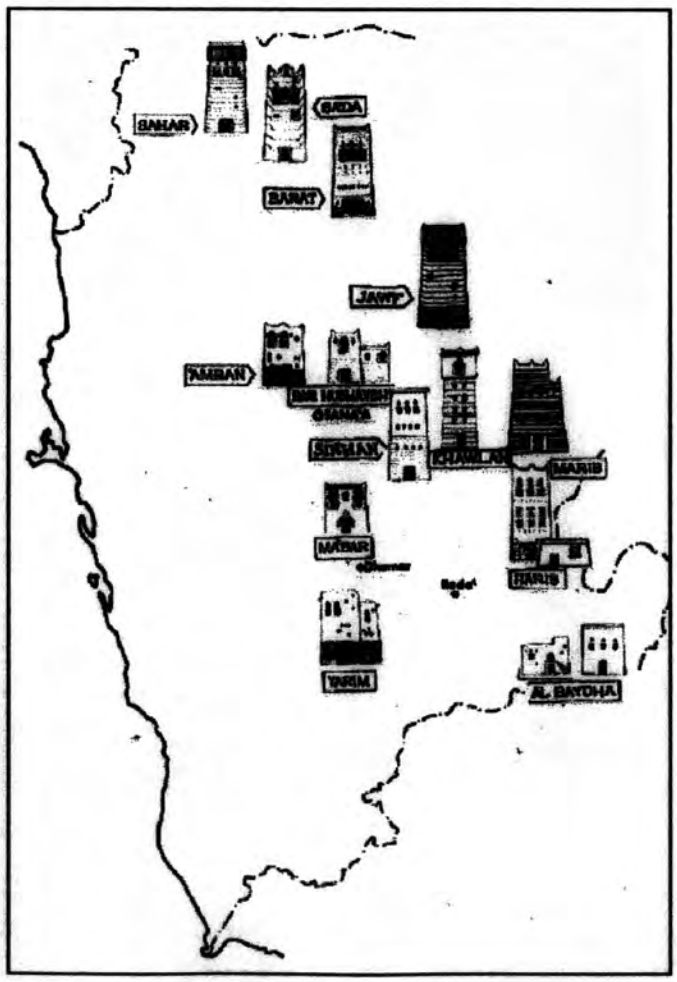
Stones are purchased at the quarry and brick at the kilns by an intermediary who delivers them either to the owner or the *usta*, if he is the contractor. The mud for earth buildings - whether in coursed clay or in blocks - is usually produced at the construction site but, in the 'seventies, places were still frequently seen where mud blocks were manufactured to be sold to other construction sites.

Schematic maps of major regional styles. *Top left* - Tihama; *right* - Cities of the Central Highland plains; *bottom left* - Stone construction; *right* - Earth construction









Section 2 - Materials and Techniques

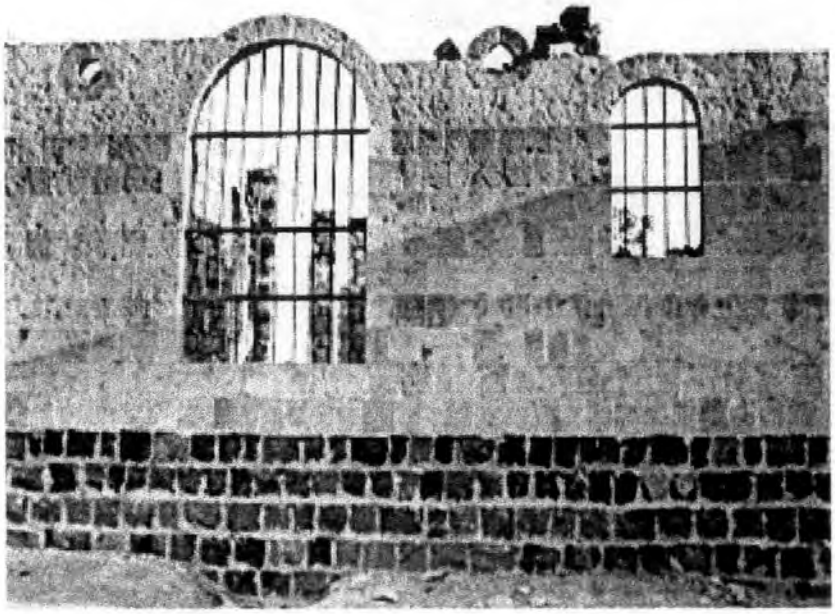
2.1 - Regional styles

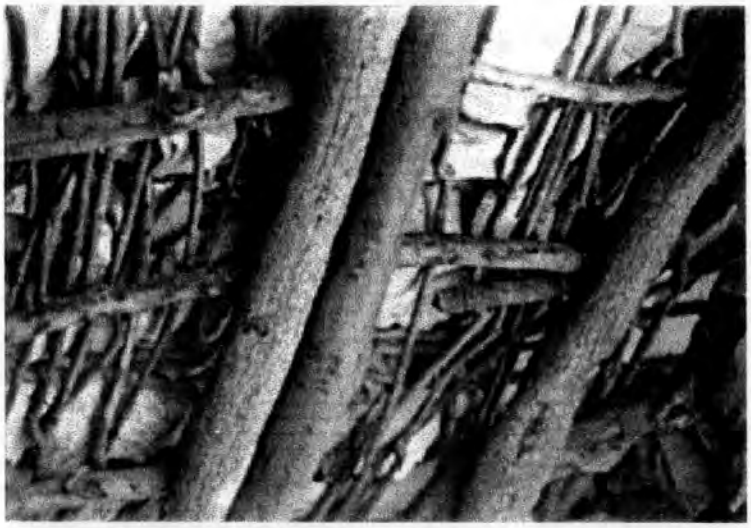
Except for vegetal fibres, used exclusively in the Tihama, the traditional materials of Yemen are raw or baked earth and stone, for the wall structure; mud, lime and gypsum plaster for rendering of exteriors and interiors; wood, alabaster and coloured glass for wall openings, and iron or brass for fittings. Glazed clay, seen in Tihama pottery, is not used in traditional construction: the only glazed tiles the writer saw were imported and recently applied.

The material of which the building is made, normally that which is available *in situ*, does not influence the basic plan of the house types surveyed, but establishes variations in style reflecting the physical landscape and surface geology. Thus, earth construction is predominant in areas with alluvial deposits, stone construction in the rocky slopes. Mixed situations frequently occur, either in the same settlement or in the same building. Towns usually display the more refined examples and those that fall within the availability of several materials, as at Sana'a, Dhamar, and to a certain extent, Rada', offer a synthesis of the use of different techniques.

House extensions uninhibitedly carried out in different materials and styles are frequently seen, particularly in the post-Revolution period. For example an original dwelling in mud may have been improved by a new cut stone extension with windows of a different regional origin. Similarly a brick floor may be added to a stone building. New materials, once they became cheaper and quicker to apply, made understanding the history of a house more obvious. In much of the countryside stone and earth now cohabit with cement blocks and corrugated metal.

With the exception of the Tihama grass houses, foundations and roofs are always constructed along similar principles and there are only minor technical variations in the way each wall material is used structurally. The textural differences, however, justify the drawing of a tentative map of regional styles based on the material of the structure as much as on the treatment given to surfaces and fenestration. The homogeneous groups mapped by the writer are named after the town or wider area where they were seen to be well represented. However, there may be better examples and additional subgroups may be found in areas that were impossible to visit at the time of the survey.





Top left- 'Amran; *right* - Basalt foundation, Sana'a; *centre left* - Silf, Hayma; *right* - Tana'im, Sinhan; *bottom right*- Building a roof, Sana'a; *middle* - Ibb; *right* - Rendering a ceiling with *malaj*, Sana'a

2.1 - Foundations, floors and roofs

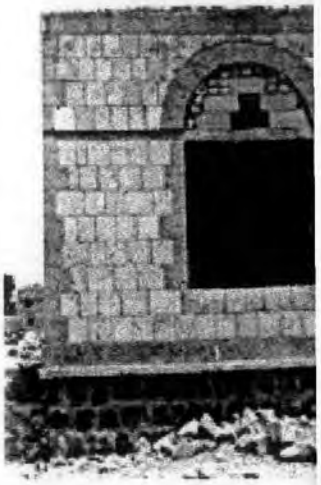
All buildings have a hard rock foundation, commonly of cyclopean stone often from wadi boulders. With ease of transport after the Revolution the use of basalt became widespread and extended to areas where it had not formerly been part of the local building tradition. A basalt plinth, two or three courses above the ground, has become a feature of stone buildings over the 20 years covered by this study.

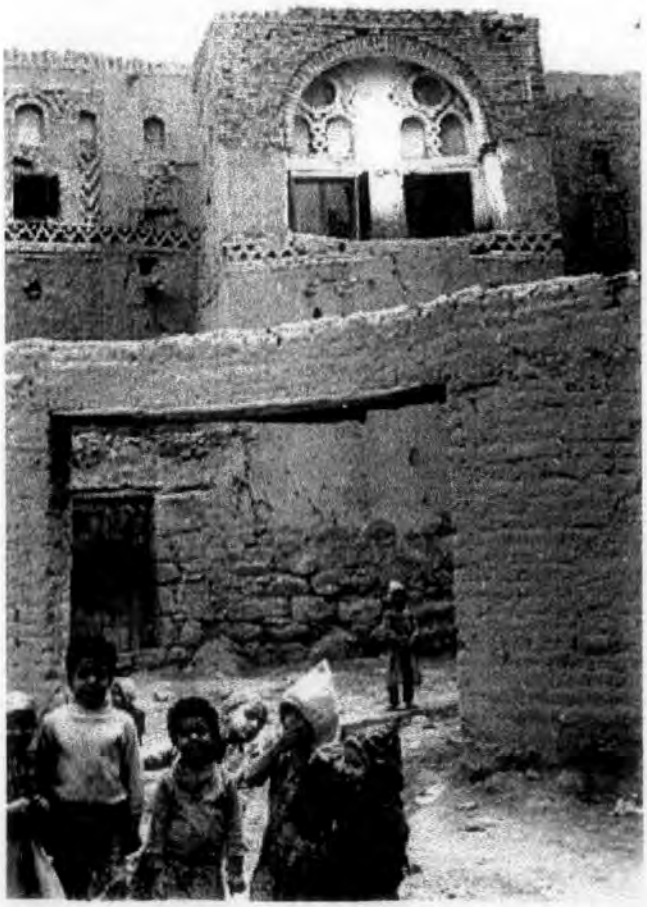
Foundations are dug until solid ground is reached, the rule being that of "until the soil is too hard for the pick to enter". This accounts for foundations being 2 or 3 metres deep in alluvial soils and very shallow in rocky areas. The foundation may not be apparent, as is common in much of the earth construction, or it may be raised to form part of the ground floor walling. In this way when the top floors are of earth, the ground floor may appear as a high stone foundation. Stone foundations continued to be used after the introduction of framed concrete structures with the concrete foundation beam bearing on the cyclopean stone.

Floors and roofs are built by providing a load bearing structure of parallel beams - very often just rough tree trunks - at 40 to 60 cm centres. In the Mountains, twigs are then spread between and covered with a thick (around 30 cm) layer of sifted, dampened and compacted earth. This may be left exposed or covered with a coarse aggregate or surfaced with water resistant lime mortar (*qadad*). Waterproofing the roof with *qadad* may be explained, as at Ibb , by the amount of rainfall in the area but also improved finishing as was seen in the much drier northern Highlands. On the ceiling side the twigs are surfaced with a mortar made of mud and dung (*malaj*), which, in all but the most remote or elementary buildings, is finished with the same gypsum plaster used for the walls. In elementary stone construction, wood beams are used but stone slabs replace the twigs and are left exposed on the underside. In the Tihama twigs were seen to be replaced by a trellis of fine branches covered by palm leaf mats or by wood boards sometimes forming painted ceilings.

The width of the rooms is conditioned by the length of the available joists with beams from native species averaging 3 metres in length. Imported timber of longer standard sizes became common after the Revolution. The novelty of their regular form has resulted in a different type of ceiling, in which the wood beams are left exposed and only the flat parts in between are plastered.

Reinforced concrete roof slabs were introduced during the Civil War.





Top left and middle - Arch in Dharahan and vault at Thula; *top right and opposite* - formwork; *below* - Kawkaban; *bottom left* - Dhamar; *right* - Al Swaydiya; *opposite* - Great mosque, Harib;

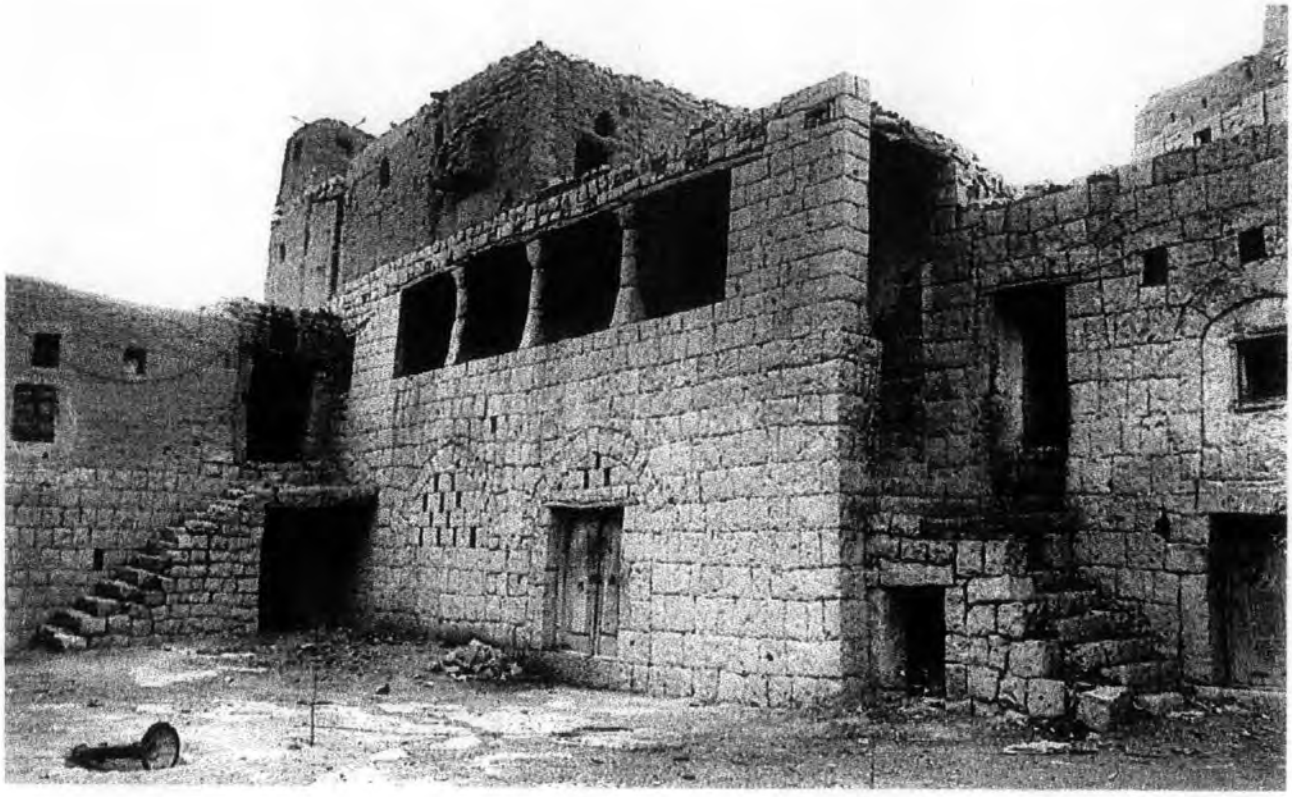
2.3 - Arches and columns

Wide spans and large openings in the wall are usually dealt with by the use of arches having maximum spans of about six metres. Arches are sometimes built into the walls to reinforce their load bearing capacity, improve their earthquake resistance and allow for future larger openings. In the public domain, arched entrance gates are common; and, in the eastern mountain flanks of the Sana'a and Dhamar valleys, arches bearing house floors across public rights of way are frequent.

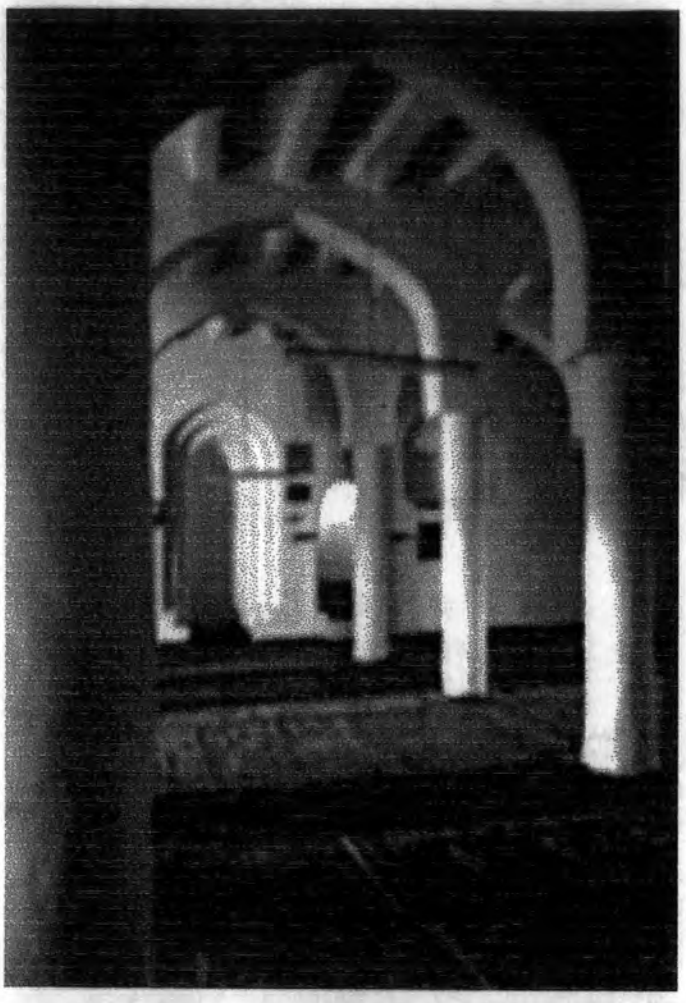
Centring for arches is usually made from rubble or mud blocks. Material saving devices may consist of bracing a wood beam diagonally across the jambs or along the springing line and pile the blocks upon it.

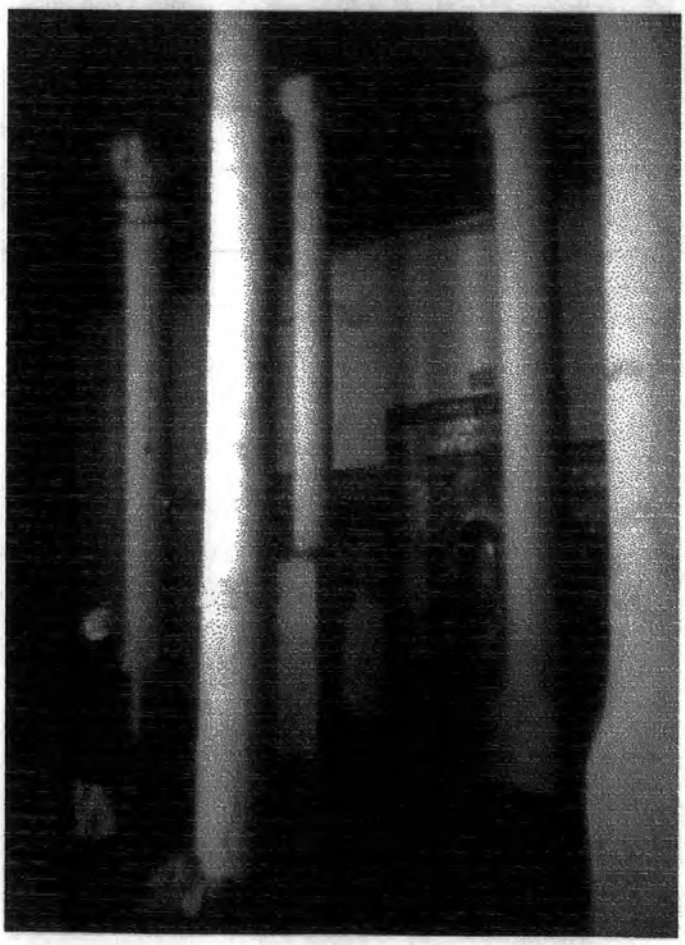
Columns and wood joists are used as an alternative to arches and occur very frequently in mountain mosques where they may be made of baulk timber, with ornate capitals. In the great mosque of Harib the columns are made of tree trunks and strongly evocative of archetypes.

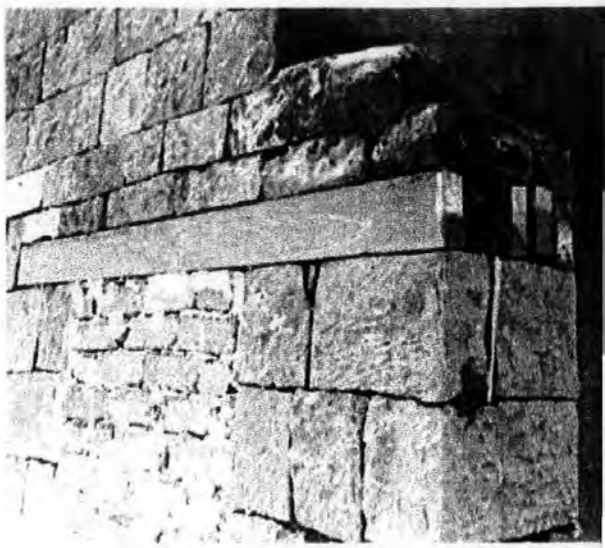
Columns occur in baked brick, particularly in the Tihama, but also in stone. Stone columns are built up in sections, as much in large as in minor structures, such as *saqif*, suq stalls, porches or bridges between buildings. Monolithic columns are part of the pre-Islamic monumental tradition and those seen in later structures have generally been recycled from a variety of ancient buildings.

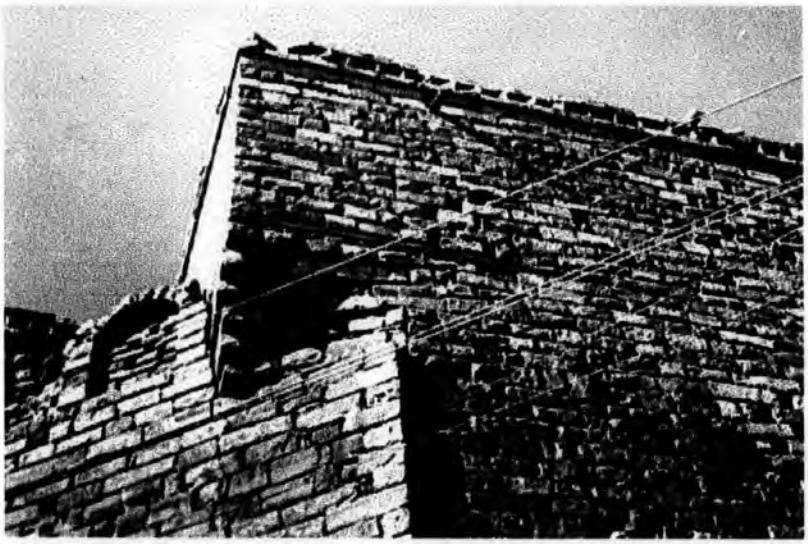


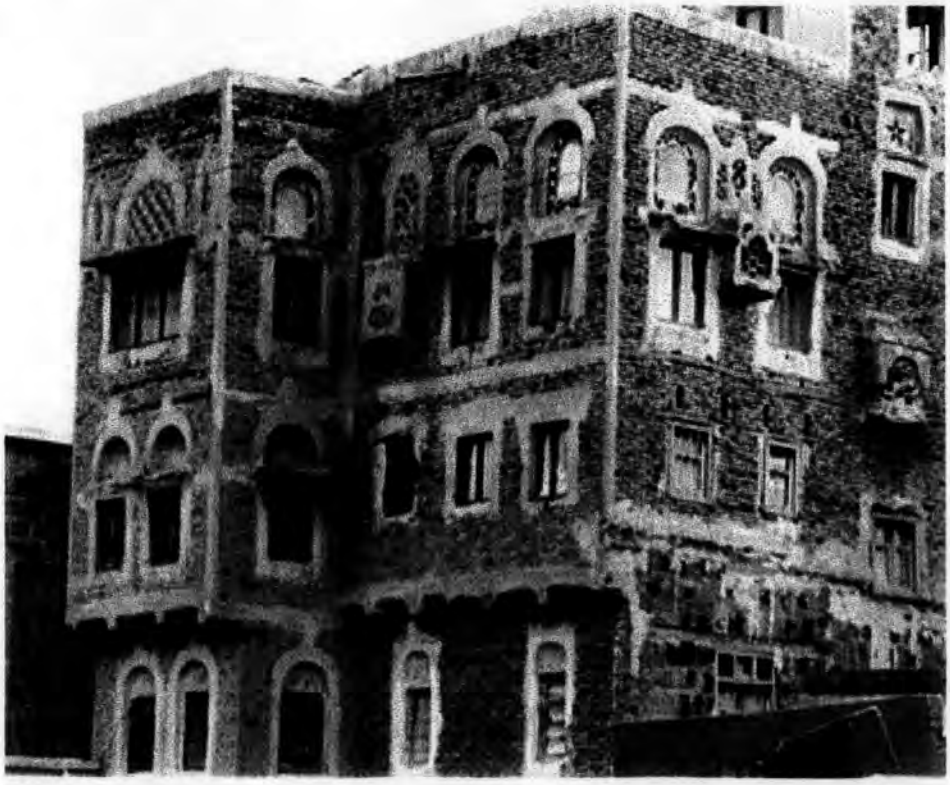
Top - 'Amran; *centre and bottom left* - *Saqif* and house, Khamir; *right* - Al Jarrahi, Tihama; *opposite* - Great mosques of Kawkaban and Shibam











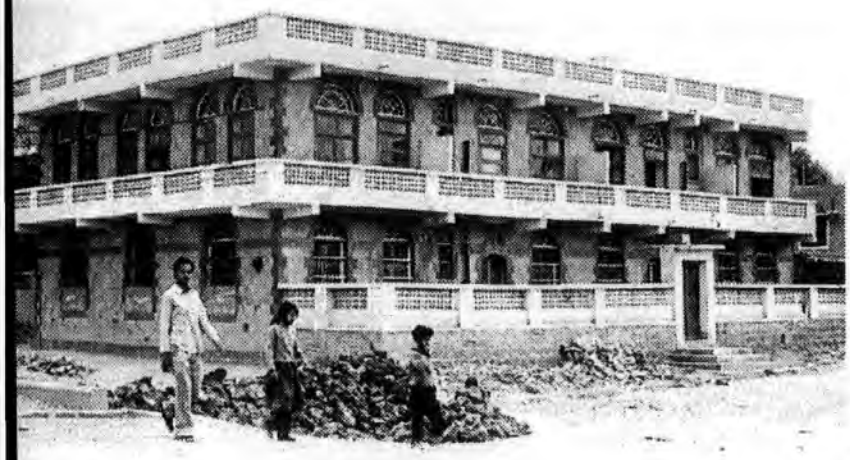
Top - *Basut* in Ibb (*left*) and Jubban; *centre left* - Thula; *right* - Yarim; *bottom* - Al Qa'a, Sana'a; *opposite* - Early 1970's concrete cantilevers in Sana'a *(left)* and Hodeida *(right)*

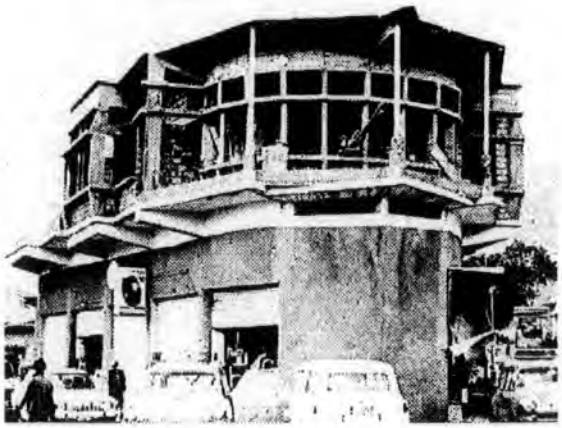
2.4 - Tie-beams and cantilevers

Wood strips (*basut*) embedded in the walls and running along the courses as a form of bracing for the masonry appear particularly in the southern half of the country, from Sana'a, through Dhamar to the Ibb province. The system was still in practice in the mid 'seventies but the positioning of the joists seemed then a matter of formality rather than a real understanding of their function. The 1983 earthquakes sadly proved this to be the case.[1]

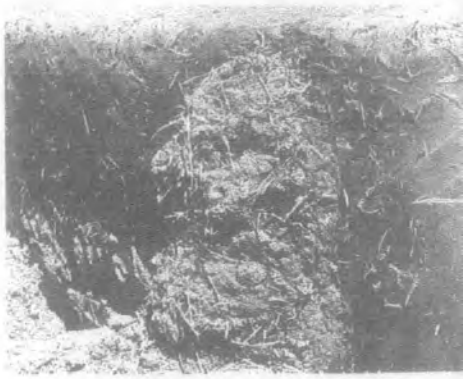
Cantilevers are used to increase living space above the ground level. The simplest cantilevers consist of carrying the wooden floor joists an average of 60 cm beyond the bearing wall face and building upwards from their extremities. This is a feature of many houses of the Jewish neighbourhood of Sana'a, but it is widely seen elsewhere in the country. Remarkable cases were seen for example at Yarim, Dhamar and Khawlan where the cantilevered top floor is a distinguishing feature. In Thula corbels occur frequently and represent the best examples of masonry work seen for this purpose.

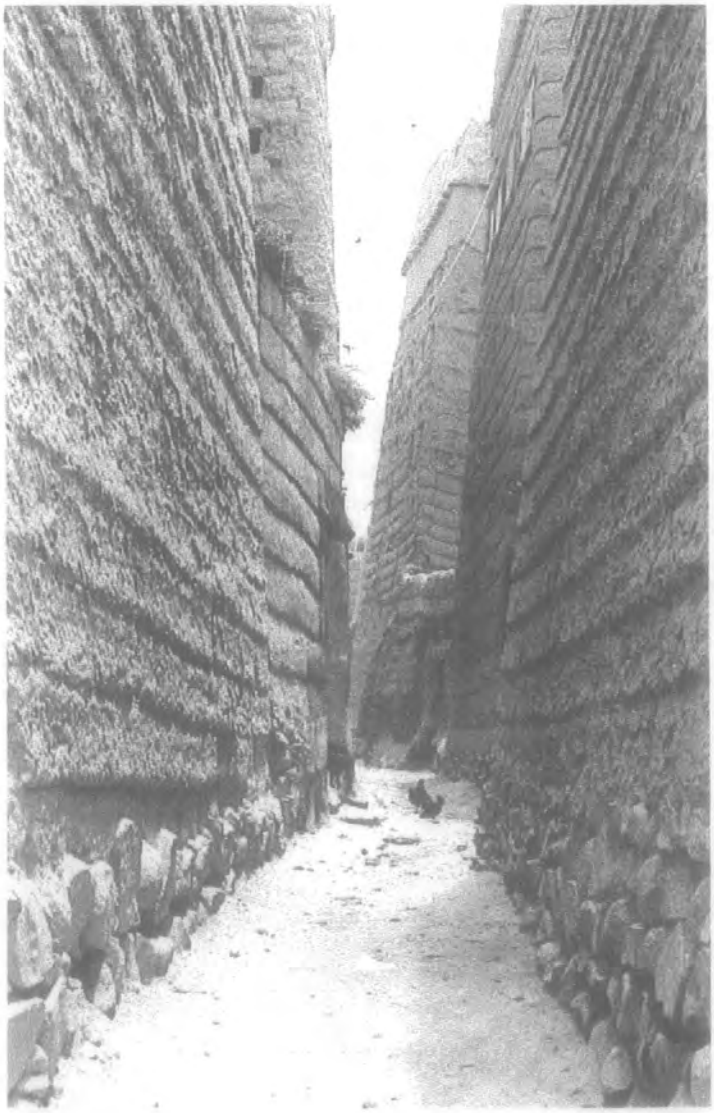
Later constructions use extended cantilevers made of imported timber. Cantilevered reinforced concrete balconies and floors, as seen elsewhere in the Arab World, became one of the first and most popular features of post-Revolution buildings.



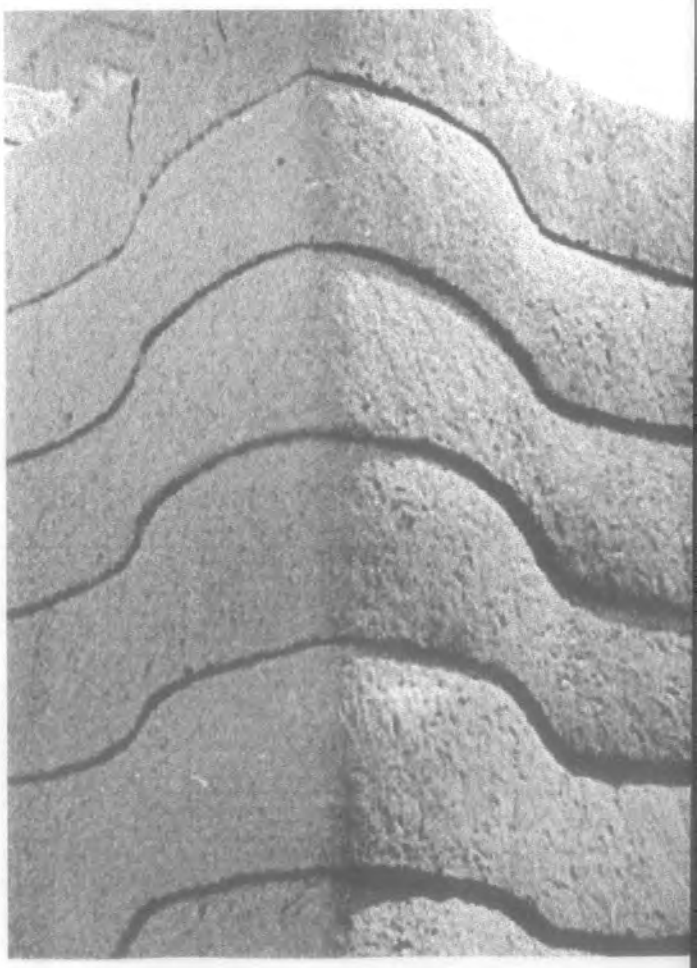


[1]The older buildings seemed to have resisted to this earthquake better than the newer ones perhaps because there were no earthquakes for a long time and, as the memory of the threat receeded, so the rational principles for the use of the *basut* were forgotten. The question of techniques lost because of not being applied over a long period of time is also illustrated by what seems to have happened with the waterworks found at Habur and elsewhere. Their very quality implied durability and, after a couple of generations, when repairs and expansion were finally needed, craftsmen had lost the technique.





Top and centre - Aspects of construction in *zabur*; *centre left* - shows detail of intersection with cross wall; *bottom left* - Barat; *right and opposite* - Sa'da



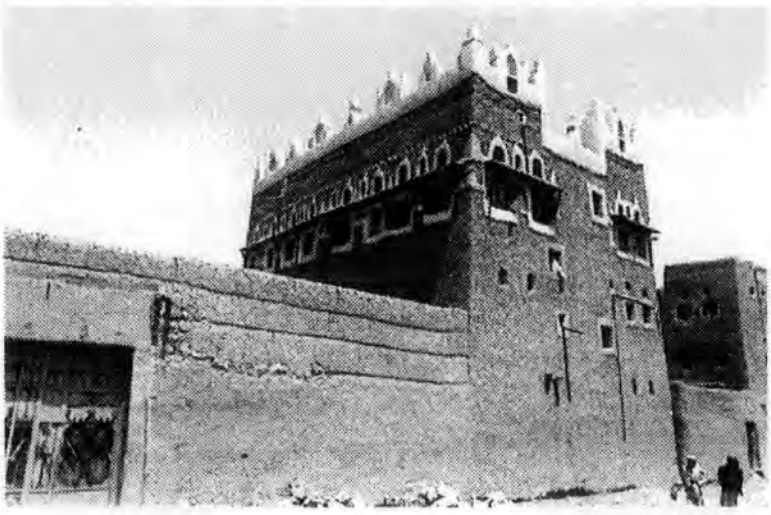
2.5 - Earth walls

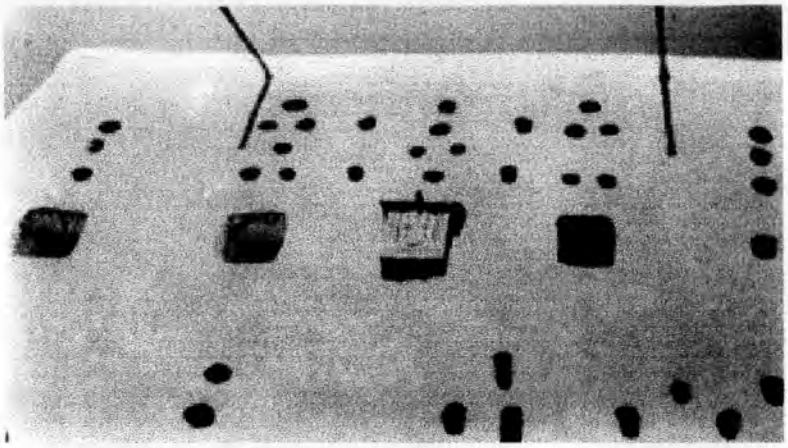
Earth construction falls within three main groups: sun dried coursed clay (*zabur*), sun dried blocks (*libn*) and bricks baked in kilns (*'ajur*).

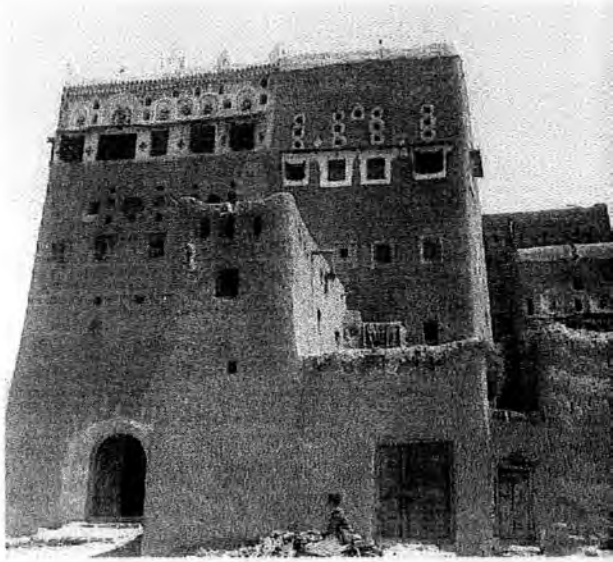
The raw material is dug from the site itself and, in the pit thus opened, it is mixed with water and straw (barley is said to be preferred) and kneaded with the feet. This process is common to all three methods, the important variations being found in the subsequent stages.

COURSED CLAY

In *zabur*, the material prepared in the pit is formed into round lumps, as big as two hands can carry, and brought on the back of a helper to the building site. Other workers take and throw these lumps to the master mason who vigorously thrusts them onto the course of wall being built. The impetus of this thrust is important because this is what consolidates the mud balls into the course. The course is then worked by hand until it is complete all around and finished by being patted with a wood paddle. If cross walls are not finished at the same time, their intersections with the external wall are begun so that a critical vertical joint is avoided at the juncture of the walls. Each course is some 60 cm high and, in an average house, takes no longer than a day to build. The thickness of the walls at the ground floor is within the 60/80 cm range, depending on the intended height of the building. In external walls each layer tapers slightly inwards so that its lower part oversails the top of the previous course. This helps to protect the wall face and joints from rain running down the wall and emphasises the characteristic battered profile of these buildings. In the northern and northeastern Highlands the corners of each course are raised, thereby restraining the courses and resisting any shearing action. A top coat of *malaj* - a plaster made of mud and animal dung - may or not be applied to the exterior of walls but is generally applied in interiors where it may also be finished with gypsum plaster.



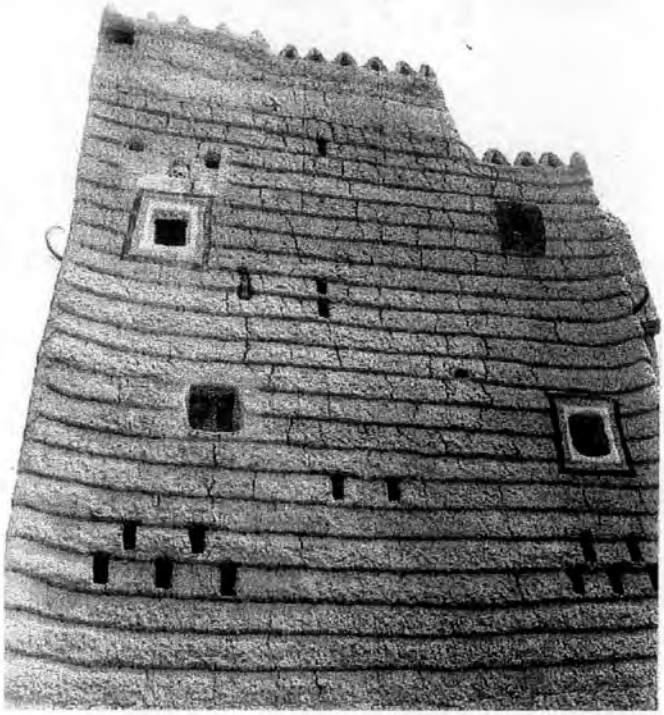


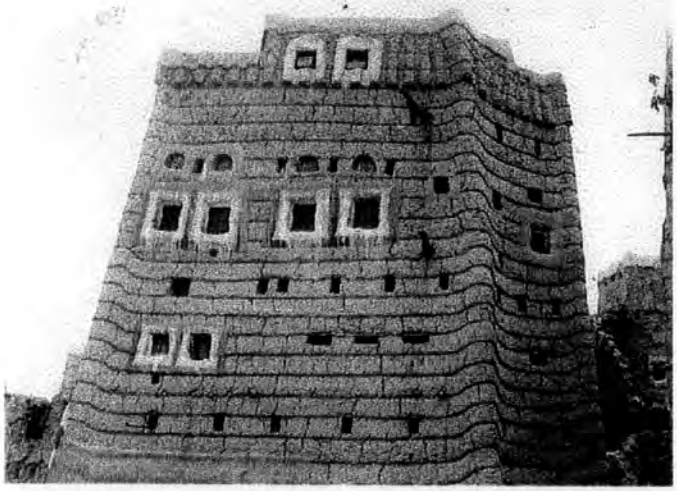


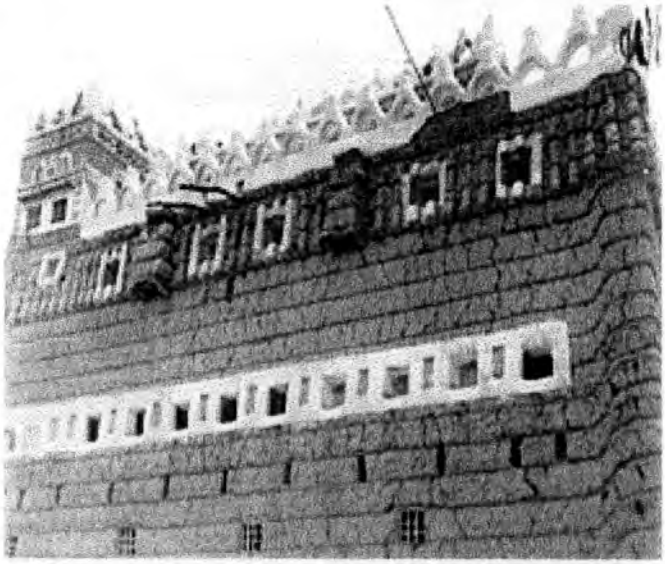
Left - Barat; *rightf* - Sa'da; *opposite top* - Sa'da; *bottom left* - Ma'bar; *right* - Bani Hushaysh

The size of the openings is conditioned by the form of construction, which tends to use small wood lintels rather than large arches. The door may be set between butresses or within a recess made by these beneath a lintel of the same width. Often, in areas of mixed techniques, a portion of the wall, in the shape of an inverted trapeze is made in stone; the door is set there and follows the current model in stone buildings. Windows and fenestrals are narrow and their height determined by that of the courses; multiple perforations rather than single wide fanlights are therefore characteristic of the areas where *zabur* predominates. Small arches for the windows made with earth blocks are not uncommon in older constructions but their use became more frequent during the time span of this study, being also made of baked bricks and concrete blocks .

External decoration is usually subdued. Ornamentation in the mud wall itself is scarce and may consist of rows of roundels resulting from the capping, as at Sa'da, of the slighly protruding ends of the floor joists. Distinctive features are mostly evident at the roofline of the buildings.

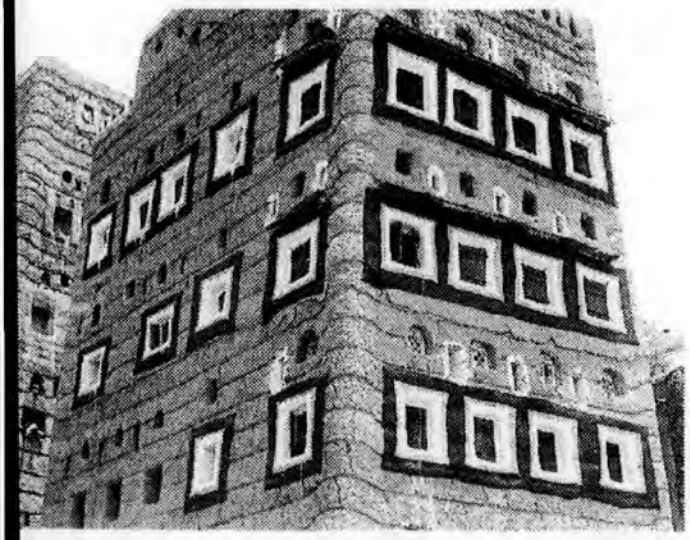




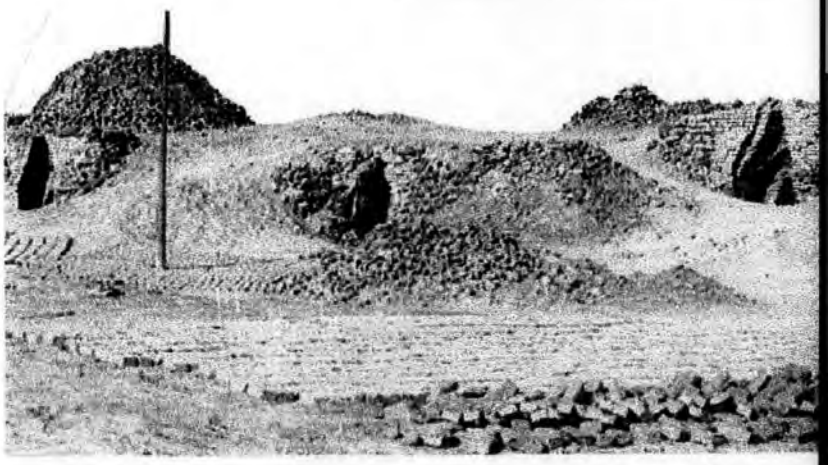


Top - Al Mwasa and Khirab, Barat; *centre left* - Suq al 'Ainan; *right* - Ta'la, Sa'da; *bottom* - Suq al 'Ainan; *opposite top* - Sa'da; *bottom* - Suq al 'Ainan

Rooflines, in the simplest instances are marked by triangles, made of earth blocks positioned at the corners and the centre of each elevation. In the Marib area these are sharply defined contributing to the characteristic outline of its buildings. Otherwise a few major decorative techniques are recorded. From the northernmost Highlands to the northern slopes of the Eastern Plateau buildings display fluted bands along the top or rows of triangles built of mud blocks surfaced with mud and occasionally white plaster. Also in the Eastern Plateau - mainly from Barat to the Jawf - a very important decorative device is the use of multiple stripes of red ochre around openings and along the lower courses of the walls. Internally, decoration may consist of thinner stripes painted on the white plastered wall, around openings or hallway skirtings. In and around Sa'da a distinctive feature is the utilization of white plaster in rooflines, arcaded parapets and crests complemented by ornamentation of openings with simple plaster work, providing a strong overall effect. The openings for windows and fenestrals may be shaped from the interior as a free version of a trefoil and carved.



Top - Al Wasta, Ma'bar; *centre left* - Rubat al Qa'la, Yarim; *right*- Khawa; *bottom left* - Mud bricks, baked bricks and rendering, Bir al 'Azab, Sana'a; *centre and bottom right* - Brick making in Sana'a and at the Tihama, 1976; *opposite* - Scheme of brick kiln, Sana'a

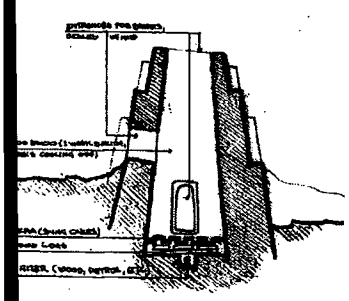


As one goes southwards, *zabur* building becomes more austere and featureless. In the Central Highlands - in the Amran and Sana'a basins, and particularly along their eastern fringes, at Bany Hushaysh, Sinhan, Khawlan and Al Hada - *zabur* is used to build orchard and garden walls or the lower part of houses, the upper part being in *libn*. As in other examples of more than one material in the same building, the style is established by the upper floors and these buildings have been seen as part of a group of sun-dried mud block construction.

EARTH BLOCKS: *LIBN* AND *AJUR*

Mud block construction is widespread from north to south. It predominates in the alluvial basins along the centreline of the country but also whenever there is mud available. Even in areas where stone is pre-eminent, mud blocks are used for secondary constructions, interior partitions and boundary walls. Associations of mud with stone and of mud with baked brick in the external walls identify local styles.

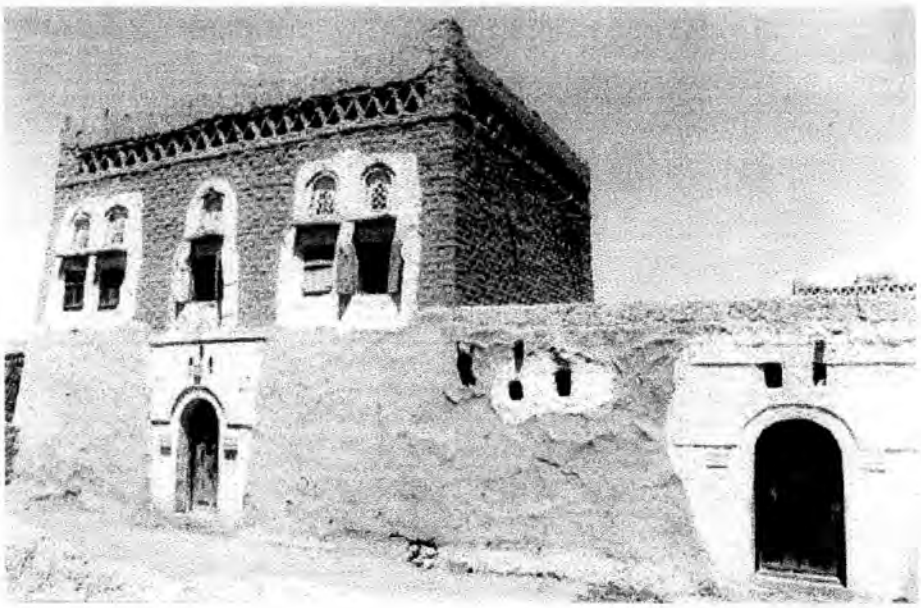
Blocks[2] are shaped by small wood frames and left to dry on the ground. In the case of *libn*, once dried they are ready for use; in that of *ajur*, they are later baked in a kiln, set up in the drying area. There are differences of shape between Tihama and Mountain kilns, but the principle is the same: truncated conical brick chambers, open on the top, partly sunk in the ground with a pit at the bottom for wood and dung fuel and one or two side openings. Bricks are fed in and taken out from the top and side openings, which are sealed with mud during the baking. A kiln takes 20,000 blocks, involving baking for a week and two days cooling off. A small brick factory, surveyed in 1976 at Mahraq, Sana'a, consisted of three kilns employing four men and producing 6,000 bricks a day.[3]



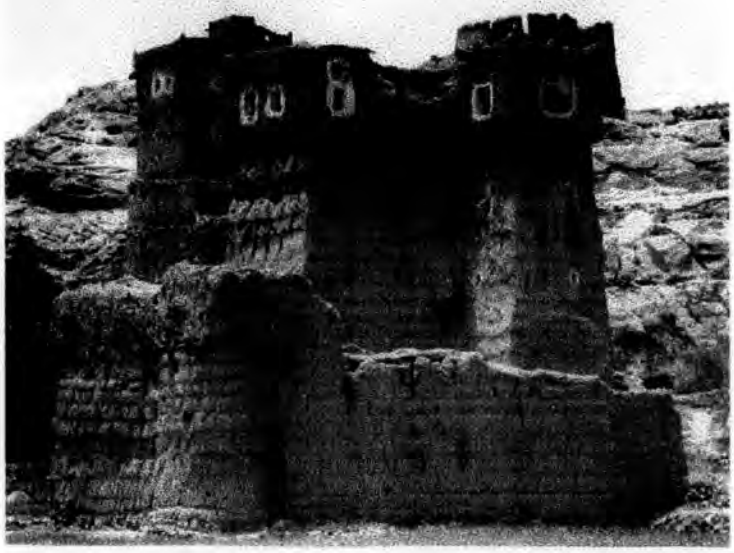
As in *zabur* construction, *libn* walls may be left exposed or surfaced externally with *malaj*. Unlike *zabur*, however, both *libn* and *ajur* buildings employ arches for the framing of windows and doors and as a decorative device. In the southeasthern sector of the Central Highlands baked bricks may be incorporated in the texture of the mud wall. In Sana'a baked bricks are used for facing and tying in mud blocks, particularly in the thinner walls at the upper floors.

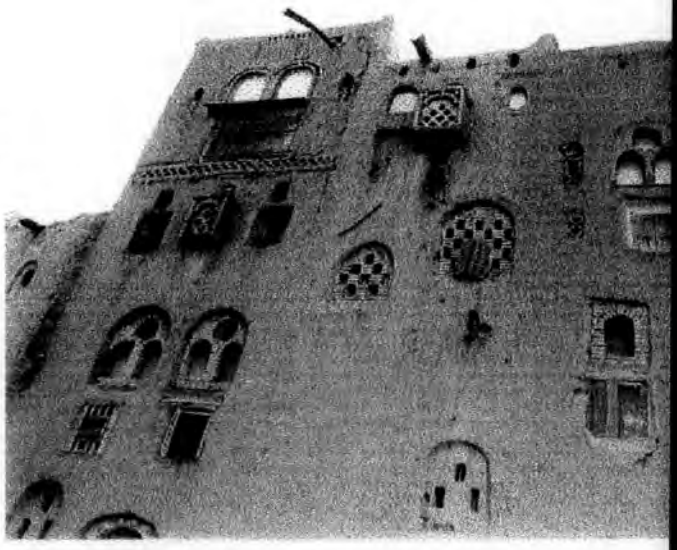
[2]There are minor regional variations in size. In Dhamar blocks averaged 22x35x8 cm but 27x35x8 cm. in nearby Ma'bar. In Sana'a, common measures for dried mud blocks were 25x40x12 and for baked bricks 16x16x4 or the half-size of 16x8x4.

[3]The composition of the material for bricks in this factory was presented as half *turab* (dirt), half *tikha* (dung), and *tibn* (straw) or *nashara* (sawdust, wood shavings) q.b. *Nashara* was being preferred to *tibn*.



Top - Ma'bar;*centre* - Tana'im, Sinhan; *bottom left* - Al Najda'i, Khawlan; *right* - Rada'; *opposite left* - Yarim; *right* - Al Baydha

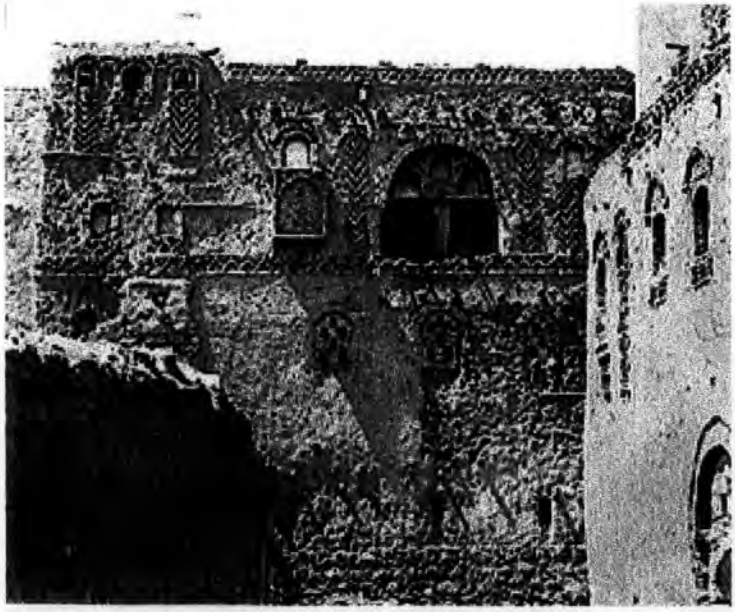


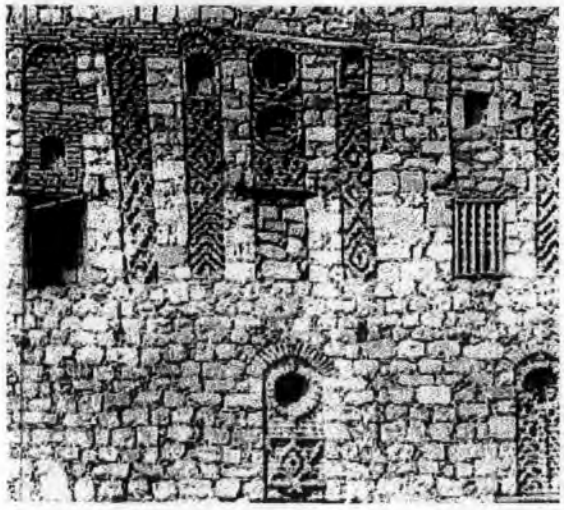


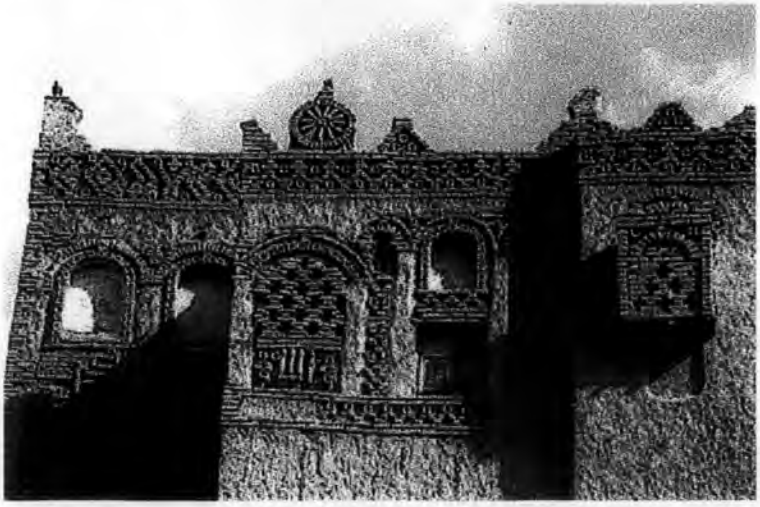
Construction with mud blocks is relatively uniform with minor variations in the type of fenestration and especially in the cornices and rooflines of the buildings. In most regions these feature triangles raised at the corners or scalloped parapets as at Bany Hushaysh, Amran, Sana'a, Al Hada, Rada'. At Sinhan, Khawlan and northern Al Hada, an oversailing top floor or cornice perhaps decorated with a triangular frieze is a characteristic feature explained as a means of throwing rain away from the walls. In the Mabar plains two storey houses are soberly decorated with inlaid friezes and parapets made of simple rows of mud block triangles. In Dhamar and towards Rada' mud walls are combined with fired bricks for arches and decorations. At Yarim the crude mud construction cantilevering over stone lower floors makes no concessions to decoration and, in its elementary brutalism, is a distinguishing feature. In Al Baydha, mud and stone construction exist side by side with similarly precise volumes and type of fenestration. Parapets are straight, and not scalloped as is common elsewhere, and there is no surface decoration except for a narrow band of red ochre along the roofline or around the windows.

Baked brick (*ajur*) is best represented in the Tihama, as previously noted, and in and around the major towns of the Central Highlands: Sana'a,

Top - Zabid; *centre left* - Dhamar; *right* - Sa'da; *bottom left* - Dhawran; right - Rada'; *opposite* - Bir al 'Azab, Sana'a



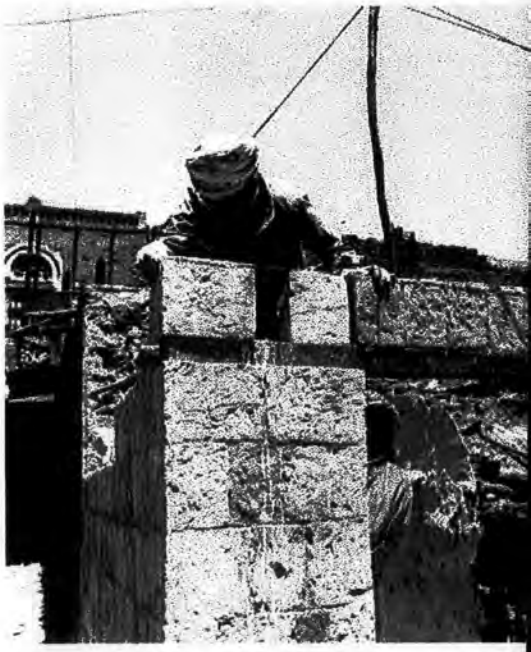




Dhamar, and Rada'. Scattered examples appear in other towns notably Dhawran and Sa'da. Decoration in brick consists of inlays, with many variations on basic lozenge and chevron patterns in friezes, spandrel panels, parapets and around the windows.

If in the Tihama the walls may be entirely brick, in the Mountains the walls are commonly brick and stone. Three situations are however typical. In the first, stone lower floors are topped by brick walls decorated with inlaid work which is seldom plastered, as exemplified by Dhamar. A variation of this, in which the brick inlays are systematically emphasised by white plastering, is exclusive to Sana'a and its environs, offering the best examples of refined, even baroque, brick work found anywhere in the Mountains. The second situation has brick as a part of the ornamentation of stone walls, being applied in arches, friezes and panels, with excellent examples in Dhawran. Finally, brick is used in the same way in mud block rather than stone walls, Rada' showing this technique at its best. Here, an original treatment of bricks involves cutting their corners, thereby intensifying the decorative possibilities of structural forms including arches for windows and ornamental inlays in geometric bands or calligraphic panels.

Top left - Stone mason tools. From left to right: *zawiya, fa's, zaqra, matraqa*; *right and centre* - Aspects of stone cutting and laying; *bottom left*- Masar, Haraz; *right* - Al Mawza, Al Mahwit



2.6 - Stone walls

Stone is accepted as the most prestigious material in both town and country and, with improved access to quarries and settlements, it is becoming common in areas that once were exclusively of earth construction. Traditionally, when earth and stone buildings co-exist, the former might be demolished and replaced by the latter, as a process of betterment similar to that of the grass and brick buildings of the Tihama. The substitution of mud by stone walls can however be achieved without displacing the occupants using an ingenious method of cutting sections of the wall from the ground up and underpinning them with stone. Sana'a masons were known for their skill in this technique.

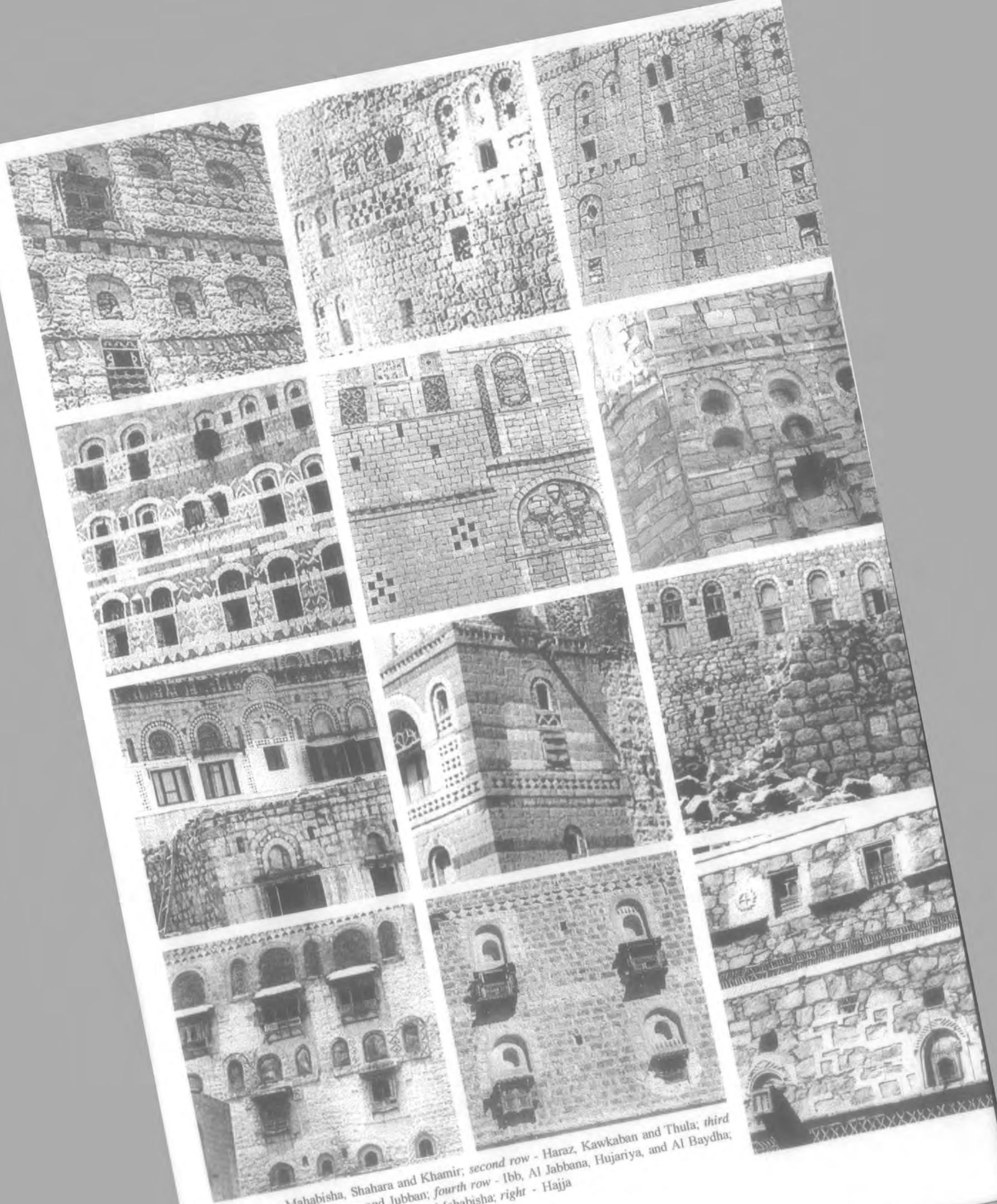
The construction of a stone wall, in Sana'a for instance, may entail the involvement of no less three branches of the masons guild: the *usta* , being the chief mason, lays the external stone facings (*wajh*); the *thana* (from *thny*, to double) builds the interior face, and the *rassas* fills in the core with rubble and mortar made of mud and sometimes gypsum plaster. Unskilled day labour (*shaqi*) assist mainly in carrying the stones from where hewn stones (*waqis*) are being shaped by the *muwaqqis* depending on the position they occupy in the wall, namely *wajh* (facing stones); *dubr* (angle stones); *mardam* (sill stones); *qalfa* (roughly cut stones for the interior work to be plastered).[4] The *muwaqqis* is paid by the piece according to the shape and quality of the stone and his wages are determined by counting the stones applied in each phase of the construction. His is a prestigious skill although not equal in status with that of the *usta*.

The geology of the country offers great variety of stone for construction.[5] There is a basic stone house found with only small variations in widely separated areas of the rural Highlands, being normally of good dry masonry, regularly arranged small arched windows and fenestrals and little decoration. This seems to form the underlying pattern other than in those areas where characteristic styles are recognized.

The variation of styles depends on a number of factors: the quality of the

[4]The size of stones varies from region to region. Most commonly the depth of the stone is 20 cm or little more, the face varying from about 22x 26 cm in Sana'a and Dhamar to 22x40cm, 30x45 cm , 35x45 cm, etc, as found at Al Hada and Ibb, for instance.

[5]Basalt, where available, for foundations, granite, limestone, flagstone, schist, and a variety of lavas for bearing walls. A few examples of stone used in various areas surveyed are: in Mahabisha, dark limestone; in Huth, Khamer and 'Amran, limestone and dark limestone, the last two including also basalts; in Shahara and in Manakha, Trap series, as in Turba, where there is also sandstone; in Hajja, granite, sandstone and limestone; in Tawila, Kawkaban and Mahwit, sandstone; in Thula, flagstone (which accounts for the characteristic stonework); in Al Baydha, schist; in Sana'a and Dhamar white (*abyadh*) and black (*habash*) lava, etc.

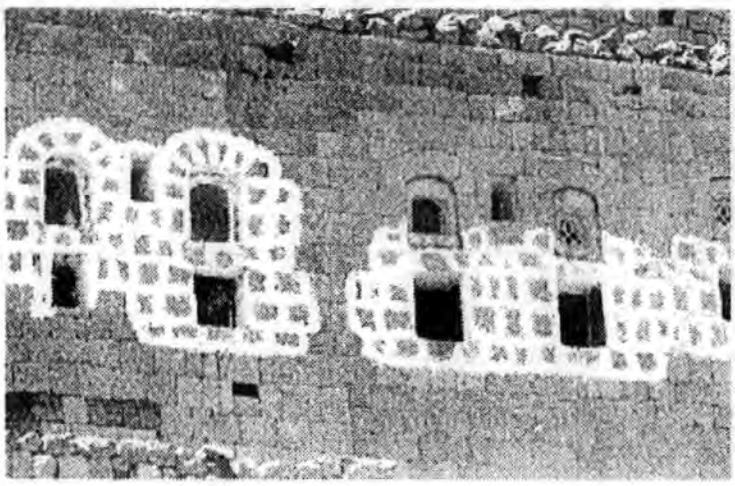


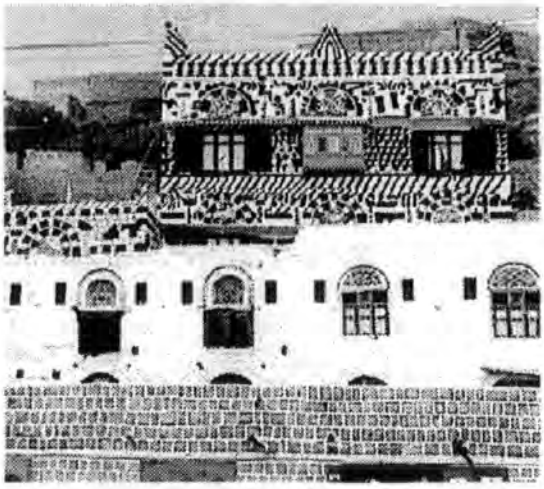
First row - Mahabisha, Shahara and Khamir; *second row* - Haraz, Kawkaban and Thula; *third row* - Al Mahwit, Dhamar and Jubban; *fourth row* - Ibb, Al Jabbana, Hujariya, and Al Baydha; *opposite top* - Bani Matar; *bottom left* - Mahabisha; *right* - Hajja

stone itself; the way it is cut and assembled ranging from rubble to dressed ashlar, full masonry or rubble core, dry or mortar bonded, with hairline or stripped joints; the size and importance of windows in the elevations; the type and arrangement of ornamentation; and, occasionally, specific bulk features, such as the forms and volumes taken by bathrooms and toilet shafts in different regions.

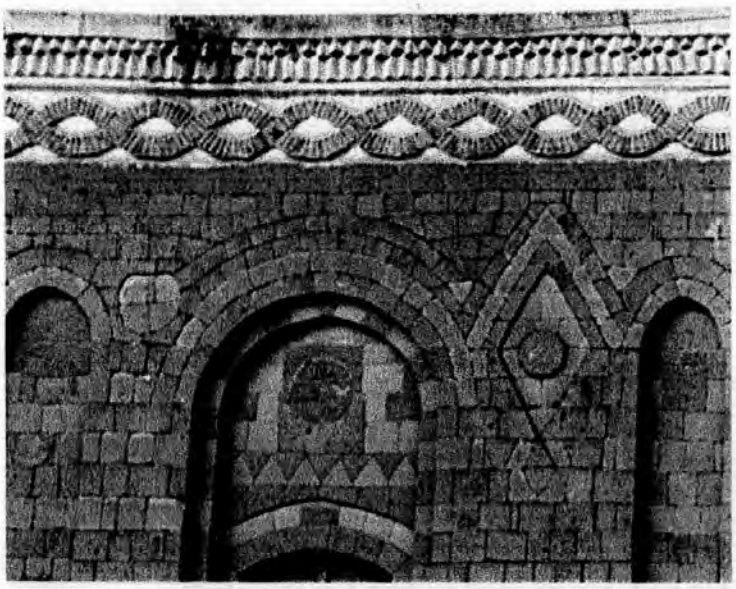
Simple details, such as whitewashing the masonry joints around the windows, often appear in the modest setting of rural housing, thereby demonstrating the concern for ornamentation which is apparent even in the most rudimentary situations. In more elaborate instances, particularly at the western Highlands, free form or geometric patterns are whitewashed directly onto large areas of stone walling sometimes covering the whole building. As such they constitute a direct and easy form of decoration in otherwise almost featureless facades.

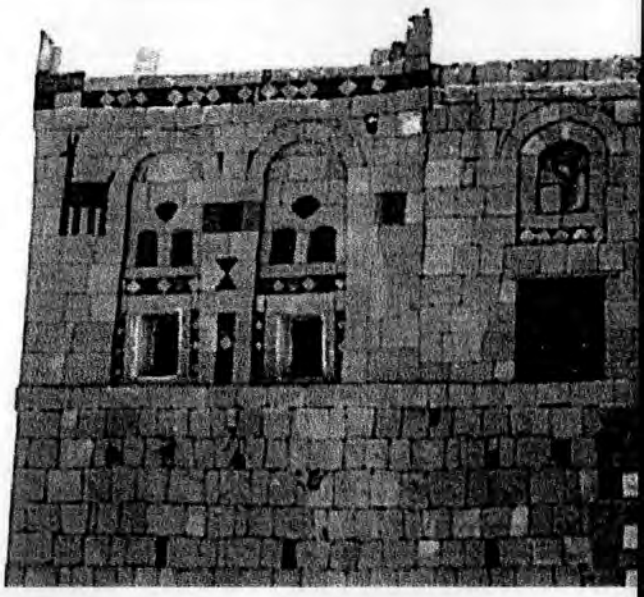
Spontaneous and even whimsical introductions may consist of simple inlays or incisions. The introduction of industrial paint facilitated the depicting, with a variable degree of naturalism, of floral and animal themes together with the motifs made familiar by the Civil War and seen elsewhere - aircraft, weaponry and the Republican eagle or flag .





Top left - Detail of woolen rug; *centre left* - Great mosque, Al Rhawdha ; *right* - Near Bainun, Al Hada; *centre* - *bottom* - Rada'a; *opposite* - "Old" and "new" styles in Mithal and Al 'Aqrut, Al Hada, in 1976



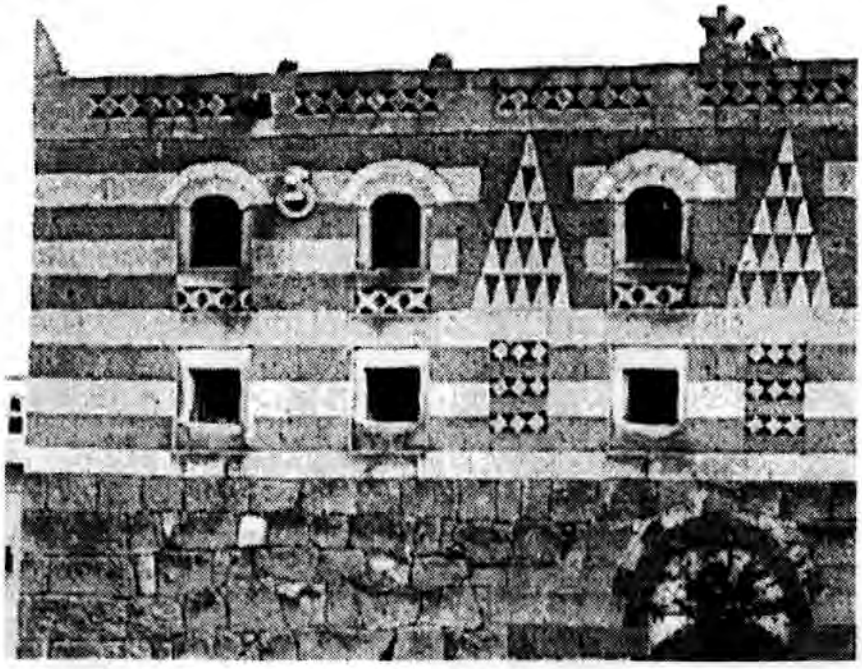


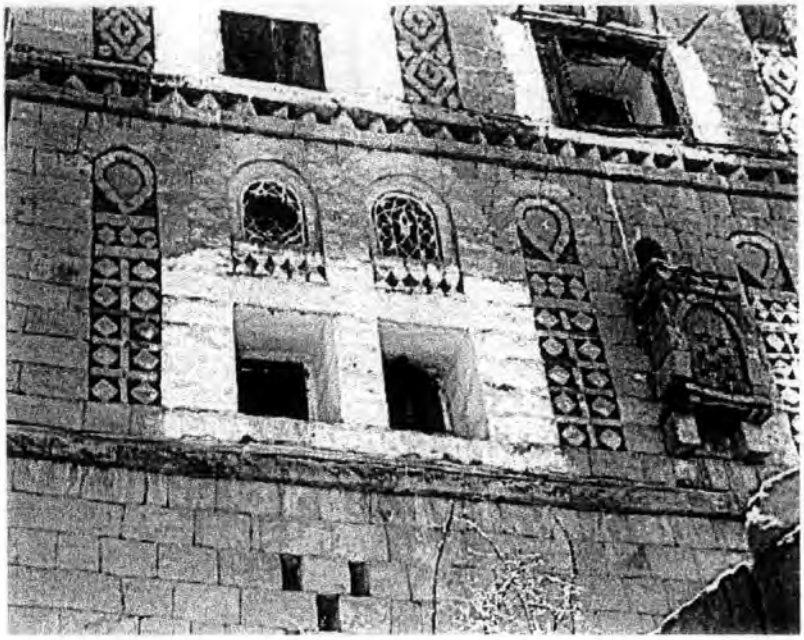
2.7 - Inlays

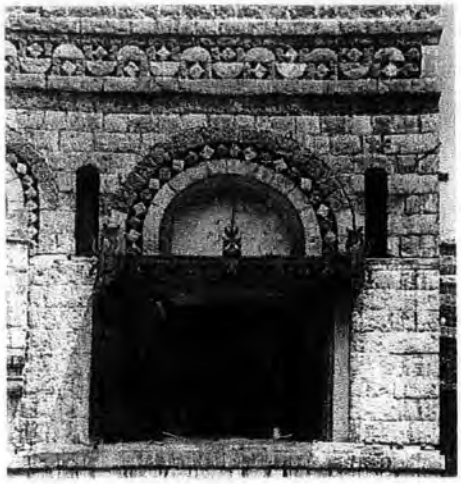
Much as it happens with baked brick buildings, inlaid ornamentation is the most characteristic form of decoration in stone walling. In simple inlays the decorative effect may be enhanced by colour differentiation with darker stone used in arches around openings, quoins, stringcourses and isolated geometric shapes. The combination of stone in various colours for the same building was much developed after the Revolution and will be described in chapter 5.

The most remarkable form of inlaid work, however, is based on relief and has a similar approach in both stone and brick techniques. Isolated or repeated elements are set in a recessed panel or course so that the relief effect is obtained by the external plane of the inlays being flush with the wall surface. The patterns develop from the structural substance of the walls in a process which the writer found analogical to the patterns woven in wool garments and rugs.

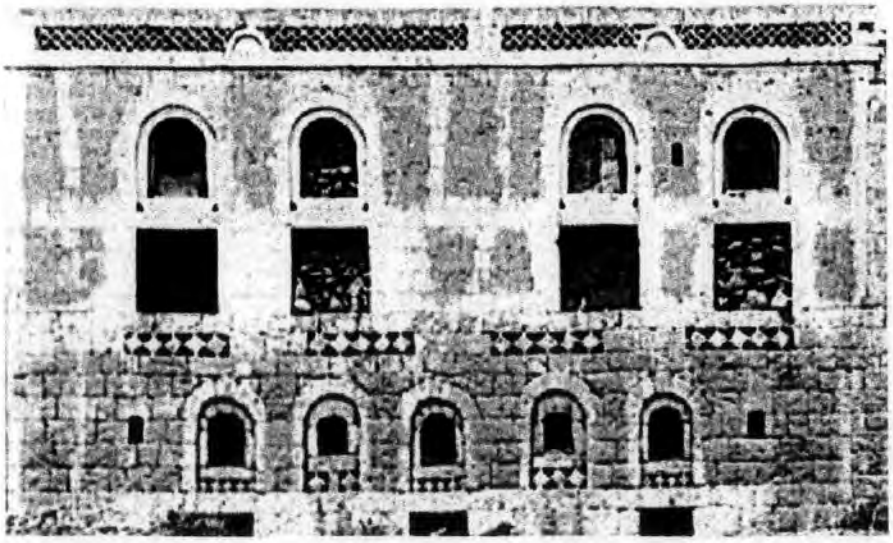
The basic element is generally a square set as a lozenge whose decorative possibilities result from the frequency with which it is repeated, in linear form or in clusters, and the overall effect given by the size and number of components. Other elements may be associated with this motif, or replace it altogether, in specific regional forms. For instance at Al Hada cruciform and cuneiform elements in friezes and panels appear both in old and new construction. At Ibb, friezes consist of many





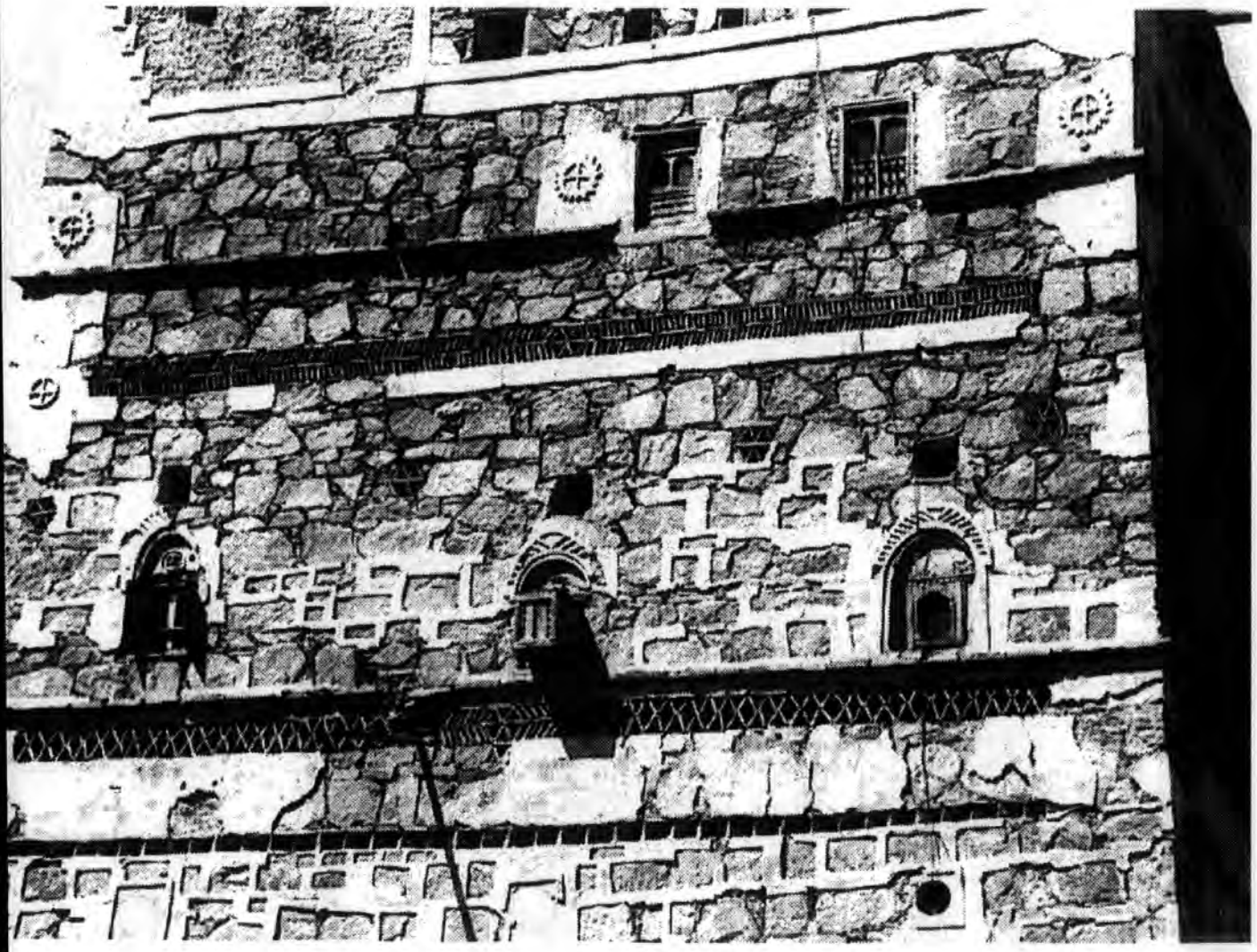


Top - Al Tawila; *centre* - Thula; *bottom left* - Al Kitba, Khubban; *right* - Harib; *opposite*- Al Baydha

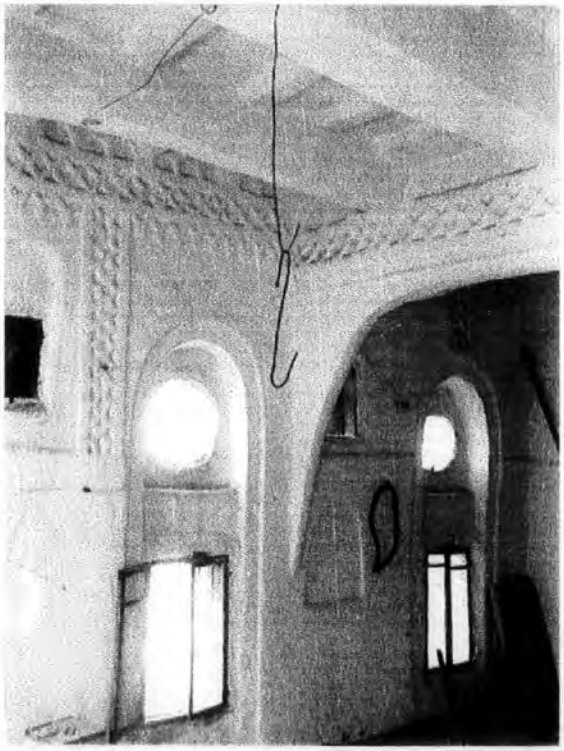


variations based on dentils, triangular prisms and quadrefoils. At Al Baydha, schist inlays feature triangular or X motifs deeply recessed in the walls. At Thula, where flagstone is the main building material, stone reliefs are particularly elaborated, with a vocabulary close to work done elsewhere in brick features: enriched chevron and diamond frets counterpointing the complex stone tracery of fanlights.

Occasionally the same feature appears in regions that are quite distant from one another. This is the case with the diamond inlays around openings and in friezes which are as prominent in Mahabisha as in Mahwit or Al Hada. Similarly, the cruciform openings of Shahara also appear in Ibb, and the whitewashed decorations of Mahabisha and Hajja are repeated, with small variations, in and around Khamir and Haraz. The formal principles of the stone houses of Jubban are similar to those found in mud at nearby Rada'.



Top left- Room rendered in *malaj*, Dhu Awlayin; *right* - Whitewash and red ochre stripes, Suq Al 'Ainan, Barat; *centre* - *Qaddad* in Ibb *(left)* and Al Hajjar, Haraz *(right)*; *bottom* - *Qadad* in moat at Bayt Mahdam, Bani Matar



2.8 - Finishes and rendering

Once the structural elements - foundations, walls and roofs - are complete, other craftsmen finish the building. First comes the plasterer (*muqassis*) who is responsible for his team doing not only the work of rendering the walls and ceilings with gypsum plaster (*juss, guss*) but also for carvings, shelves (*safif*) and the tracery (*takhrim*) for the window fanlights (*'aqd*). Finally come the carpenters, for the doors, windows and the traditional ornamented board above the windows (*kunna*). Carpentry has always been costly and houses are often left without windows until the owner has enough money to order them. Terrazzo tiles became common in the 'seventies and laying them introduced another specialist - the *ballat* - who was formerly responsible for the application of water-resistant lime plaster (*qadad*) .

Malaj has been seen associated with the rendering of exteriors of earth buildings and to the ceiling and interior walls of all forms of construction. Only the more modest interiors of mountain buildings remain at that level, sometimes embellished by isolated or repeated simple motifs moulded in the clay. Interiors are otherwise finished with lime or gypsum plaster.

Lime and gypsum plaster were commonly used in the Tihama as in the Mountains for the rendering of interiors and exteriors of walls. The technique of lime plaster, known as *qadad* and applicable to stone or baked brick surfaces, is now abandoned but for restoration work[6] and the arduous process of its production and application in Sana'a was described to the writer by a former *'usta* in 1976. According to him, rocks of fired lime (*nura*) were crushed and mixed with fine grained black gravel. Water was added and the mixture kneaded after the lime had "boiled". One layer of this plaster was applied and small incisions made on the surface. It was then beaten with a flat stone for one hour every day during a month, with thinner layers of plaster periodically applied. Patterns could be cut in the lime plaster while it was still soft. Finishing was with animal fat rubbed to a polish all over the surface sometimes using powdered alabaster. It would take a month to complete a room of about 10 m2.[7]

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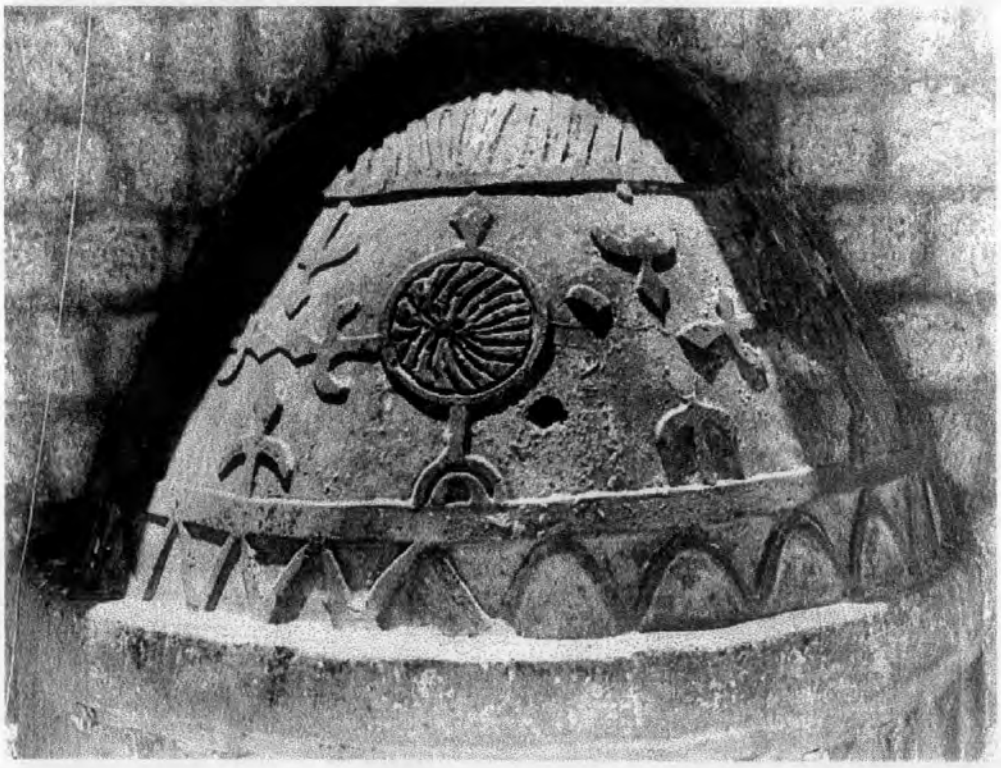
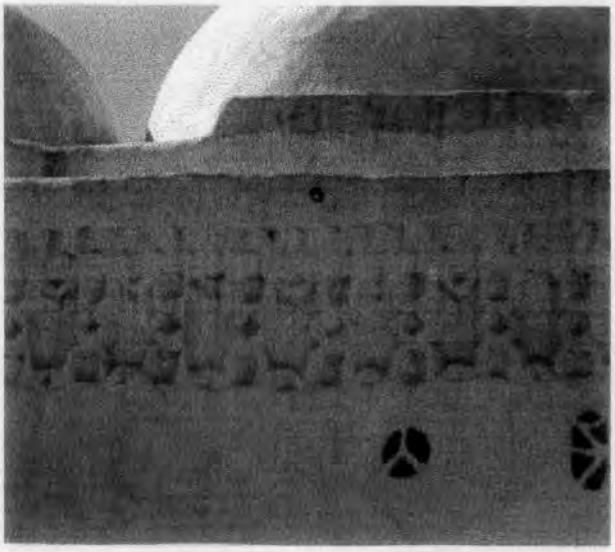
[6]Selma Al Radi describing her experience with the use of *qadad* in the restoration of the 'Amiryia mosque in Rada', considers that the technique is flourishing again and reports other applications in restorations in and around Sana'a and in Zabid. These are usually the result of the effort of specialised foreign teams to reanimate a material of recognised excellence, probably originated in Yemen millenia ago. This article is a detailed description, step by step, of the material's preparation, application, performance, time and man-power involved (Al Radi:94).

[7]According to Selma al Radi up to a full year is needed before *qadad* is properly set.

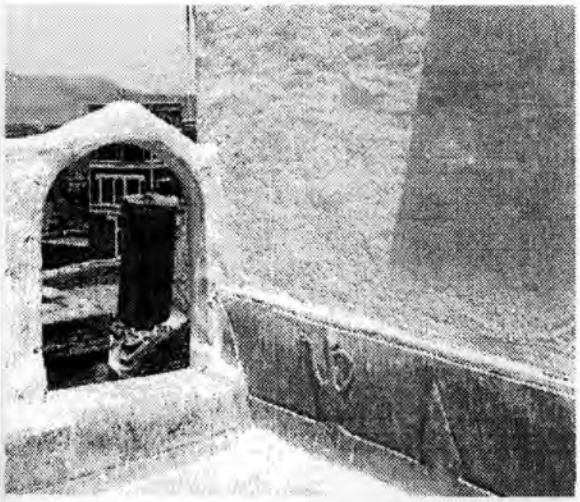
Left from top to bottom - *Qadad* in mosques at Sana'a, Huth and Rahida; *bottom right*- *Qaddad* in entrance door, Thula; *opposite top*- Roof terrace and hallway, Sana'a; *bottom* - Gypsum kilns, Al Ghuras, Bani Hushaysh

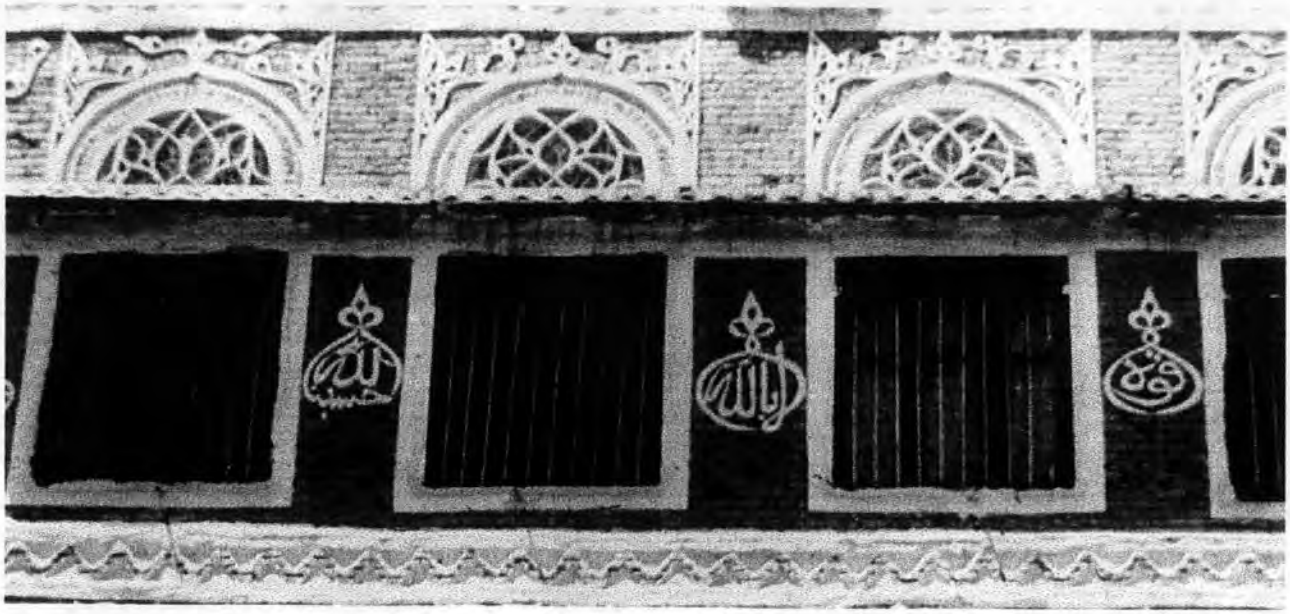


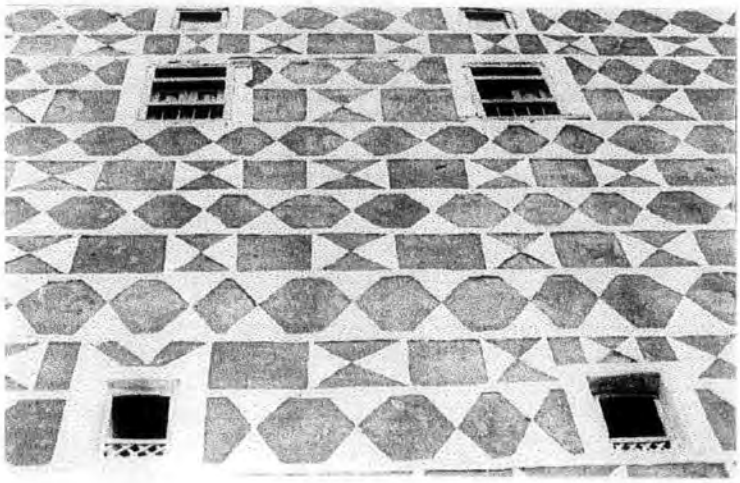


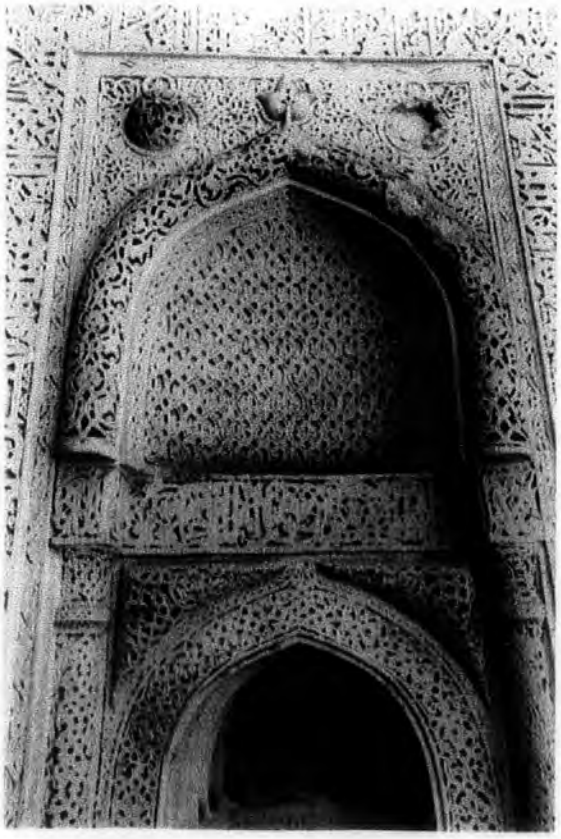
Qadad (or *nura* , as it is also commonly designated) was responsible for the water proofing of domes of mosques (where it was exemplarily carved), water reservoirs, roofs and interiors of houses. Here it was mostly applied to bathrooms and hallways, in skirtings with fretworked panels or simple representations of birds, flowers and kettles. External application in mountain houses is most common in the Southern Uplands, appearing in aprons and around the openings of stone walls as at Ibb and the Hujjaryia. Internally, simple motifs may appear in the main rooms, along the ceiling line or in wall panels.

Gypsum plaster is an easier technique, but because of its lesser resistance to weather, is used mainly for the full rendering of interiors. Gypsum is also baked in kilns and the powdered product is sold in bags direct to the builders or in the suq. The plaster is prepared in buckets and, having achieved a pasty consistence, the walls are covered with it using a float or the bare hands. The final surface is smoothed by hand, with a large brush sometimes being used for the first and last diluted coats.







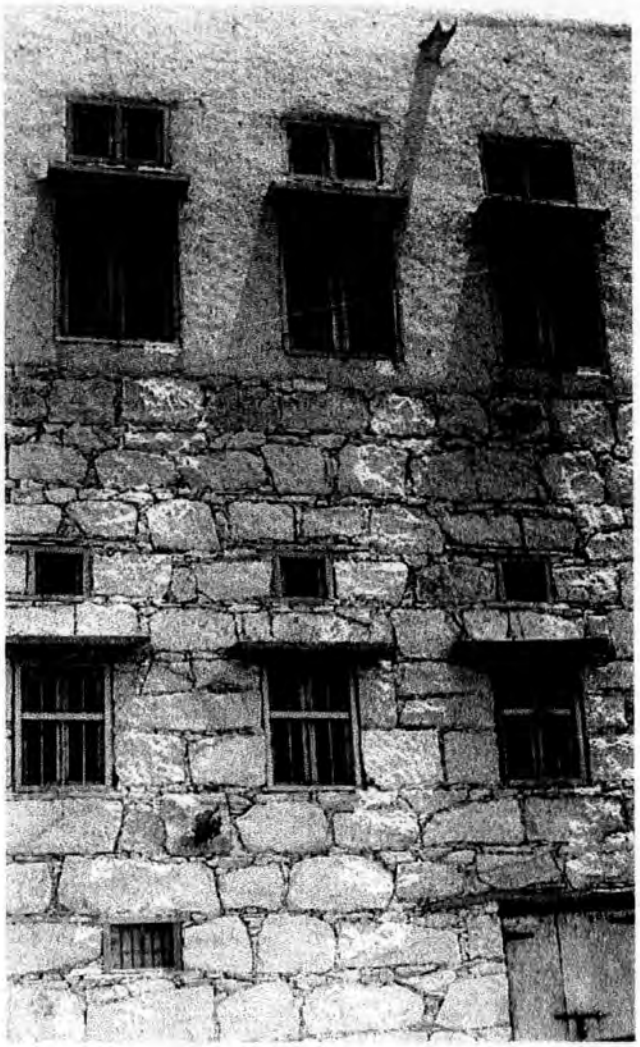


Top - Sana'a; *centre left* - Al Suma'a, Al Baydha; *right*- Sana'a; *bottom* - Mosque of Dhafar al Ashraf; *opposite* - shelves and brackets at Sana'a and Ta'iz

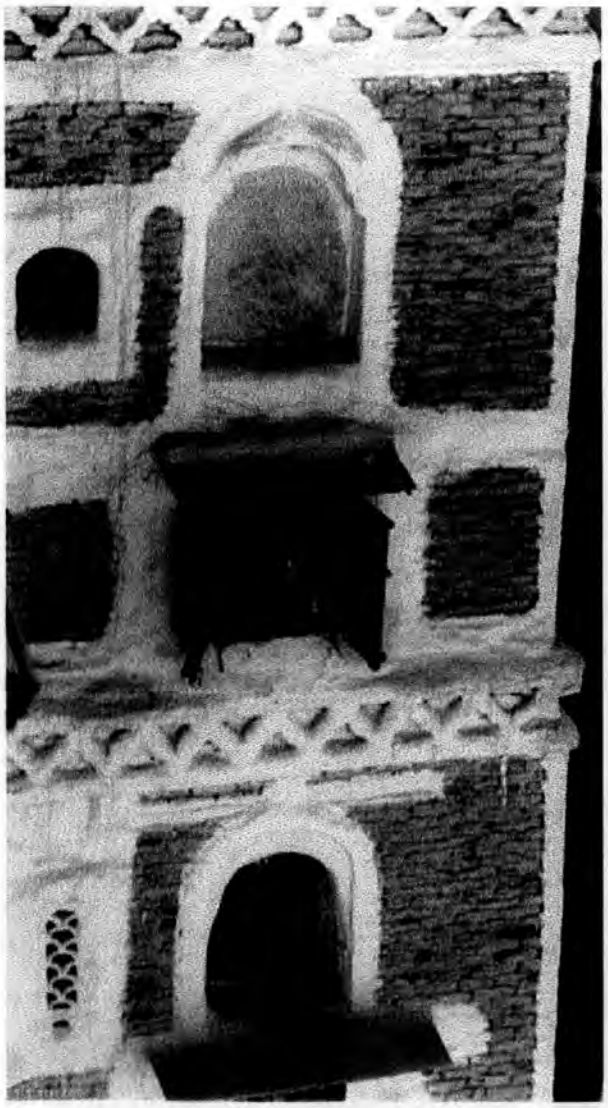
In exterior walls gypsum plaster emphasises openings and inlaid work and provides the tracery for fanlights. Calligraphic inscriptions or variations of the ancient fleur de lys motif occasionally appear applied to the wall between windows, or on arch keys and inlaid panels as seen at Sana'a. In the area of Al Baydha applications of gypsum plaster in solid geometric shapes directly onto the stone walls were recent work in the 'seventies. Overall plastering of the outside walls is a recent phenomenon, first seen in Sana'a in the seventies as an expeditious way to restore decaying mud or brick exteriors. In 1990 this was being done in such relatively distant places as Sa'da, Rada'a and Hajja.

This gypsum plaster has a drying-out time that allows for elaboration with such simple tools as a penknife to produce showy results. At their simplest, interior carvings consist of ogee arches contouring the openings and stylized birds forming the brackets of the built-in plaster shelves (*safif*) featured in most rooms. Enriched work may however fill every possible pretext as, for example, in shelves and wall panels around and between openings and niches, all with calligraphy or stylisations of birds, leaves and flowers, the fleur-de-lys motif being recurrent. Patterns may be stencilled, but skilled craftsmen often do without them.

Unlike other techniques that suffered with the industrialization of building materials, gypsum plastering, carving and tracery have prospered due to their association with a degree of ostentation that new money favoured.

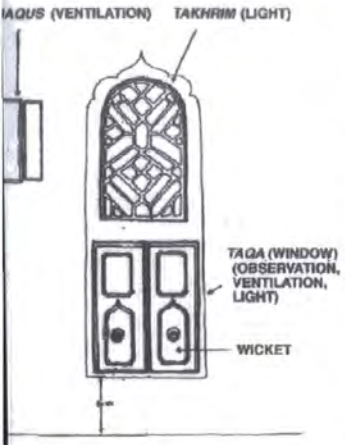


Top left - Al Qafla, Shahara; *right* - Al Baydha; *bottom* - Sana'a; *opposite, top* - Scheme of window with *shaqus* and *takhrim*, Sana'a; *bottom* - *shaqus* with *takhrim*



2.9 - Windows

Clay lined openings in the roof occur as the only source of light and ventilation in basic examples. Small rectangular windows are seen in more advanced house types. In tower houses, and for obvious reasons, they are prevalent in the strife-ridden hinterland.



Even in primitive forms a translucent fenestral is set above the window lintel. In the region of Al Baydha[8] this is systematically a small rectangle; elsewhere single small rectangles only appear in the most elementary situations, round or arched forms being common early in the process of formal evolution of the house.

In this way the most common window arrangement in the Mountains consists of two parts usually contained in an stilted arch and separated by a wood or stone lintel. The first part is a lower rectangular window (*taqa*) provided with wood shutters or, even more simply, fixed wood bars, for letting in air and light; and the second an opening above, fitted with a fixed translucent element for additional light, known as *'aqd* (arch), *qamaria* (from *qamar*, the moon), and *takhrim* (tracery, lit. lace work, embroidery). This element may be rather complex and form a major component in the decorative characterisation of buildings. Ventilation slits (*shaqus*) or additional fenestrals on either side of the window frequently complement this scheme. The window back is usually only between 20 and 40 cm allowing the occupants to look out while sitting on the floor.

In the Tihama fenestrals or fanlights only appear in urban examples and particularly in the "Red Sea Houses". The arch above the shutter may, instead, include decorated tracery for additional ventilation.

Some styles affect a narrow canopy along the lintel between the shutter and the fanlight (known in Sana'a, where the best examples were found, as *kunna*). In the Southern Uplands this canopy is usually made in light masonry and plaster but, elsewhere, wood is more generally used and decorated.

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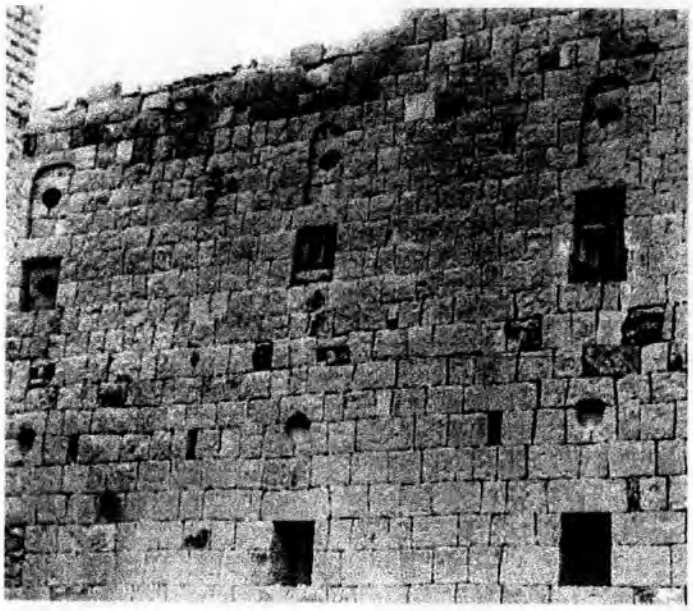
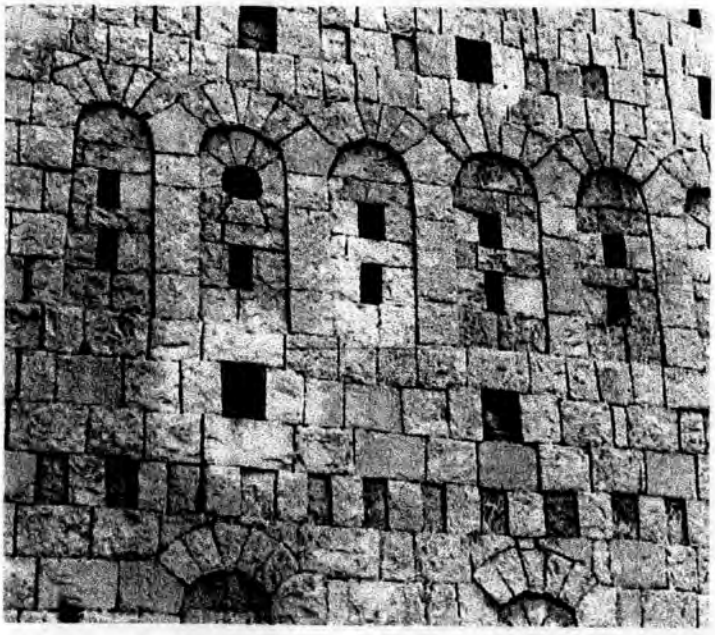
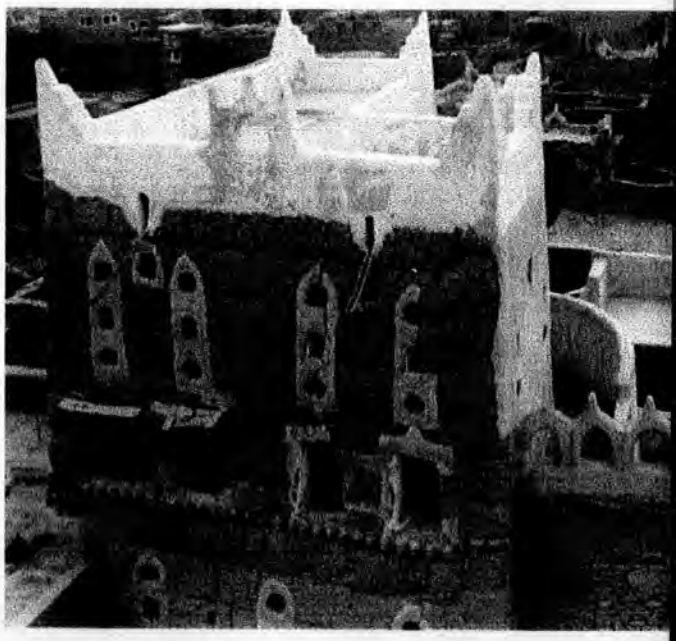
[8]The form taken at Al Baydha by the superimposed large and small rectangles for the window and fenestral is a clear stylistic distinction from the rest of the North Yemen architecture. Al Baydha appears like the northernmost version of a type predominating in South Yemen and namely in the Hadhramawt, in which the rectangular shape of the top fenestral and latticed shutters are distinctive features.







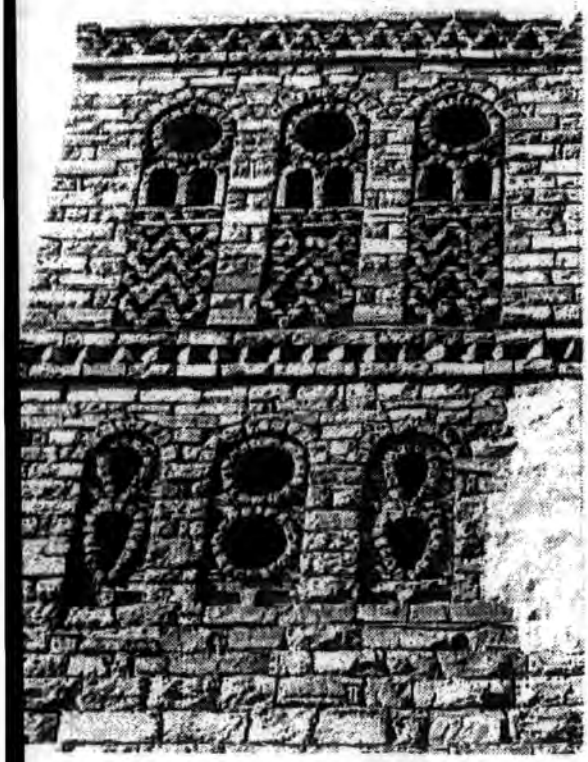
Top left- Madinat al Jawza, Sinhan; right - Al Jabbana, Hujariya; *centre left* - Khamir; *right* - Sa'da; *bottom* - Ibb; *opposite left* - Thula; *right* - Sana'a

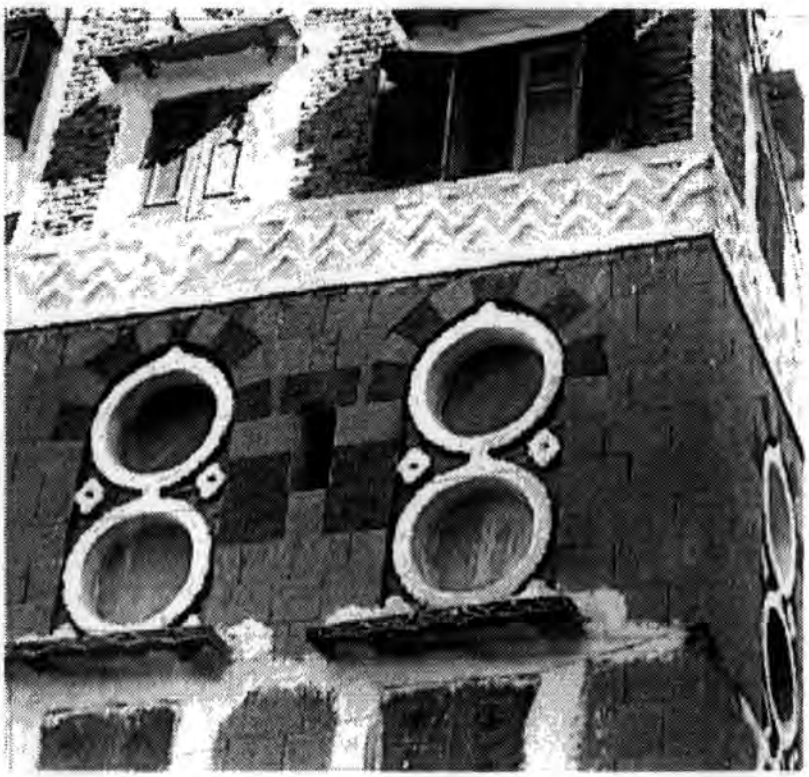
FENESTRALS & FANLIGHTS

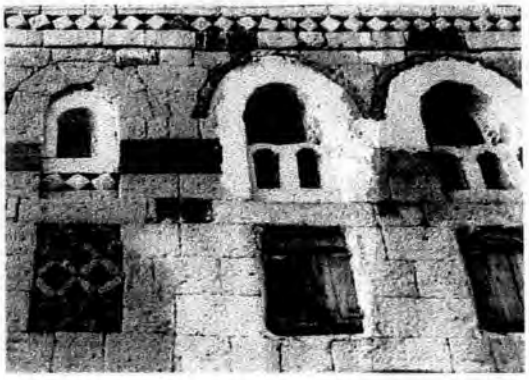
The forms taken by the translucent element of the window can be seen as part of an evolutionary process, possibly depending as much on chronology as on regional conventions and stereotypes evolved in the main towns.

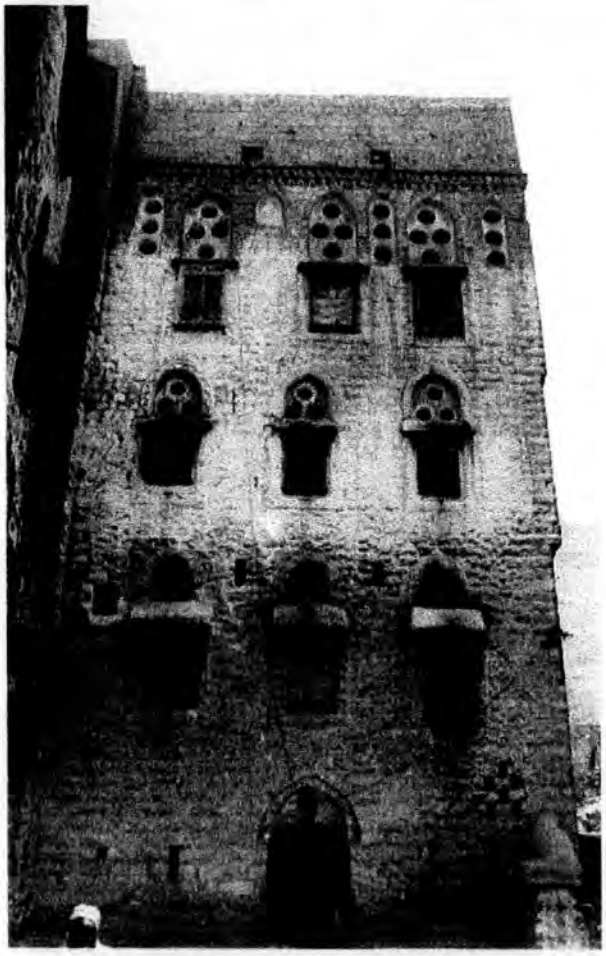
This element may be an alabaster plate, rectangular round or arched, as narrow as 15 cm across and set in a recessed spandrel inside the window's structural arch. This spandrel may eventually be knocked down to enlarge the window to the limits imposed by the arched frame. The surface of the panel itself around the alabaster may be ornamented as at the Hujaryia, where it is practically the only decorated area of the buildings, but, in general, decoration, if it exists, is only on the structural arch itself.

In *zabur* construction the enlargement of this area is obtained by vertically doubling or tripling the alabaster element. In stone buildings double elements exist either as very small circles or rectangles set in a recessed panel, a basic form typically exemplified at Khamir; or larger rounds, set in stone or brick tracery spanning the width of the arched frame. This is a common feature of the Old City of Sana'a and of other refined examples of the central Highlands styles, often illustrating a characteristic proportion in which the rise of the structural arch is twice its chord. In the stretch between Thula and Mahwit, through Kawkawban and Al Tawila, typically capricious forms, such as inverted tear shapes, may replace or be combined with the circles.





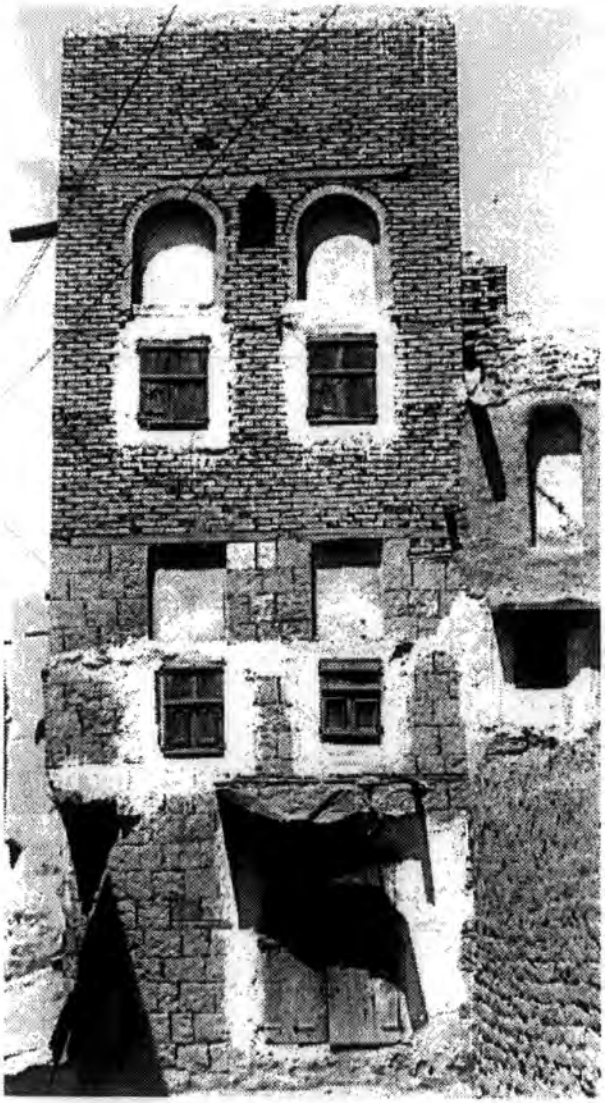


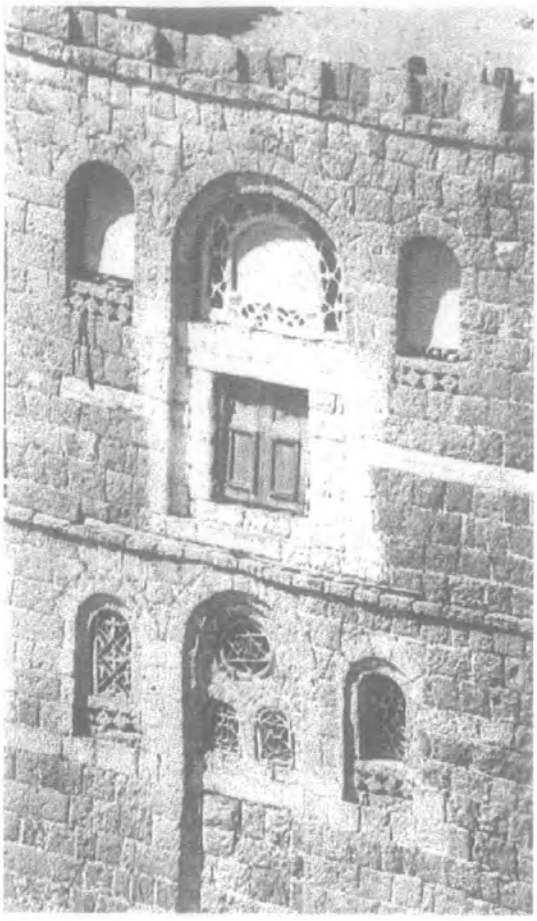


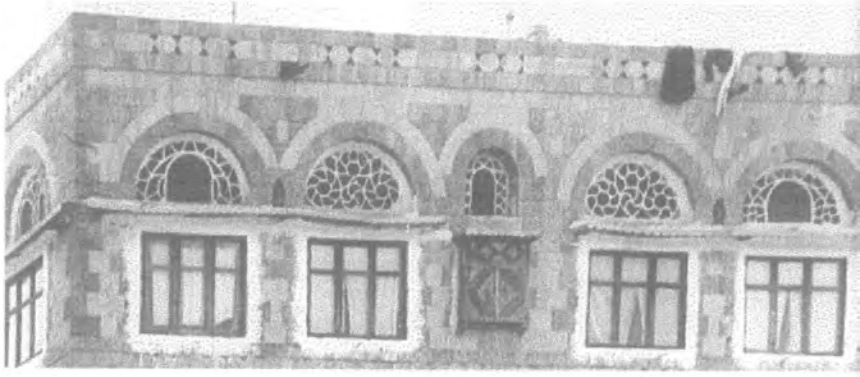
Top from left to right - Al Nadhira,Kubban, Al Rasaba and Al Mithal, Al Hada; *centre* - Ibb;*bottom left* - Al Mahwit; *right* - Al Qa'a, Sana'a; *opposite, left*- Al Qa'a, Sana'a; *right* - Al Hanaka, Rada'

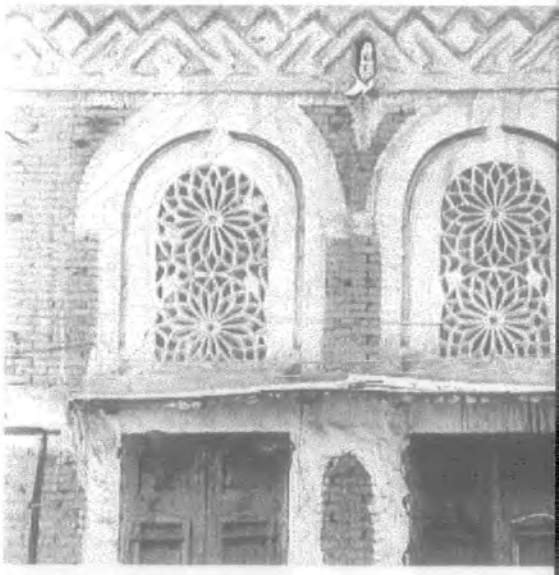
Triple openings appear based on two elements, which may be rectangular, arched or round, the top element being round or arched. Many combinations are thus possible, set in a panel and in stone or brick tracery. In wider windows the openings are increased, reaching complex compositions of rounds, arches and rectangles. In all cases the traslucent elements are never more than 20 to 40 cm across.

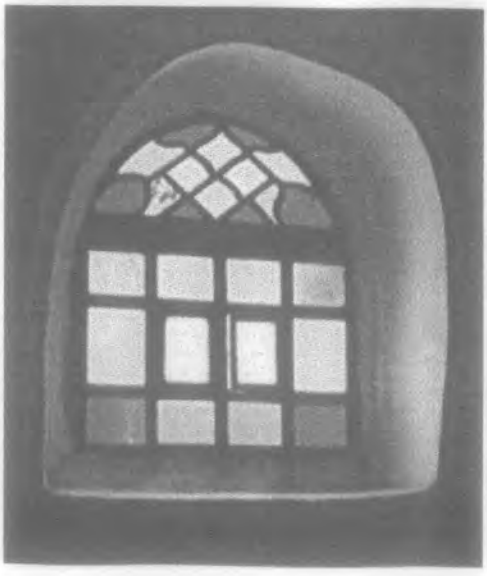
Single fanlights made of alabaster plates of a standard size of about 60x90 cm are common. They may be made wider by joining two plates side by side, a relatively rare procedure seen especially in the central highlands. The fanlight area may instead be increased, as in the area of Rada', with twin or triple arches over the lower section, each arch dimensioned to the standard size of the alabaster. Examples of this arrangement were occasionally seen as part of complex facades with a number of highly decorative effects as far away from Rada' as Mahwit. Similar forms are currently being assimilated in the composite modern idiom developed in cities.

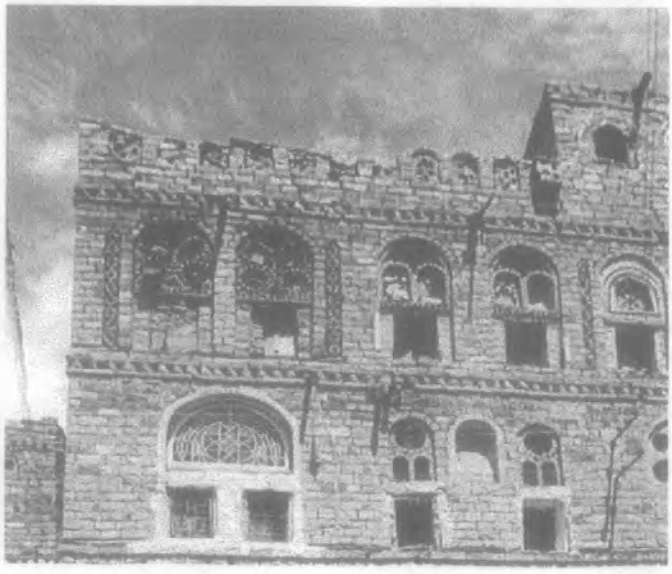












Top left - Sadda, Wa
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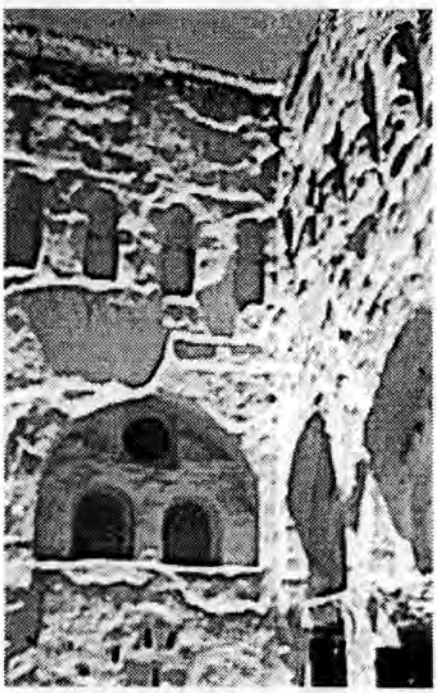
alabaster; *centre*
Sana'a Old City and I
al 'Azab; *bottom lef*
Wood tracery, Ta'iz; *rig*
- *Takhrim* replaci
stonetracery, Thu
opposite - Gre
mosque of Shibam
1973 *(left)* and in 19
(right)

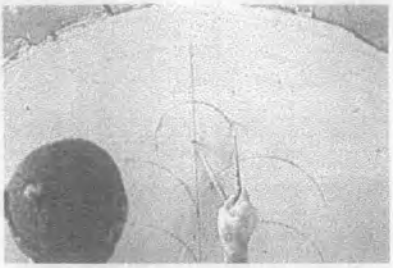
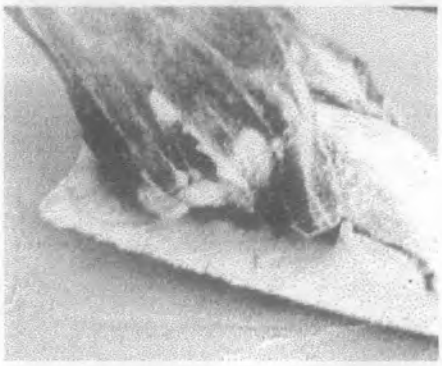
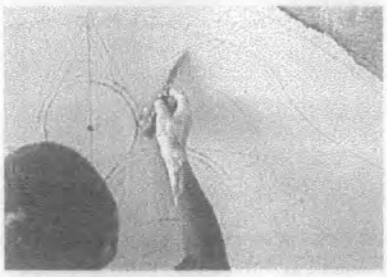
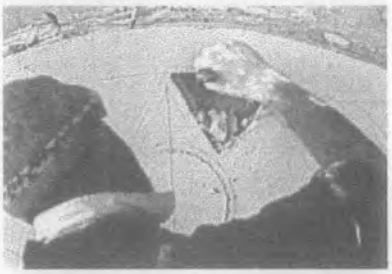
Coloured glass was seen to occur as an alternative to alabaster already in the double and multiple perforated stone or brick tracery fanlights, but is more widely seen set in stucco tracery (*takhrim*).[9] In that form it has appeared combined with alabaster as a narrow band around a central alabaster pane, providing additional illumination and embellishment. In general, however, stucco tracery tends to replace alabaster plates, being the most common way to deal with large single fanlights. Good examples occur throughout the country, the best being concentrated in the triangle Thula/ Mahwit/ Sana'a.

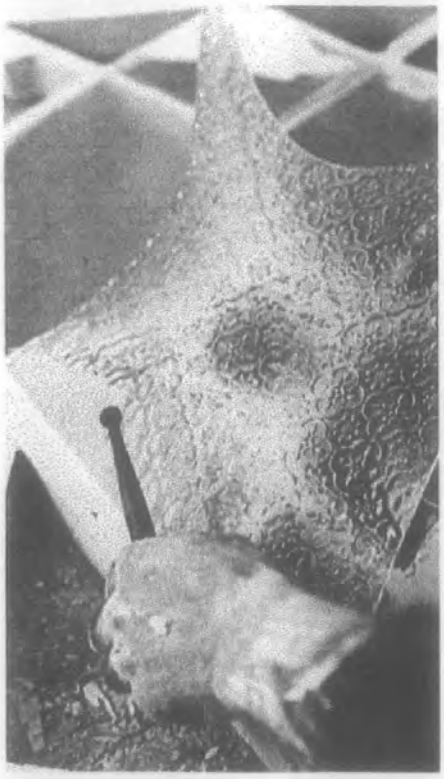
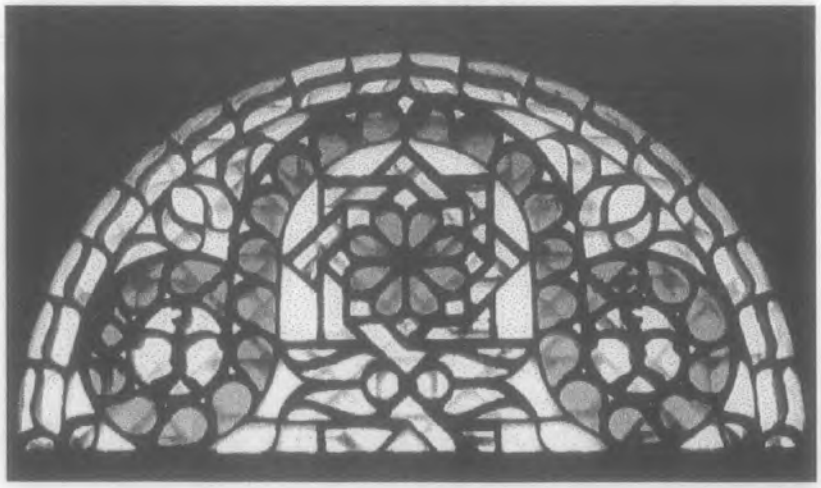
A small *shaqus* may be incorporated in the middle of the tracery, a frequent feature in Sana'a but also found elsewhere. Mahabisha shows a peculiar kind of alabaster fanlight with a single or double opening part at the bottom.

The references of Niebuhr to *"a round wicket fitted with a piece of Muscovy glass"* and *"small panes of stained glass from Venice"* above the shutters, to add light to the rooms,[10] suggest that two centuries ago replacement of alabaster for coloured glass was already possible. It was however in post-Revolution times that alabaster began to disappear, systematically replaced by *takhrim* and even clear glass panes.[11] Often the whole stone or brick tracery supporting the alabaster pieces has been broken and replaced by a single gypsum and coloured glass panel.[12]



[9]Wood tracery was seen in Taiz and in the mosque of Dhawran.The example seen in Ta'iz was the only instance where the writer found this in domestic architecture.
[10]Niebuhr, p 374 and 375.
[11]Alabaster plates were still sold in the Sana'a suq in the mid 'seventies, but no longer in 1990.
[12]In the early 'eighties, at the great mosque of Shibam, not only were the triple alabaster fanlights replaced by single *takhrim* but also the whole surface of the courtyard walls, highly textured by countless applications of plaster, was scraped and evenly re-rendered.

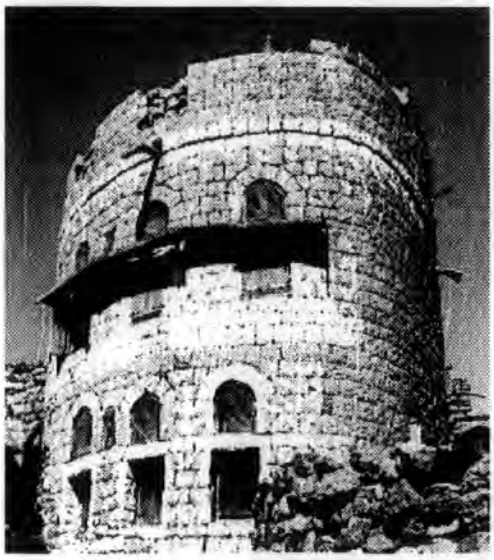



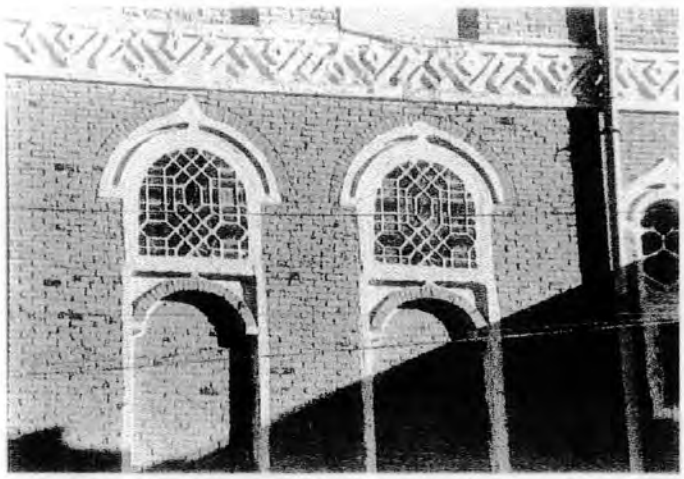
Top - Tools and aspects of *takhrim* making; *bottom left*- Hollow *takhrim* and *shubaq* as part of the house ventilation, Sana'a;*right* - Alabaster plate as the outer face of *takhrim,* Thula; *opposite left - Takhrim* in hallways, Sana'a; *right* - Outer screen of metal latticework, Al Hajjra, Haraz

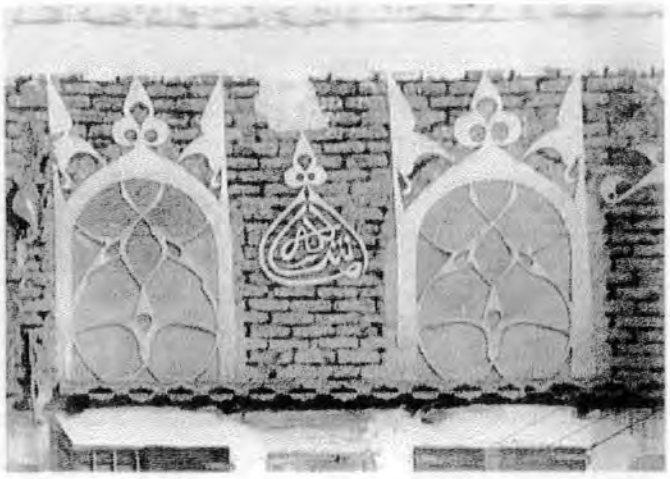
Takhrim is the work of the master plaster carver (*muqassis*) but it is in fact a craft of extreme simplicity. The materials and tools required are plaster, a board on which the screen is made, compass, trowel, knife, hammer and a glass cutter.

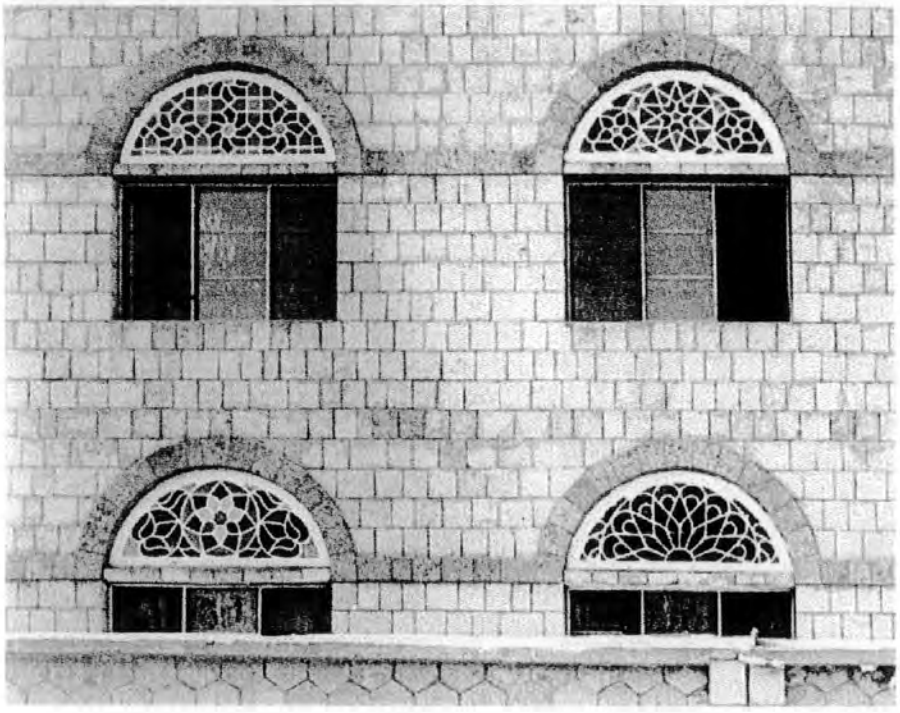
The plaster is laid on the board and roughly shaped to follow the arch in which it is to be fitted. The surface is smoothed with a float or by hand and left to harden enough for a pattern to be traced. The exact contour of the arch and of the pattern to be filled with glass are, then, cut out with a knife. Once the plaster is dry enough it is separated from the board by gently knocking the back of the board and then turned over. Glass is cut slightly bigger than the voids, so that the edges lie on top of the tracery. Liquid plaster is sprinkled to fix the glass to the frame, followed by heavier plaster covering the whole work. At the critical degree of hardness the areas covered with glass are cut out from the obverse side, setting the piece against the light. Once the screen is ready, it is fixed to the opening with the aid of more plaster which may correct any imprecise fit.

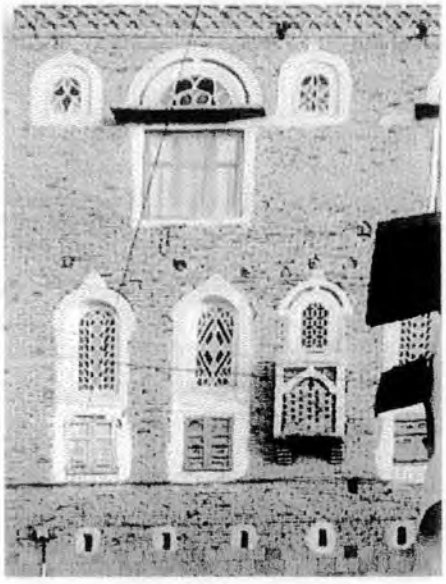
In the simplest examples stucco tracery consists of a single panel with coloured glass, as seen in most provincial examples and in the fanlights above interior doors between rooms and hallways. At its most refined, however, the fanlight has an outer screen - hollow or filled with plain glass - and an inner screen, having a different pattern, with coloured glass. In many cases the outer panel remains in alabaster, creating a softer light. Alternatively, a similar effect is obtained by stretching a piece of white cloth between the screens. One peculiar variation was seen in Manakha and elsewhere at the Haraz mountains, consisting of a metal latticework outer screen, a form apparently well established when first seen by the writer in 1973 and explained by local informants as a means of protecting the interior screen.







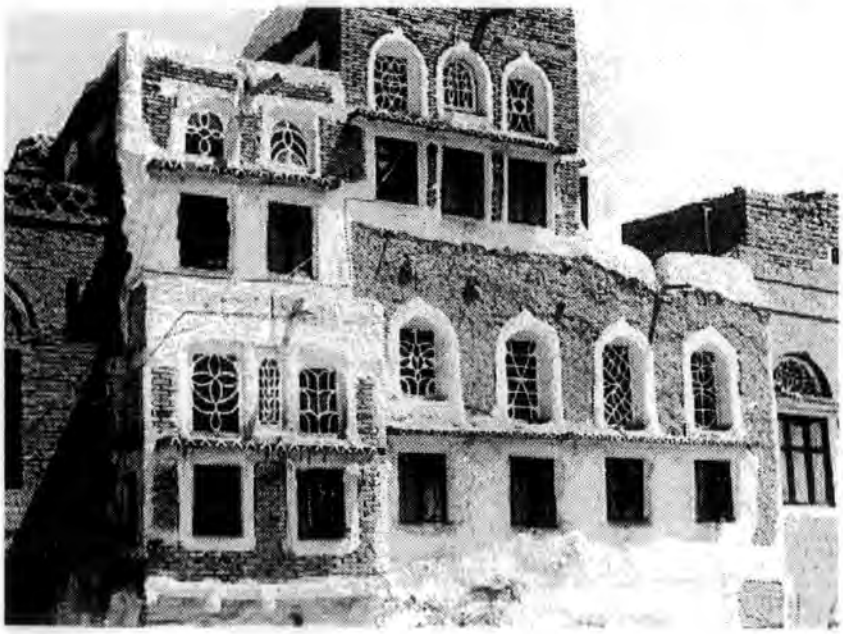


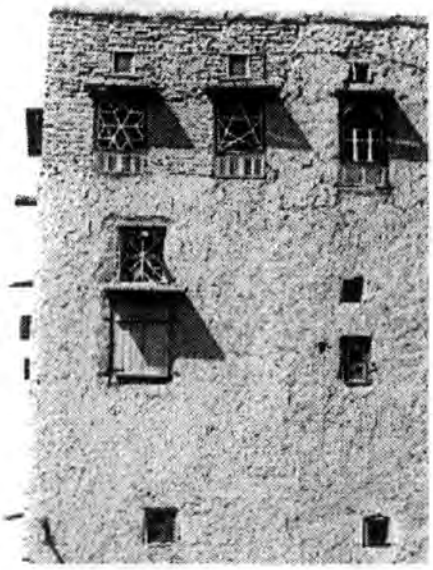


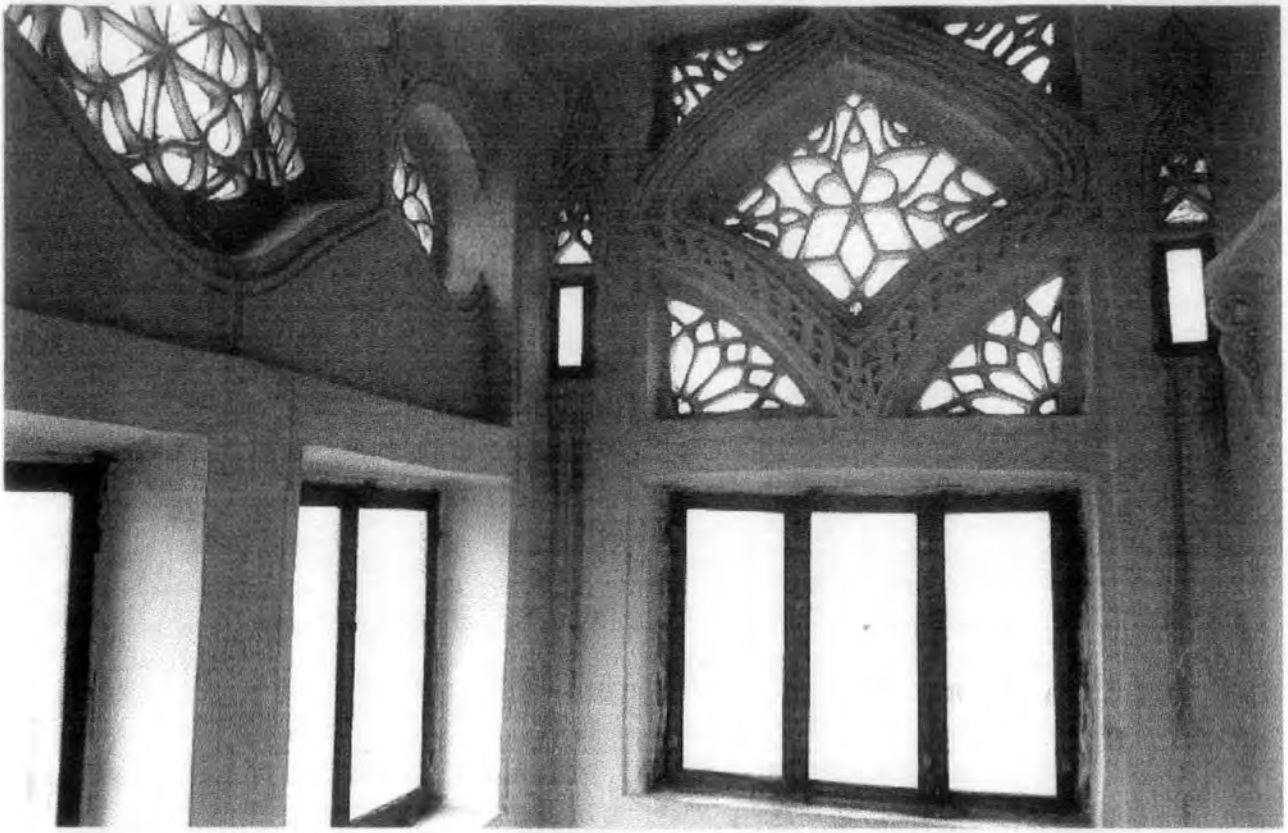
Takhrim examples seen in Sana'a during the late 'seventies; *opposite left* - Al Qa'a, Sana'a; *right* - Al Baydha

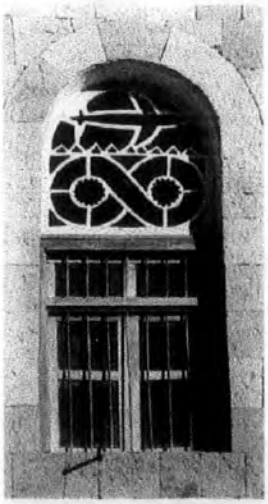
Changes in the design of fanlights are reflected in the patterns, in the quality of the glass and in the design of the tracery itself. Thus, the classic examples are set on stilted arches and display small designs with bright coloured glass - intense reds, blues, greens and yellows or orange. The tracery itself is delicate and thin to the limits of practicability. Wider panes of glass and more flowing designs with the tracery taking a quasi-"art nouveau" quality, seen also in the plaster work around the windows, appear to have been favoured in the 'sixties. Textured glass of weaker hues, imported from Pakistan, replaced the denser tones of Venetian and Bohemian origin. The 'seventies saw a return to more subdued tracery and geometric patterns, but with changes in the proportion of the arches (semicircular and segmental arches became widespread), in the colours and quality of the glass and in the frequent elimination of the outer screen. Another trend later emerged in which thicker tracery was subject to more elaboration so that, rather than the tracery being the support of a pattern of colours, the glass appeared as a filling for the plaster design. At about this time stilted arches and untextured glass of bright colours came back to fashion. Deep red and other colours became hard to obtain in glass and acetates began to be used in thin sheets shaped with scissors and sandwiched between clear glass plates. The acetate does not withstand direct sun and cases were observed where it was burned brown only a few years after application.

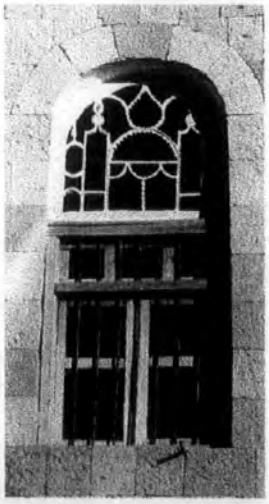
Some applications were rather heterodox as, for example, when *takhrim* substituted regular panes of window glass as seen at Al Baydha and in some reconditioned houses if the old Jewish quarter of Sana'a. Changes in design themes and further aspects of the evolution of *takhrim* are discussed in the second part of this work.

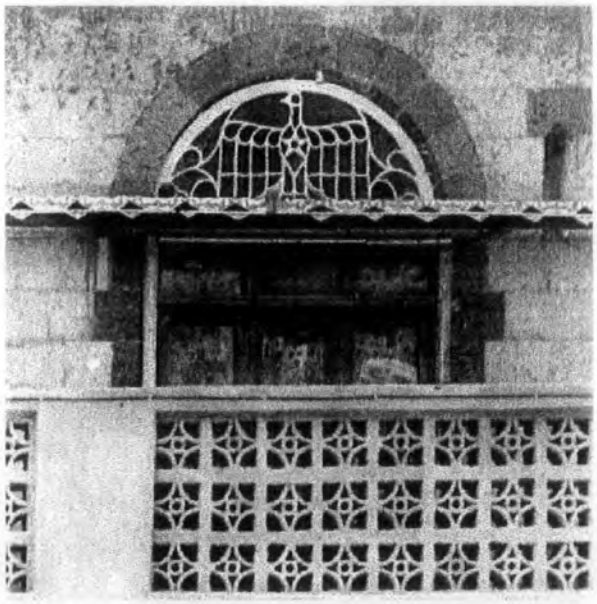


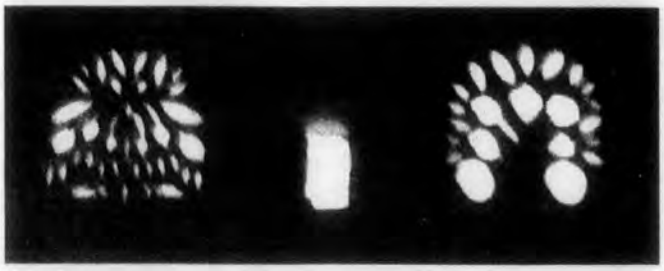




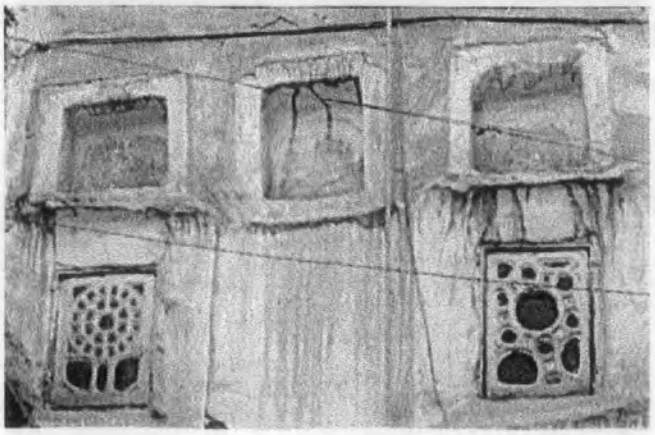


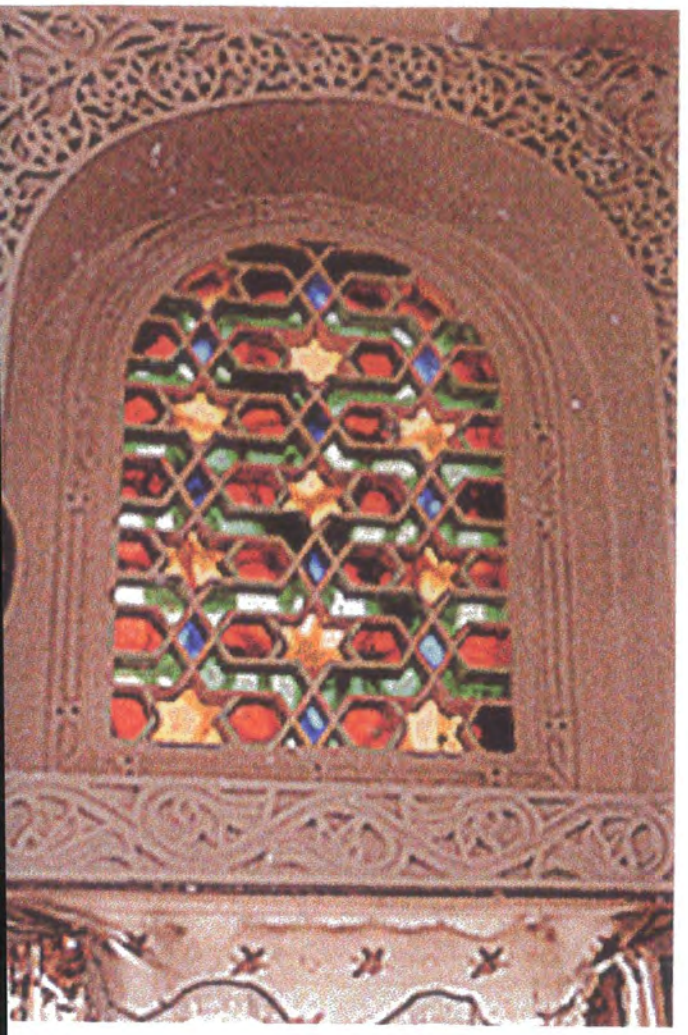


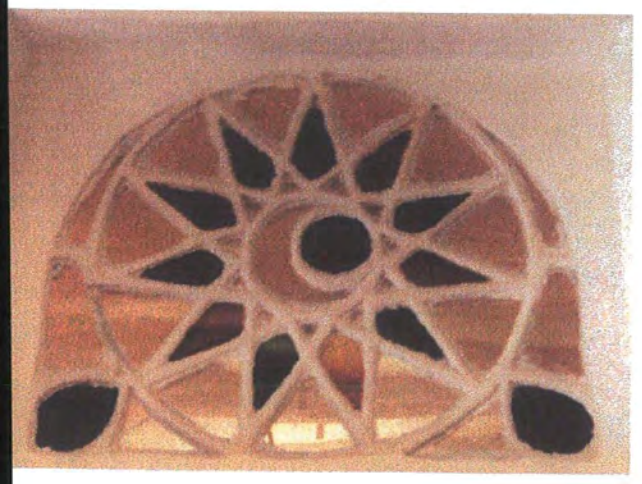


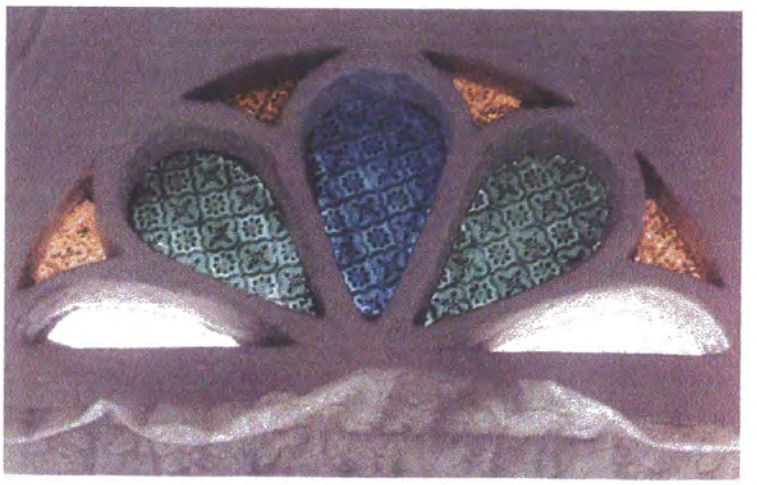


Personalized patterns: *top* - Bir al 'Azab, Sana'a, house built in the 'forties; *centre left and middle* - Al Nadhira; *right* - Sana'a; *below* - Sa'da;*bottom* - Bir al Shams and Al Qa'a, Sana'a; *opposite* - Colour and pattern with "old" and "new" *(bottom right)* glass

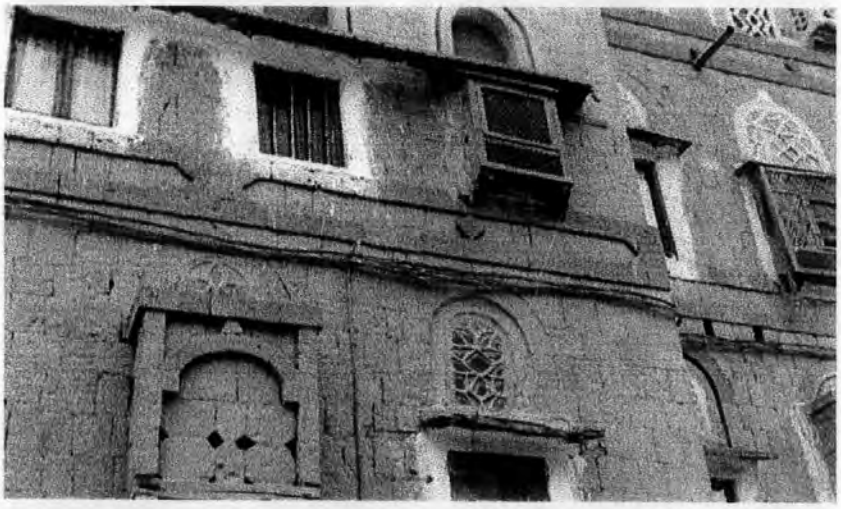


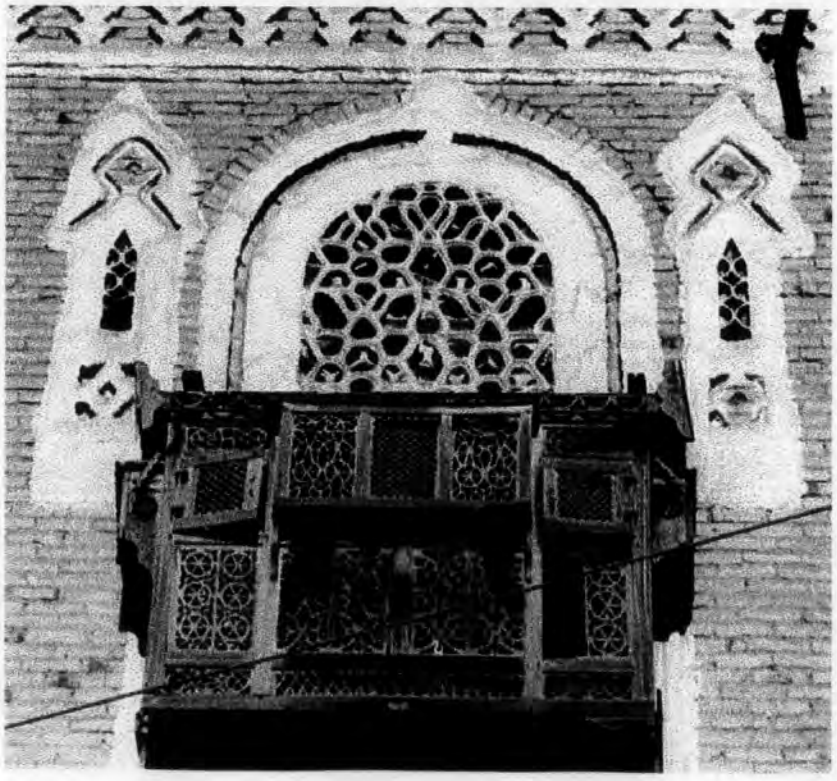






Top left - Sana'a Old City; *right-* Rada'; *centre and bottom* - Bir al 'Azab, Sana'a; *opposite left* -Jabal Sabr; *right* - Sana'a





2.10 - Carpentry of windows and doors

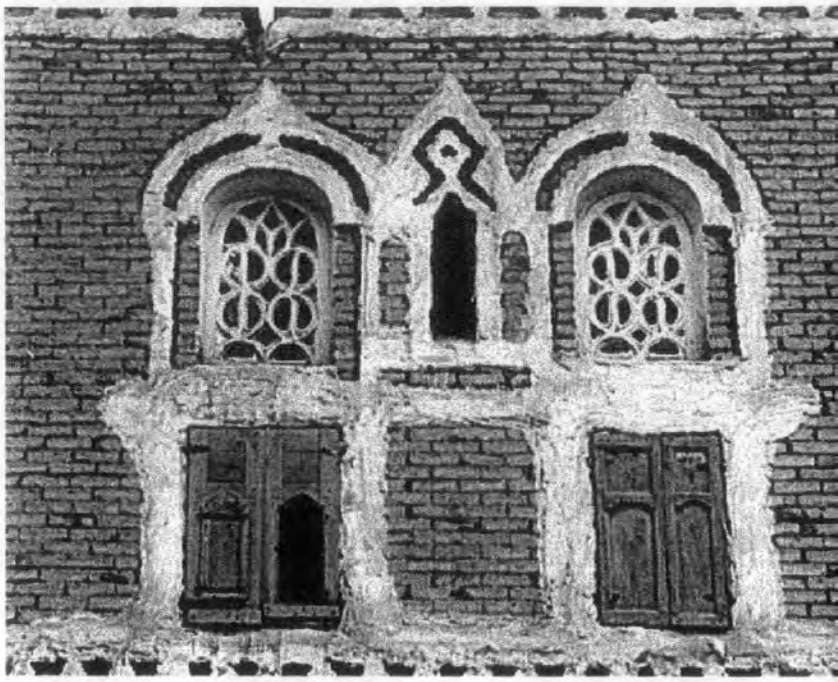
WINDOW GRILLES AND SHUTTERS

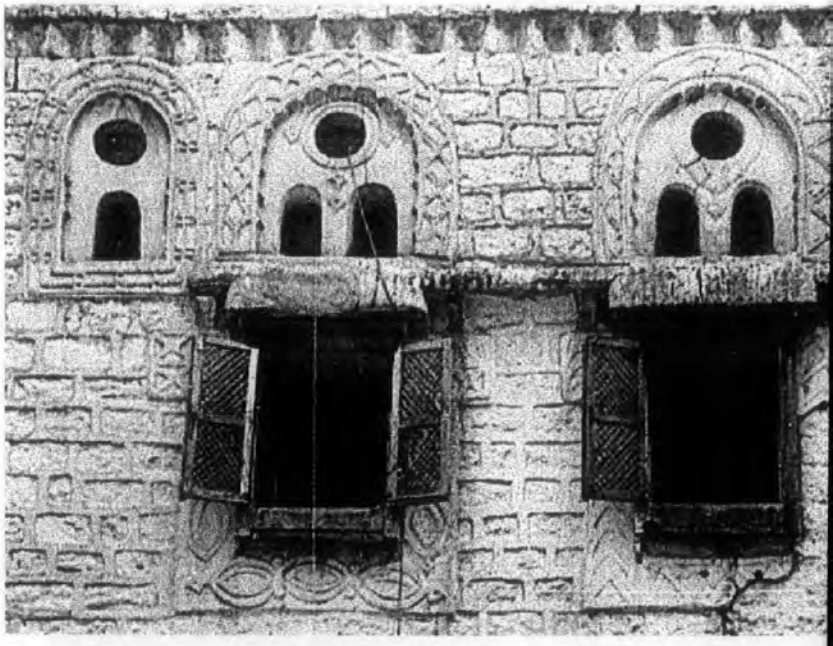
Hardwood - a local variety of acacia known as *tunub* - finished with mustard seed oil is the prefered material for the traditional carpentry of doors and windows. The increased dimensions for the opening sashes of the window account for the existence of grilles, not only as a form of external security but also, the sills being very low, to prevent children from falling.

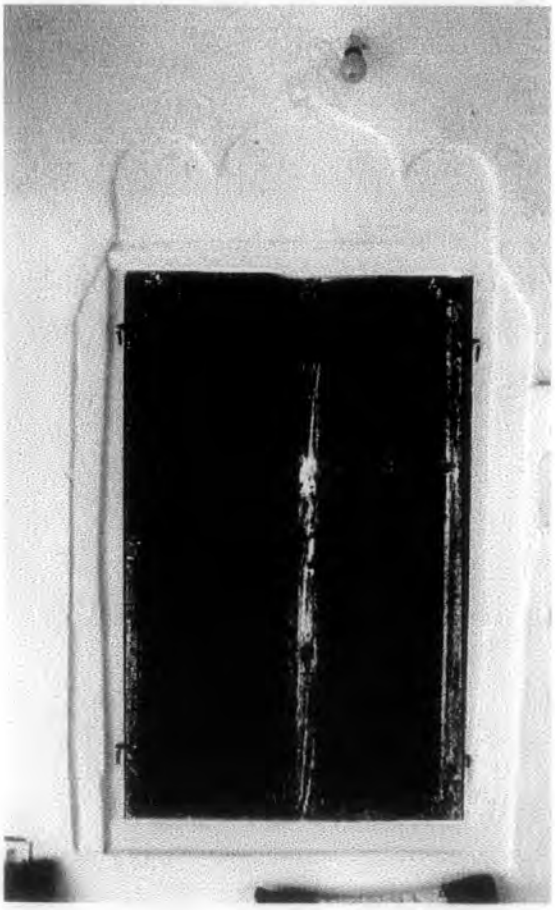
Grilles in gypsum tracery were still visible in some houses of the Old Town and Bir Al 'Azab in Sana'a; however wood was the material generally used for this detail which varies in form according to region. The grilles may be outside and independent of the shutter, as at Dhamar, Al Tawila and Al Mahabisha, or make the lower part o the shutter frame itself as at Jabal Sabr and Al Baydha where this is a constant feature.

The variety of gratings and wood screens throughout the Tihama has been previously referred to and mention has been made of the *rhawshan* or Turkish balcony. This feature was introduced to the mountains by way of the palaces of the Imam and his family. A few remarkable examples remain at Sana'a and Hajja with modified, more modest versions, in the houses of ordinary people.

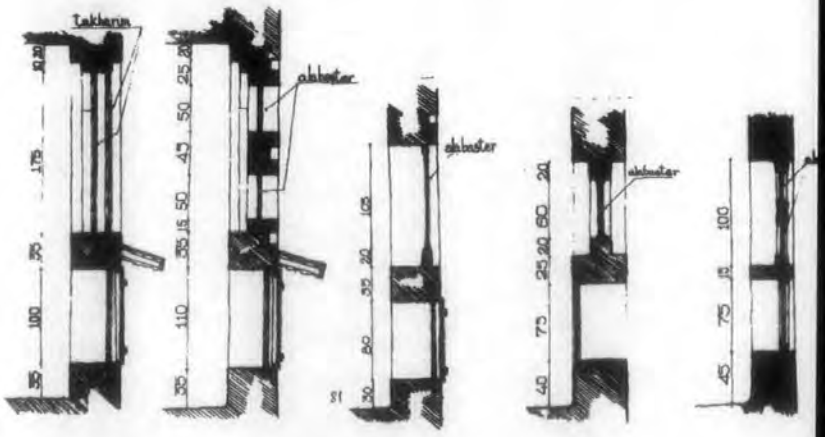
Metal bars have replaced both plaster and wood gratings and are now a standard feature.







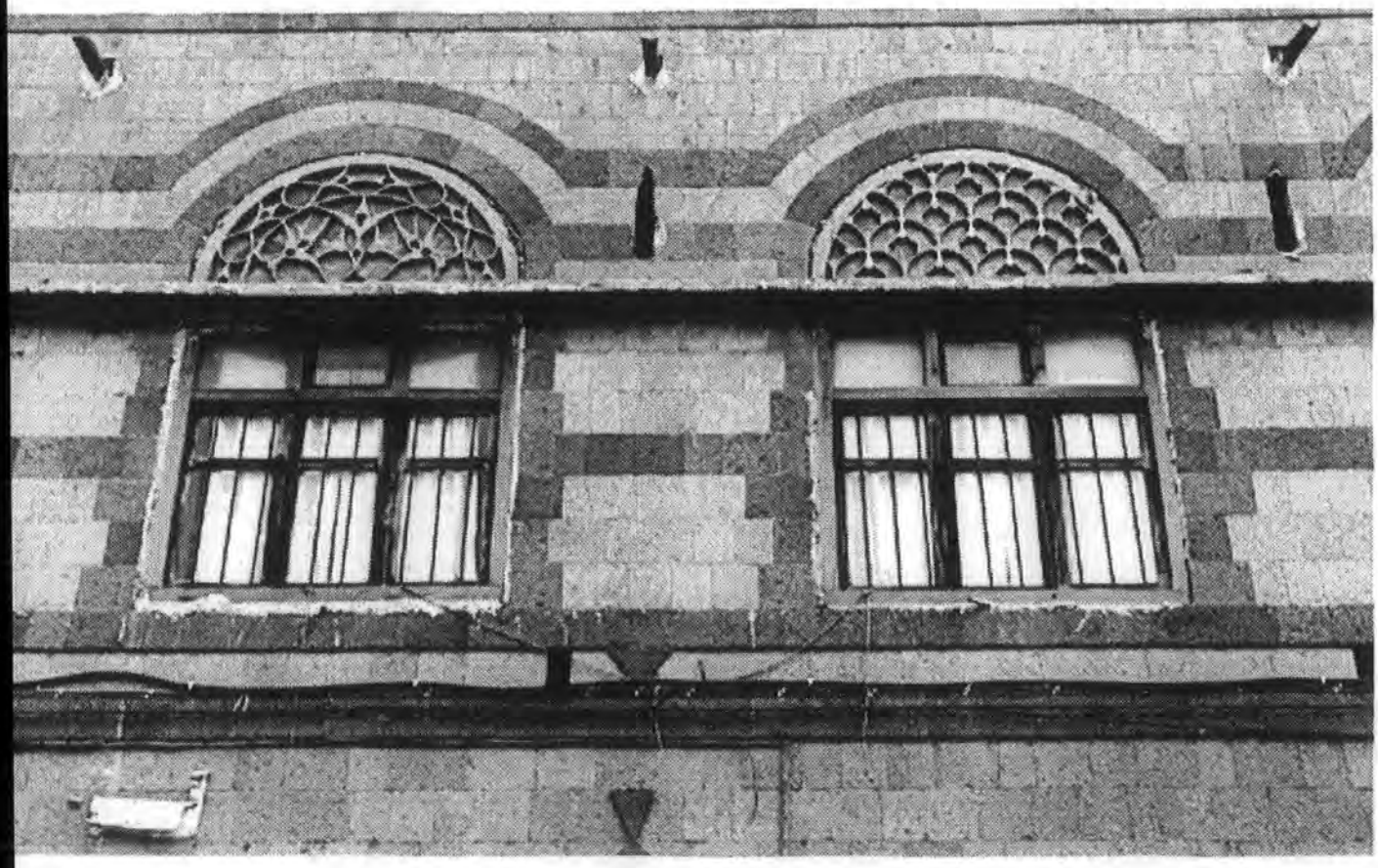
Top left - Mithal, *right* - Sana'a; *centre* - Jibla; *bottom left*- Sana'a; *right* -Schematic sections of windows; *opposite* - Sana'a



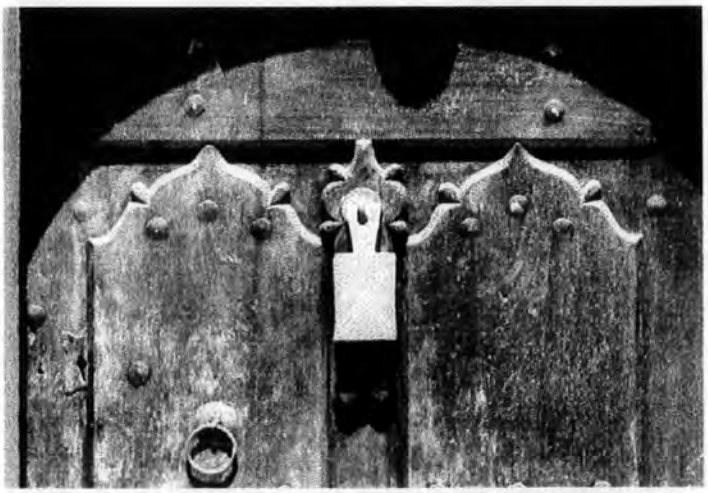
Windows in the common 70x90 cm range have a two leaf shutter, set on the outer face of the window opening outwards. Often a wicket having the size and shape of the shutters' lower panel - usually a cusped arch - may be opened in either or both leaves. Latticework was also seen in lieu of the wicket. The number of leaves increases with the width of the window; the maximum observed was six leaves but three or four was more usual. Shutters may also be decorated with carvings, inlays and, more recently, coloured paint, but seldom as elaborately as doors.

Glazed windows opening inwards may co-exist with shutters but, in the period covered by this study, tended to do without them, relying on grilles for security and curtains for privacy. The frames and sashes could be very slender - 2 cm across in a 45x60 cm double leaf window - with restrained decoration reduced to straight grooves.

As in other crafts, from plaster carving to silver smithery, until 1948, except for idiosyncratric, and often elegantly simple, examples found mostly in the countryside, the technique and decorative conventions of window and door manufacture were controlled and influenced by Jewish carpenters, although Indian influence was most apparent in the Tihama.



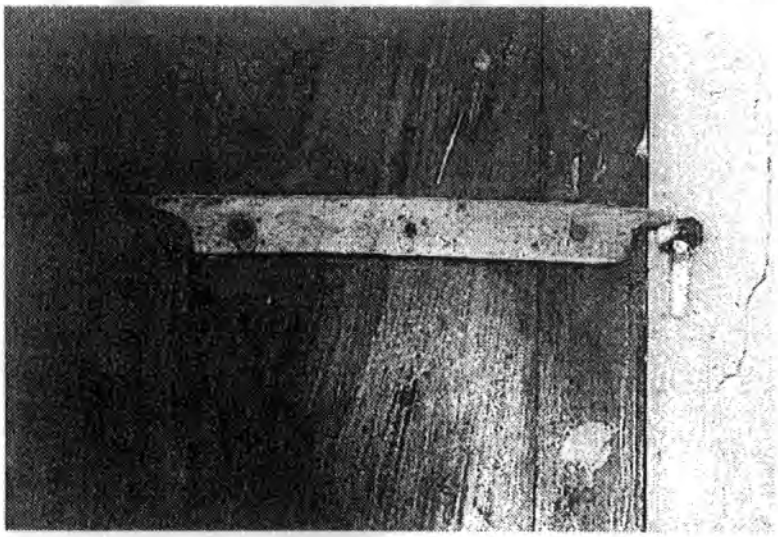
Top left - National Museum, Sana'a; *middle* - Thula; *right* - Ibb; *centre* - Sana'a; *bottom* - Interior doors at Hajja, Sana'a and Sadda; *opposite* - door fixtures, Sana'a

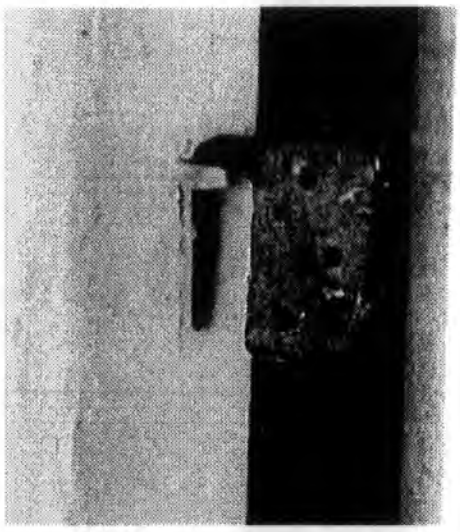


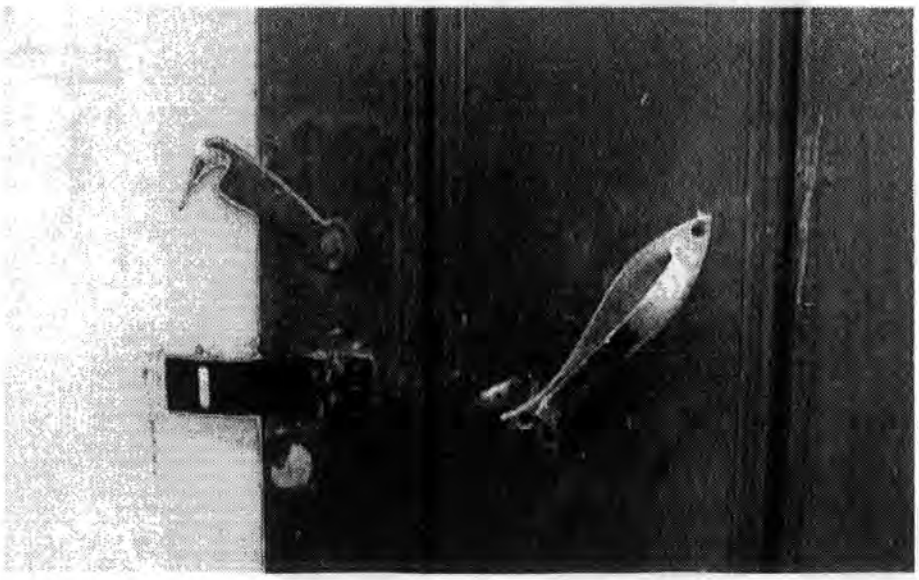
DOORS

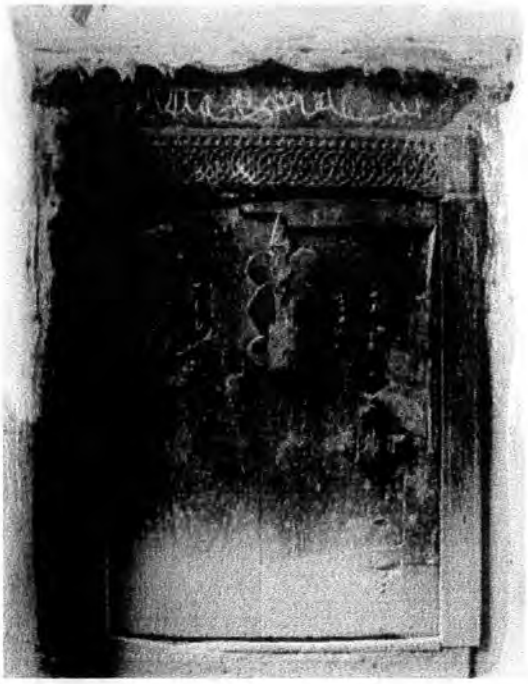
We saw that in the Tihama woodwork in doors and windows is at its best, with typical carved brackets on either side of the main doors and laborious carvings on the panels and muntins of the themes taken from both the Arabian and Indian traditions.

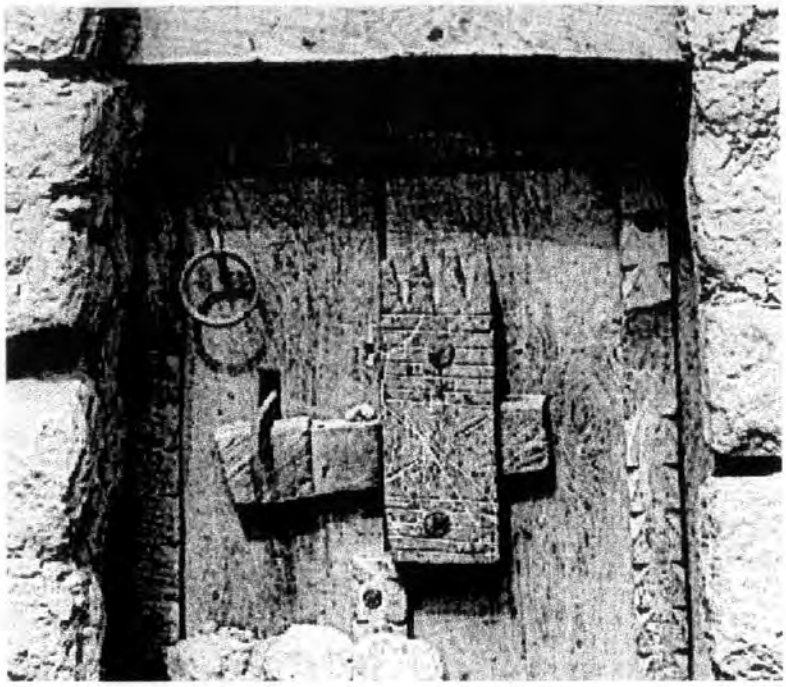
In the Mountains, door panels may be plain and decoration reduced to the block for the metal knocker, which may also be ornamented with simple incisions. Otherwise decoration either emphasises door jambs and mullions or covers the whole surface, incorporating linear or cuneiform incisions of arch, circle, foliated circle, ogee and cusped arch forms. Carvings of stylized floral motifs and Koranic inscriptions may occasionally occur associated with more spontaneous expressions, such as figurative representations of trees, birds, and other natural features. Painted colour and inlays - mother of pearl and brass - appear in the best examples, especially in interior doors. Normally, however, the only non-wood elements applied to the doors other than the fittings - hinges, catches, handles - are metal roses and rings in the centre of the panels.

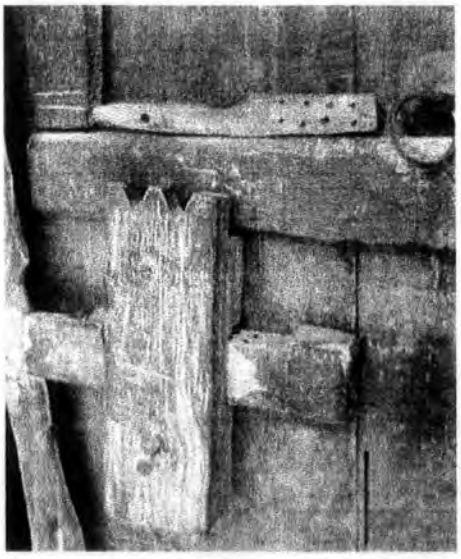




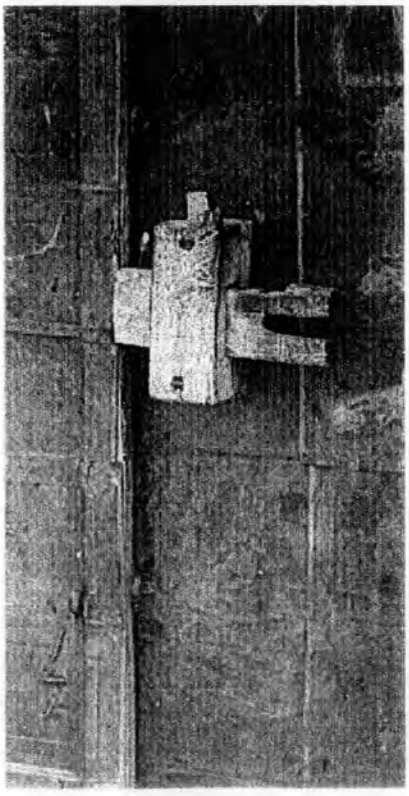




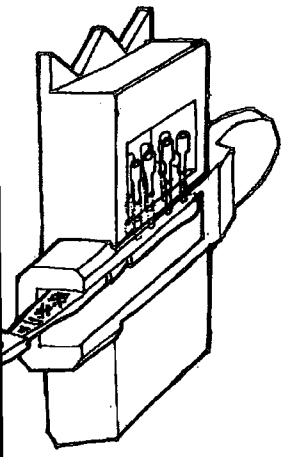


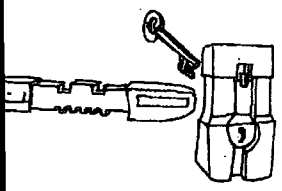


Top left - Thula; *right* - Jubban; *centre left* - Lock and key, Mithal, Al Hada; *right* - padlocks; *bottom left and middle* - Market stall doors, Harf and Thula; *right* - Bayt al Faqih, Tihama; *opposite* - Schemes of locks and keys



LOCKS





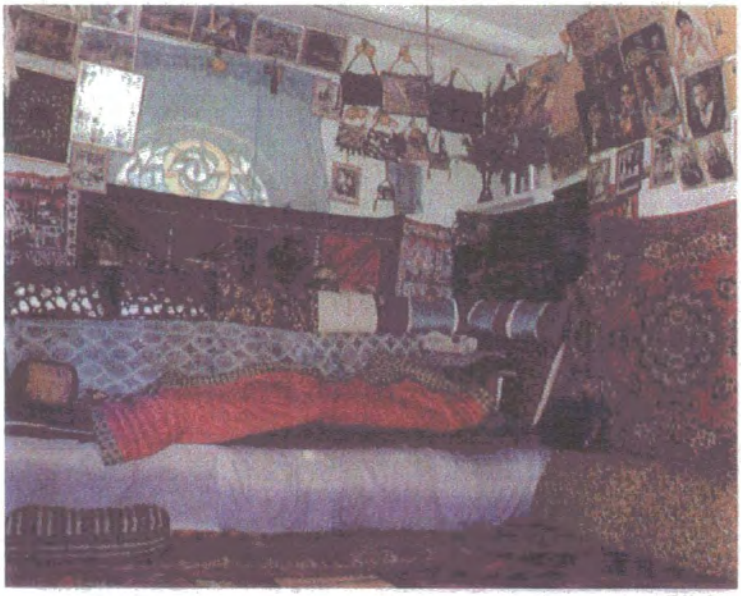
Locks of houses consist of wood blocks attached to the door panel with a hollowed core for the cogs or pegs that act over a horizontal latch set in a notch and sliding into a mortise in the door jamb. In archaic examples, seen mostly in the mountainous countryside, the rabbet for the latch is separated from a hollow above by a thin segment of wood with perforations regularly disposed. The latch itself is hollow and has on the upper part the same perforations in exact coincidence. Wood pins, working in the hollow of the block run across the coinciding perforations to the exact thickness of both segments, securing the latch in the closed position. A key, reminiscent of a toothbrush in which the bristles were replaced by as many wood pins as the perforations, is introduced through the hollow end of the latch. The key pins push the mobile pegs up and the latch can then slide. There are versions of this with metal pins or with a metal key shaped like a twisted fork, introduced through a slit in the door panel.

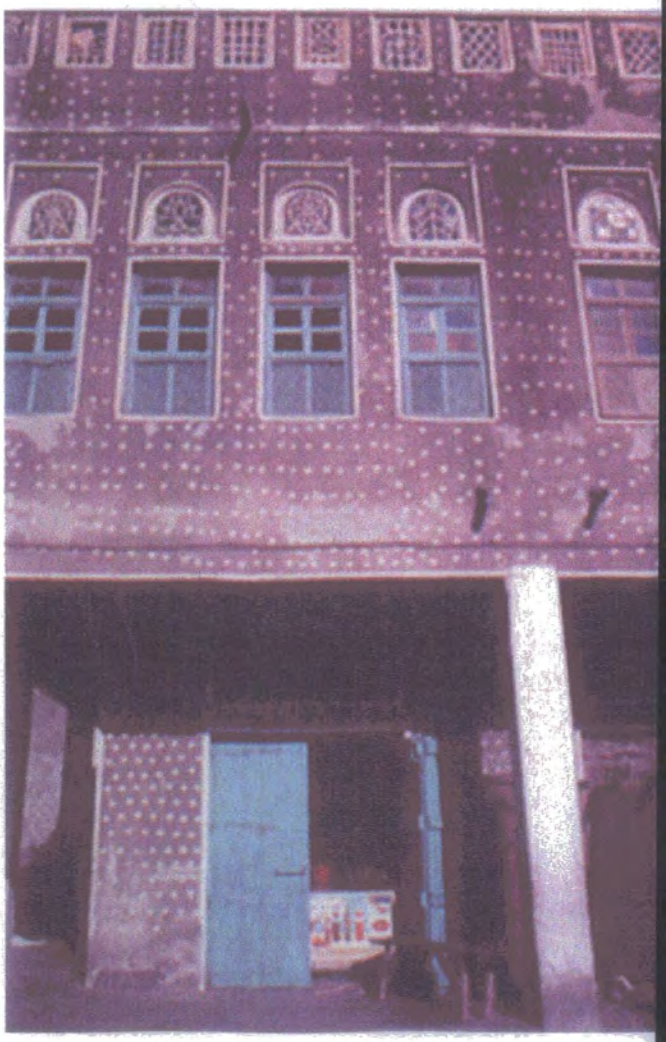
More common are the locks in which a large metal turnkey operates a notched wood latch and a wooden cog works secure it in the open or closed position. In interior doors, where smaller blocks may be desirable, iron may replace some or all the moving parts. In the Mountains moderate ornamentation may appear on the blocks of both interior and exterior locks but in the Tihama these are often as densely decorated as the rest of the door.

Metal padlocks are frequently used for the doors of such spaces as stores or market stalls. They are variations of a common principle of a cylinder containing the works to open or close an attached circular, semi-circular or elliptic ring. The key may be a flat strip of metal with a fairly complex cut out pattern that is introduced sideways and slides along the cylinder; alternatively a thin hollow cylinder, with an annular handle, which acts by being threaded into the lock from one of the bases. Since the late 'sixties, imported industrialized turnkey padlocks applied to sliding horizontal steel bars have progressively replaced these models.

The Jewish exodus of 1948, the Civil War of 1962 and increasing scarcity of wood, made carpentry a dying craft by the mid 'seventies. Traditional carpenters, sitting on the floor and using both hands and feet to hold the material or operate their tools, could still be seen in 1976, but the post-Jewish production was reduced to the barest essentials. Mechanised production began early in the 'seventies and was consolidated by the 'eighties, producing mostly frames for new types of glazed windows .

Top left - Nuptial room; *right* - Veiled woman facing the camera; *bottom left* - Roadside shop; *right* - Remodeled building, Hodeida (photos S. Kennedy); *opposite* - paintings on military truck *(left)* and in restaurant at Sa'da *(middle)*; *right* - Conventional house rendered and painted in blue and white in the early 'seventies, Sana'a



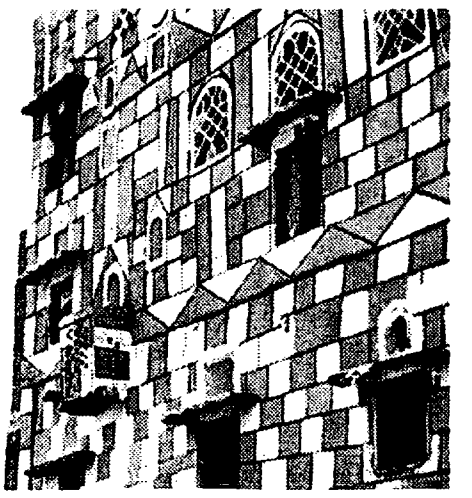


2.11 - Colour

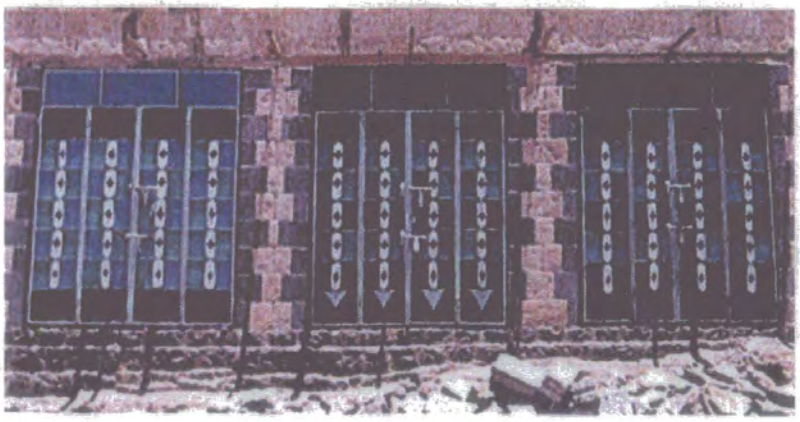
In the Mountains, the presence of colour was traditionally limited to the room furnishings such as rugs, cushions and wall hangings, and the coloured glass fanlights. There are also some good examples of painted interior doors but, otherwise, colour in architecture appears only in the instances already mentioned of red ochre applied to earth construction in both the Northeast and the Southeast. In the Tihama, colour was more widely used for interiors, particularly ceilings, complemented by an abundance of decorative objects, from Indian lithographs to Chinese enamel plates.

That Yemenis were hungry for colour became apparent as soon as industrial colour was available. Cars, trucks and bicycles were adorned with the usual array of motifs, with particular attention paid to the painting of panelling on lorries, as also seen in Pakistan. Coloured paint was applied to wood shutters or directly on earth or stone walls as a novel way of embellishing buildings, somewhat erratically and not always in the best taste, but with obvious enthusiasm, in both towns and the remotest countryside. More conventional applications to cement rendering also offered the opportunity for personalised treatment of animal, floral and geometric forms as well as calligraphic motifs.

As carpentry decayed, the best developed results of Yemen's experimentation with brush and spray were seen in the metal doors that were needed by new shops and increasingly by houses for main doors or yard and garage gates. Metal doors appeared linked to a new craft - welding - which began by making metal water tanks for domestic use, burglar bars and doors. Metal door manufacture soon became a trade on its own, with the doors transformed from being purely utilitarian to become a major colour component in the make up of the house and remarkable enough to identify both their owner and their maker.



Painted metal gates. *Top*- Sana'a; *centre left* - Sa'da; *right*.- Sana'a; *bottom left* - Al Tawila; right and opposite- Sana'a



The first doors had a uniformly painted background over which were welded designs of volutes and rosettes, made of thin flat or round iron bar. The designs were mounted in frames, welded separately, fixed to the metal sheet and painted in a separate colour from its background. Many door makers came forward with bold and highly personalized versions of animals and other figurative motifs and the customary war themes of soldiers, planes and guns. By the end of the 'seventies a formula was being adopted in which the iron bars were welded to the sheet in geometric designs with compartments painted in different colours suggesting a formal affinity with the colour glass fanlights. This soon developed into freer forms and a preference for pastel tones rather than primary colours, both in naif personal creations and in the more rigorous products emanating from the workshops.

It was expected then that this technique would evolve to take on regional variations. Yet what happened was that the inventiveness of designs and colour proposals of the mid 'seventies reverted 15 years later to a countrywide uniform formula of welded designs similar to the initial models, painted in the same colour as the background. Nevertheless individual examples still exist with exuberant colours and patterns. Metal windows were seen as a novelty in 1990.

Finally, the introduction of colour in building construction blossomed when the new road networks facilitated the transportation of stone of different colours from a variety of quarries. With the influx of masons from different regions to the main towns, a range of stone toolings was combined to extend the decorative possibilities of juxtapositioned textures and colours, as will be described next chapter.

Rada', 1990

Sources

Local informants. The information on building craft organization was provided by Etienne Renaud.

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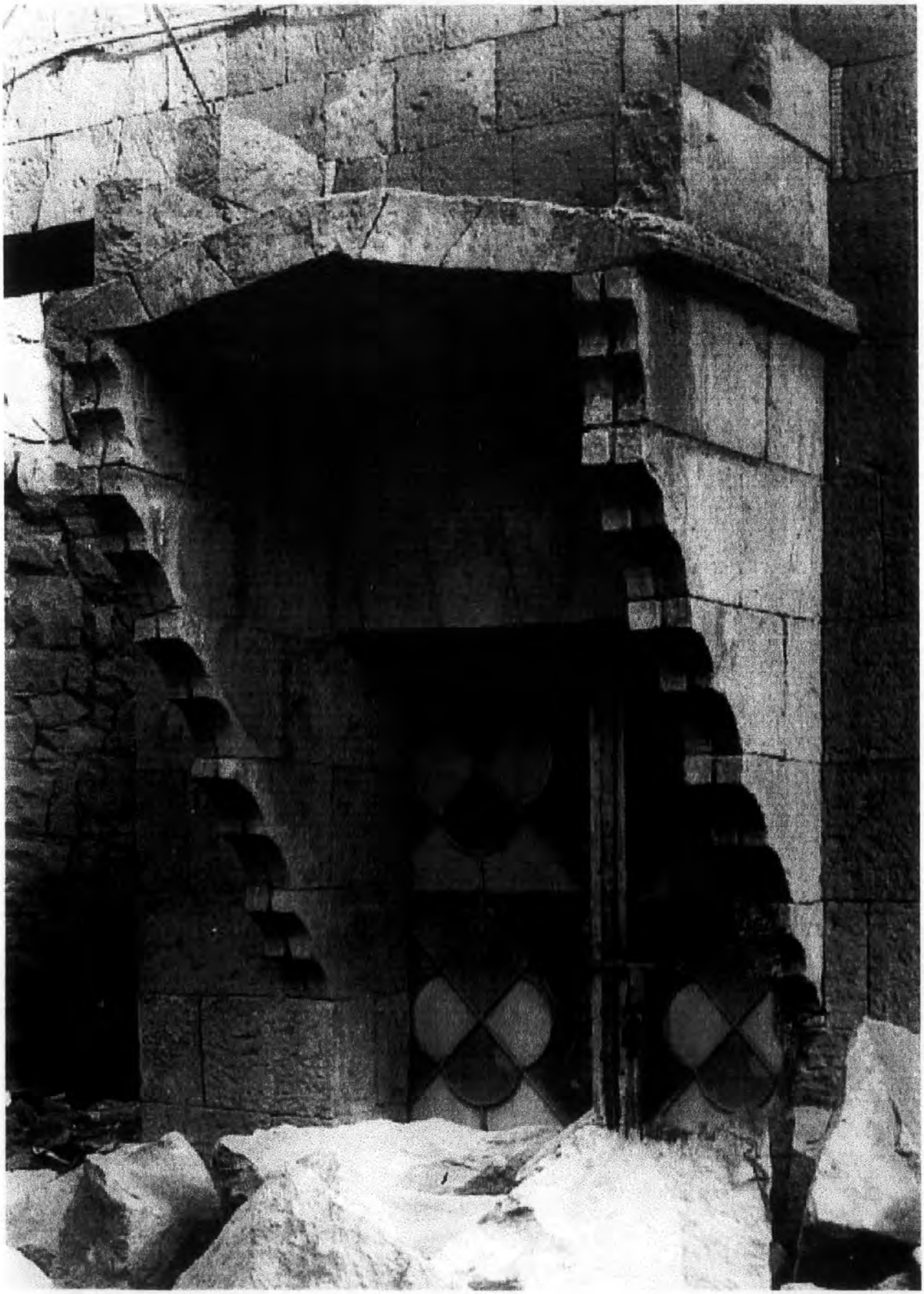
Part 2. CHANGES
(Between Revolution and Unification)



Stone canopy of a new style, Ibb, 1976

CHAPTER 5: THE BUILDING TRADE

Changes in the use of most of the materials and techniques so far documented suggest the notion of continuity until the mid 'seventies. Thereafter it is the notion of mutation that comes to mind as the interchange between town and country was intensified , the influx to the towns increased and road and electricity networks conveyed people, goods and ideas to the most remote locations. In the second half of this period television familiarised Yemenis with unimaginable images of the city and the world.

This chapter describes the aspects that impressed the writer as being most indicative of this process of change, concerning not only the production of new materials and the development of the respective techniques or the adaptation to the old situations, but also the new procedures required in the administration of the building process.

Section 1 - Builders, contractors and designers

1.1 - New professions

At the outset of the Civil War the master mason (*'usta*) was still the designer as much as the builder of three dimensional space. In his language, however, the design of the space was not pre-determined in conventional drawings, but developed in the act of building. He could also, but not necessarily, be the contractor (*muqawil*) within the fairly restricted limitations of that time.

The 'seventies saw the emergence of a range of new building related professions and organisations. They first appeared connected to the commercial importation and application of new building materials attracting the interest of local contractors. They were soon influencing the available options for building materials and techniques for the expansion that followed the revolution.[1]

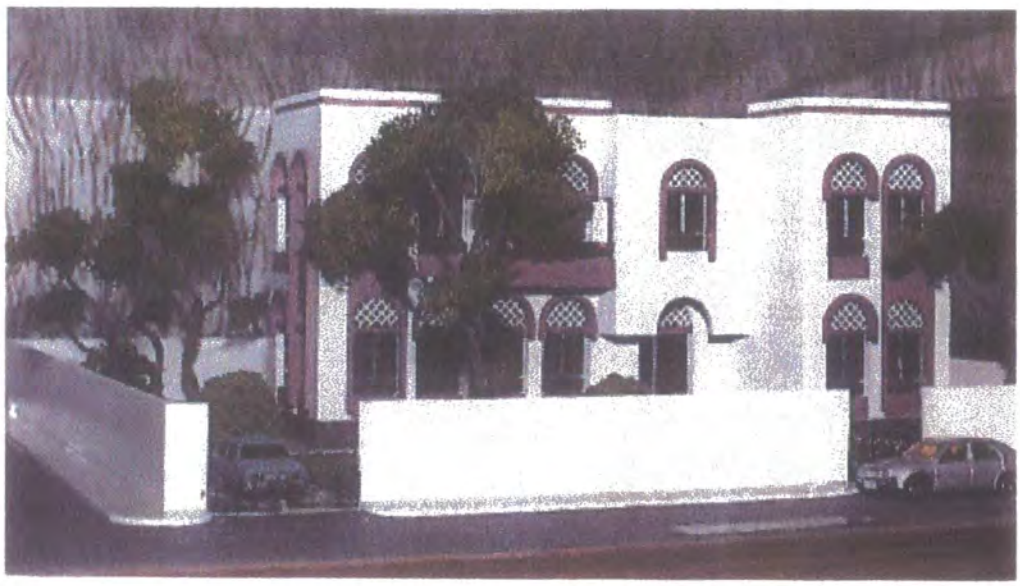
With the passage of time, contracting adopted more complex forms, associating engineering design and marketing offices with on site teams and mechanical equipment. Contracting companies often resulted from a partnership of foreign capital and expertise with national counterparts. Alternatively, foreign firms might have their overseas design projects executed by local companies. The labour force was local; East Asian

[1]The UN expert advising the Ministry of Public Works in the first years of the 'seventies, commented bitterly on the pressures by contracting firms to impose concrete on government projects rather than the local materials that had proved economically and climatically advantageous (Bertaud:71).

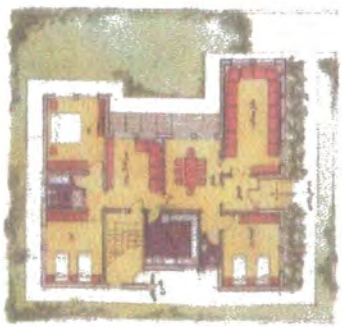
جمعيـــة المقـــاولين اليمنيين

صنعاء-ت: ٢٢٦٠٧٩
ص.ب: ١١٨٩٦
تلكس: ٢٩٨٨

Sana'a - Tel : 226079
P.O. Box : 11896
Telex : 2988

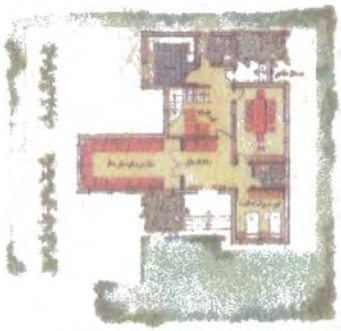


مبنية على مسطح عشرين لبنه، مباني وشوارع تسجل جميعاً باسم صاحبها مسطح المباني ٣٠٠ متر على دورين والباقي مكان للسيارة وحديقة من جميع الجوانب. فيلات على الطراز اليمني مبنية من الحجر الوقيص ومصممه ضد الزلزال، ٤ غرف نوم، مقيل وصالون للرجال، مقيل وصالون للسيدات وغرفة معيشه، غرفة طعام، واربعة حمامات، مطبخ، تشطيب فاخر، الفيلا تسلم كاملة المرافق، عداد مياه، عداد كهرباء، وتلفون.



نموذج الفيلا ذات الدور الواحد
مسقط افقي

نموذج الفيلا ذات الدورين
مسقط افقي الدور الاول



نموذج الفيلا ذات الدورين مسقط افقي الدور الارضي

Advertisements for contracting companies

labour hired by companies for specific large scale projects was recent and limited.

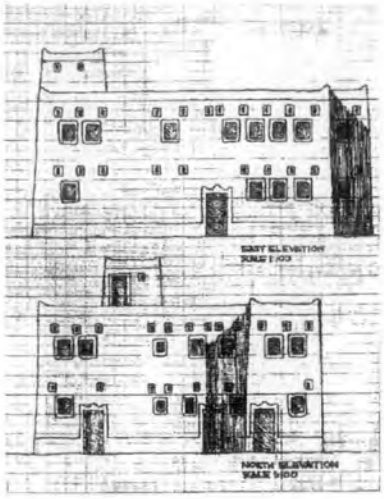
Real estate negotiators are of more recent origin, offering their clients ready made building designs prepared by themselves or in association with contracting and engineering companies.

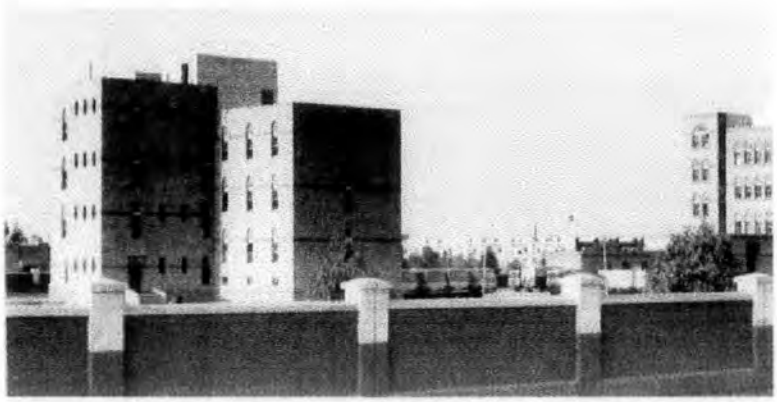
The word *muhandis* is currently applied to anybody with the skill to deal with equipment or machinery and is literally translated as "engineer". It designates as much a plumber as a land surveyor, a structural engineer as an architect. A qualifying word may specify the profession, e.g. *muhandis ma'mari*, refering only to architects, but *muhandis al kahraba* means an electrical engineer as much as the electrician who fixes the fittings. The word *handasa* however deals directly with the notion of tracing lines or making drawings as part of the design operation. A local aphorism says *handasa lugha muhandis* (drawing is the language of the "engineer").

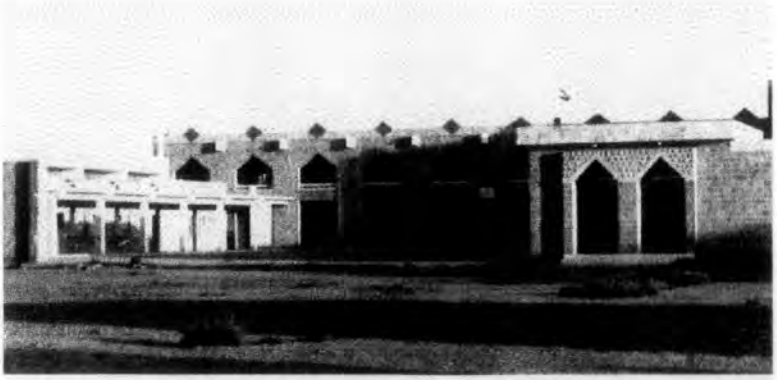
The distinction between civil engineers and architects was made by the degrees for which they graduated abroad. Civil engineers were first to arrive on the scene, principally due to the fact that the new structures required stringent written calculations and diagrams prior to construction. Working in the government or the private sector, they became involved in roles that, for want of a more precise specification, are those generally associated with civil engineers, in situations ranging from road and building design to urban planning and development control.

Architects as such originally came as foreign advisors in government offices and, as luck would have it, reflected the contemporary western world concern for the value of traditional methods. They were therefore enthusiastic in their admiration of the building forms and methods found in Yemen.

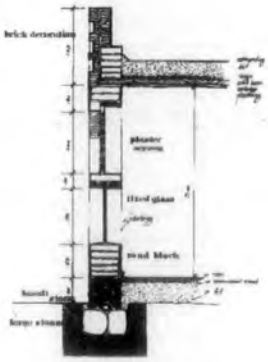
Their buildings reflect several attitudes. In one, drawings consist of instructions under the form of functional plans and a general indication of the appearance of the building. Structural materials, finalised treatment of openings and any decorative devices rely on the interpretation made by the local builder. Wider spans are obtained by the introduction of simple devices such as arches and corner beams, based on traditional technology. Working drawings are more or less sophisticated depending not only on the architect's formation but also on the expected capability of the 'usta to read them.

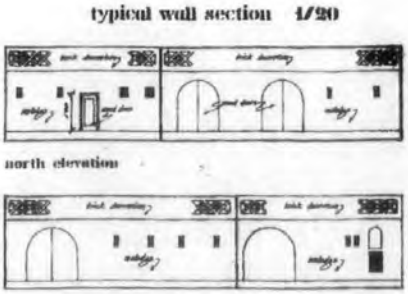


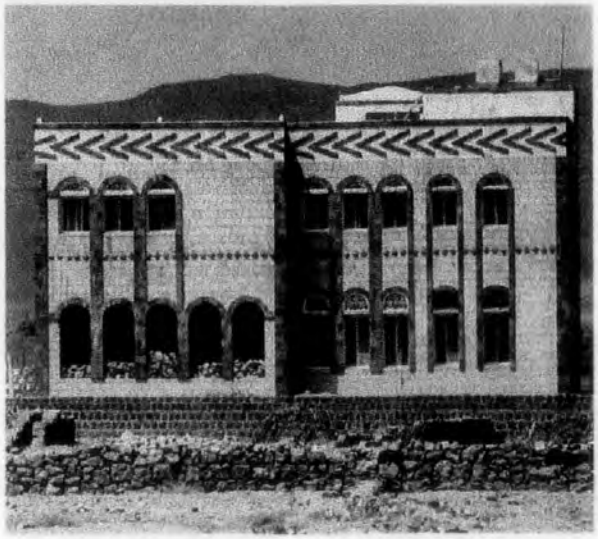




Foreign and Yemeni architects in the mid 'seventies; *top* - View and working drawings of the Annex of the Sa'da Hospital ; *centre, above* - Health and Manpower Institute, Sana'a; *below* - Sana'a University; *bottom left* - Extract of the plans for an ambassador's residence, Sana'a (source G.Erbach); *bottom right* - Villa in Sana'a, one of the first projects by a Yemeni architect; *opposite* - Hotel in Sana'a, friezes designed by a Yemeni architect





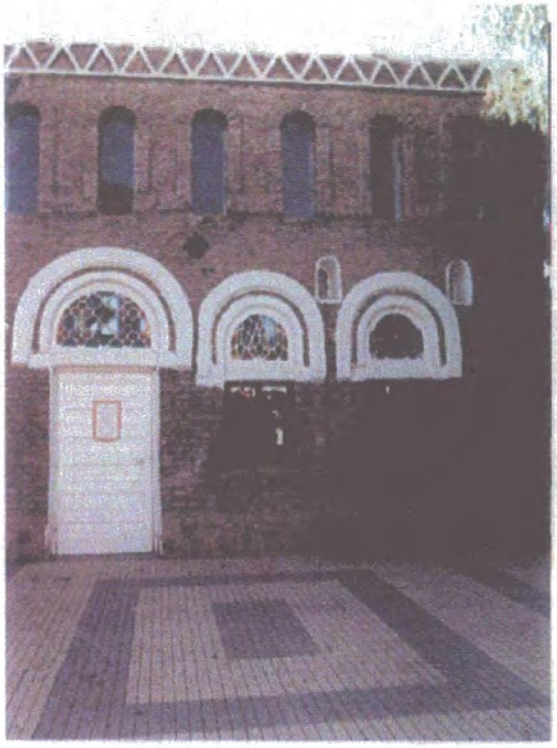


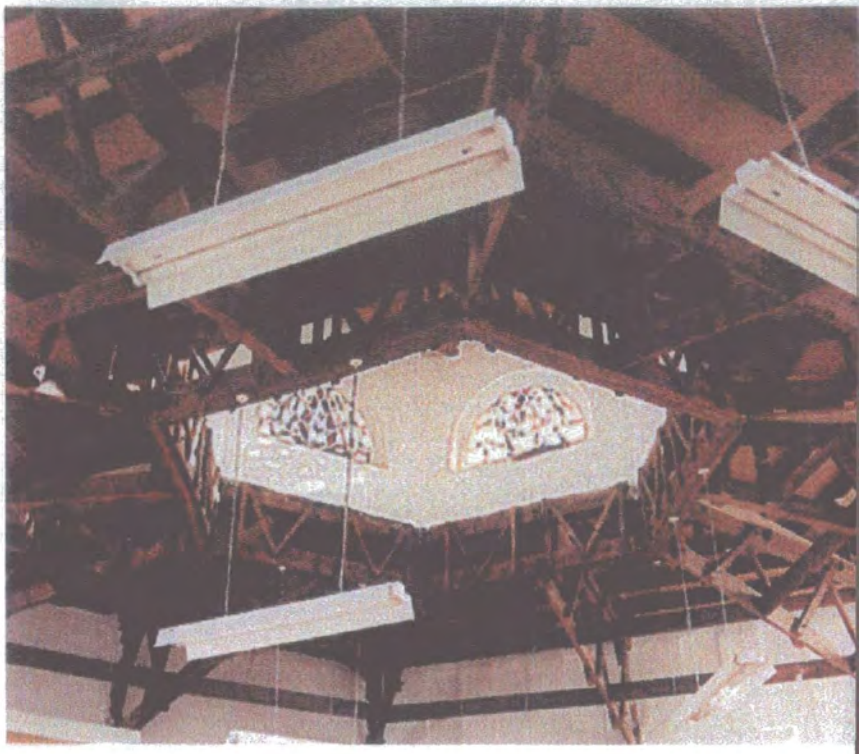
In another approach, traditional methods and materials as the basis of construction, incorporated in a design process that controls the form and aspect of the building. Innovations lie in the introduction of non traditional materials for particular features, usually involving the need of wider spans and in fenestration, with rhythms and sizes considered more adequate to the function of the building, as well as attempts at stylization of decorative features.

Later, large scale interventions- banks, hotels, housing complexes, university buildings - often designed abroad, use conventional modern structures and may adopt textural attavisms, generally reduced to stereotypes and to formal affectations, including stone facing, arches and *takhrim*.

The first Yemeni architects were closely associated with foreign advisors by nature of their role as local counterparts. In their early manifestations, in the mid 'seventies, one sees conventional volumes decorated with versions of traditional decorative friezes and attempts at creating original patterns from the traditional model studied at the drawing board.

In the mid 'seventies a committee was formed that eventually originated the foundation in 1986 of a syndicate of architects and engineers, with 400 members (of which less than 100 were architects), all graduated abroad. In the meanwhile, the Department of Architecture at the Faculty of Engineering of the Sana'a University was founded and its first architects were to graduate by 1992/93.





Foreign architects in the 'eighties: *top* - International School; *centre*- Faculty of Engineering, Sana'a University; *bottom* - National Bank

It seems therefore that we can talk about three basic and at one time co-existing professional categories.

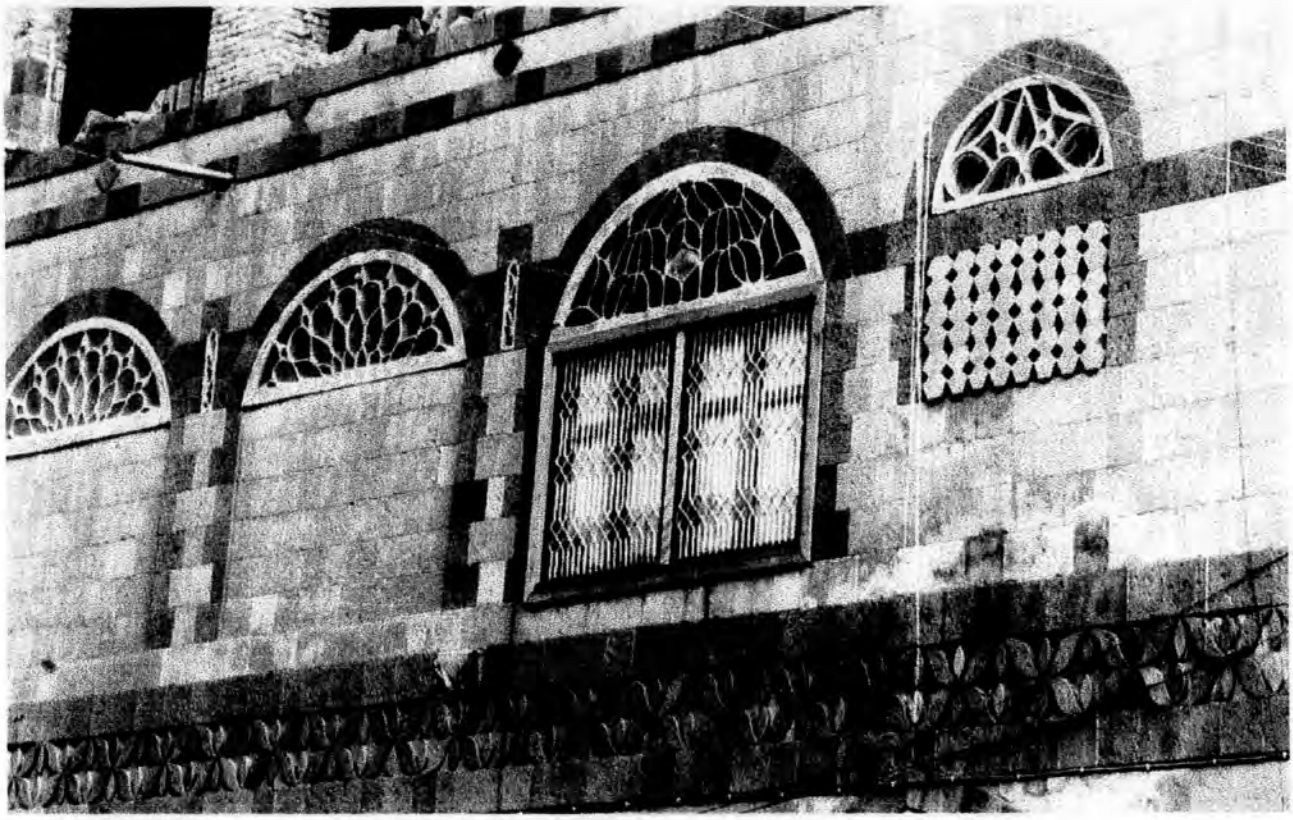
First, there is the designer/builder (*'usta)* for individual clients, interpreting functional, aesthetic and comfort requirements, as well as or better than their clients could do by themselves or with the help of their kin. Repetition of basic functional models is common and decoration, seldom excessive, follows established stereotypes. Variations of basic patterns and design principles are incorporated from one house to another by the same *'usta*. Personalised decoration is rare and recent.

The discipline of the *'usta* is given by his direct knowledge of the materials and methods, which, together with the constraints of the site, condition his capacity for invention and creation. The process of design and construction are totally inter-related.

Another category is represented by contractors (*muqawil*), for whom construction equates with economic profit, assessing the balance between quantity and quality and at the same time meeting the natural or created demands of the market. Ideally the contractor would require assemblers of industrial components and basic prototypes to work with a minimum of variations. The time spent in building becomes important - to build fast is to build cheaper for the owner and more profitably for the contractor. Design is a matter of ensuring proper structures and of meeting the clients requirements with a range of goods that can be produced by the contractor. Custom made projects are produced at the client's demand; but the client's choice is only superficially wider than it was when he was dealing with the producer of traditional bulding models. Regardless of the intrinsic quality of design or origin of a project, the act of building is the foremost consideration.

Finally design-based professions (*muhandis*) - civil engineers and architects - were originally associated with roles in public administration and in family enterprises entering the building trade. Eventually design offices, whether associated with contracting firms or not, took responsibility for large scale ventures.

These professions demand the discipline of drawing and of execution from drawings upon which the quality of detailing is supposed to depend. Models and variations can be created within the restrictions of design but structural or textural "accidents", in the sense observed at the beginning of the previous chapter, have no reason to exist.



Stone work in the early 'seventies by a mason of traditional Sana'ani extraction *(top)* and by a migrant mason *(bottom)*

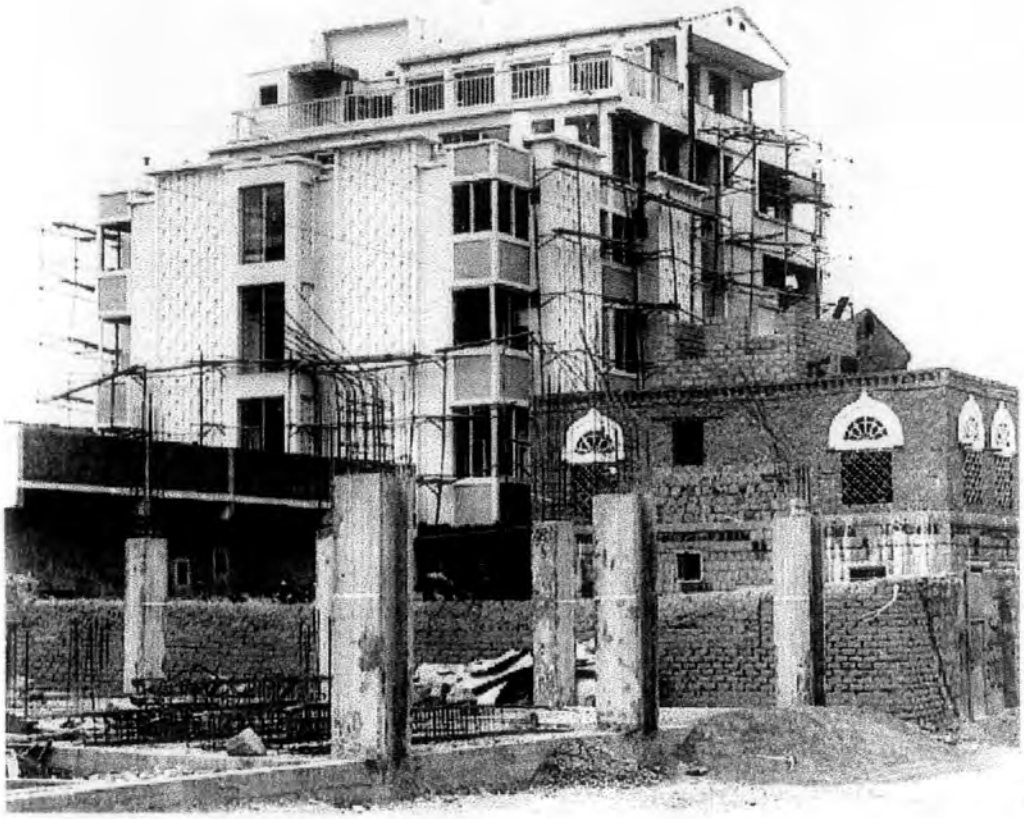
1.2 - The changing role of the ' usta

In the early 'seventies and in the large towns the *'usta* competed on equal terms with small contracting companies, working on the materials he was familiar with and experimenting in concrete. A *'usta* was engaged when his particular skill was required as a master mason or when he had an established reputation for traditional work. Outline plans indicating the general disposition of the rooms might be provided for him, particularly if the owner had in mind some special layout. The capacity of the *'usta* to interpret projects did not go much beyond having to know how to read schematic plans, with the detailing left to his own creative responsibility.

Things became a little more complicated with projects subscribed by the new design professionals. Traditional masons concerned themselves with the general floor plans and might freely interpret the other points of the architect's intentions.[2] Complications increased when concrete construction became widespread. At the same time that he had to learn a deceptively simple technique, the master mason had also to keep up with the more complex commercial and administrative aspects of his trade and face the type of competition in which it was not his skill at building that counted most.

Whether profiting from his past experience as a small scale contractor or from latent talents aroused by the challenge, the *'usta* could nevertheless turn into a prosperous contractor. Or else he could find his creativity curtailed by his integration in a team where the contracting role included the familiarity with bureaucratic procedures and was somebody else's responsibility. Consequently former qualified stone building *'usta* were found working as concrete masons in mundane buildings produced by contracting firms. The individuality and the skill of the *'usta* in this

[2]In Yemen, as in other cultures within the writer's experience, the conventions of a contemporary architectural project could appear quite abstract to a master mason. Plans in general are easily understood, their diagramatic character corresponding to what the mason is capable of imagining and mark out on the ground. Sections and elevations may be incomprehensible. One of the writer's trainees at the Physical Planning Dept. in Sana'a empirically drew plans for houses in which essential information was clear in the floor plan. The elevations were drawn around the floor plan, each one corresponding to its wall. They were highly fantasised and saturated with decorative attributes - including the Yemeni flag waving at the top of the building's elevation. The writer found them rather picturesque but was scandalised when he realized that this man actually provided masons with drawings for new houses. Twenty years later the writer's reaction has been replaced by a different understanding: those floor plans indicated a functional requirement; the elevations represented an intention, and that was all that the mason needed to interpret and build within his feel for materials and aesthetic judgement. It is conceivable that, when detailed drawings and specifications were provided, it was beyond the master mason's comprehension that the intention was so precise and definitive that it took away from him most of what was required of his creative capacity.



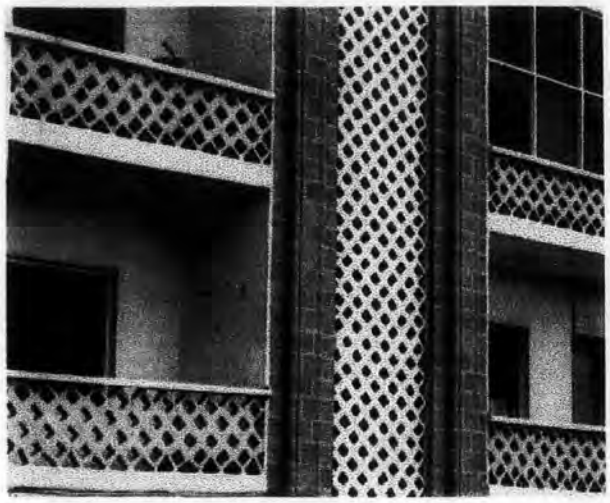
Top - Early 'seventies example of exotic concrete building in Sana'a; ***bottom*** - Current concrete frame and block construction in Sana'a, 1990; *opposite* - New stone buildings in Hajja, 1990

context were affirmed only in the final stages of building when finishings were carried out in stone or brick work. From being at the head of a prestigious profession the *'usta* found himself as part of a labour force, lacking the "paper qualifications" that were putting others in control of the building process.

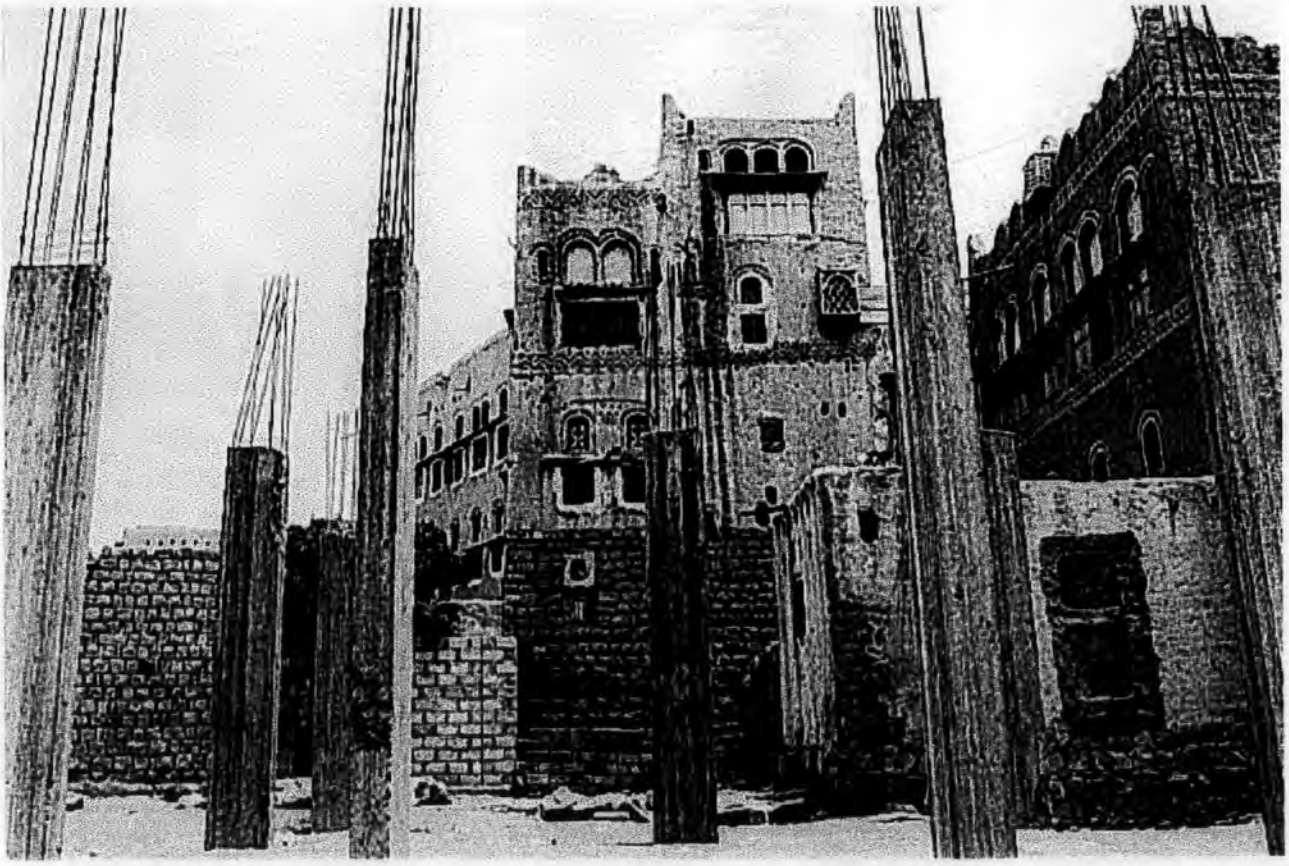
The lowering of quality standards, evident in the stone and brick masonries found at the begining of this process, may largely owe to pressure on the demands for construction. The rigid standards for progression in the professional class were eased, allowing the ascendancy of lesser masons whose qualifications resulted from practice gained in contracting teams. Provincial masons with no proven skills found their way into the melting pot of the construction industry in the larger cities.

Access to reinforced concrete technology appeared easy, once a couple of "tricks of the trade" relative to the structure had been learned. The rest was a question of bricklaying and rendering. Some of the early - and even more recent - examples of empiricism were consequently quite alarming.

It was in the countryside that the work of the traditional master mason gained importance. With the increase in local monetary wealth, a more favourable opportunity existed for specialised work that had once been mostly confined to the town, and examples proliferated of forms and finishings that were in sharp contrast to pre-revolution years.



Top - Early concrete buildings in Ta'iz *(left)* and Hodeida *(right)*; *centre* - Kuwaiti type of school; *bottom* - Rada'; *opposite* - Corrugated metal at Al Zuhra and Ibb



Section 2- Materials

2.1- Concrete

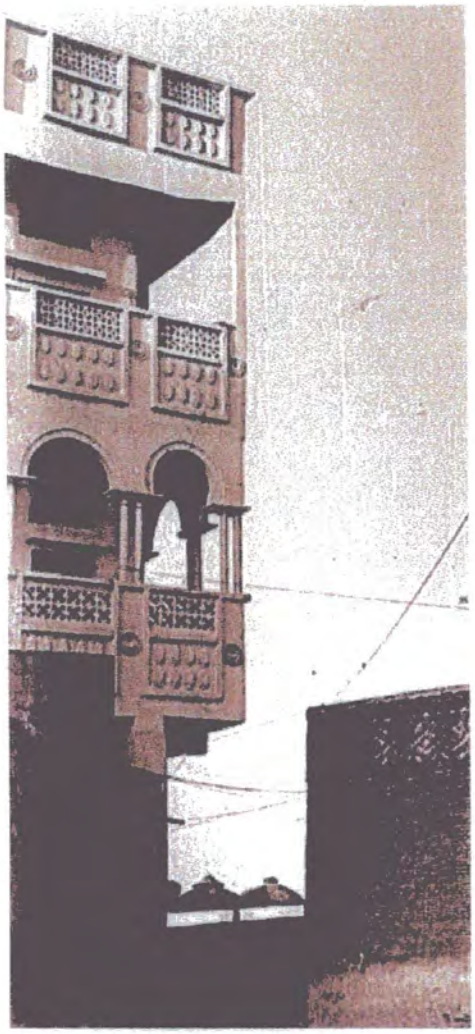
Concrete entered Yemen with the Revolution. According to Etienne Renaud the first concrete building dates from 1963 and was built in Taiz. By 1972 building in concrete was current in Taiz and Hodeida. In Sana'a the spread was more gradual, with typically three or four storey buildings of flats and shops lining the major streets opened up by the Egyptians during the Civil War to form a modern centre for Sana'a. Early post-war foreign aid was responsible for a number of public buildings erected in concrete throughout the country, including the ubiquitous schools offered by Kuwait.

In 1973 a cement plant began production in Bajil, Tihama, and ten years later a larger one opened in 'Amran. By the end of the 'eighties concrete building was taking place in the most remote locations.[3]

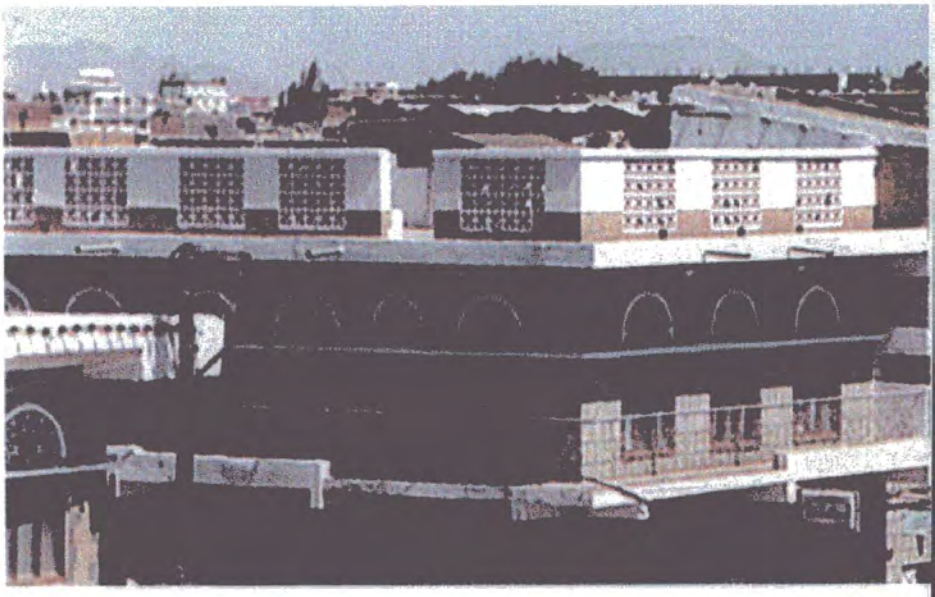
At a certain point concrete was concurring with corrugated metal to devastate the formal equilibrium of the traditional situations, as is evident in the mountains and more dramatically so in the Tihama, where this association has greatly disturbed the quality of both reed and baked brick settlements.[4]

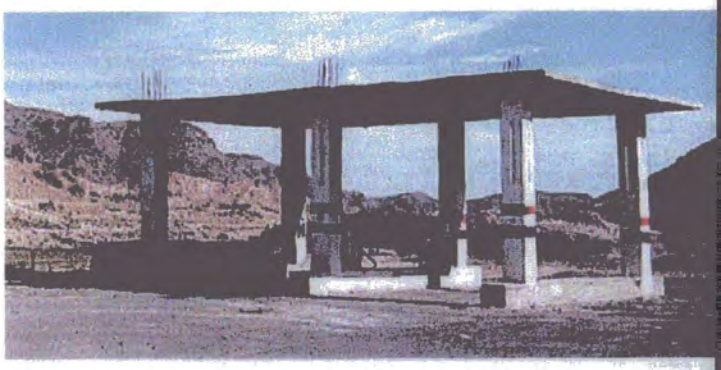
[3]Until 1975 the production of cement was not counted in tonnes; thus in 1969 0.5 million concrete blocks were produced in 20 industrial units of the artisanal type; in 1971, 29 units produced a value of 4,178,000 ryials. In 1975 this value is 22,588,000 ryials, corresponding to 62,500 t, and increasing steadily to 85,300 t in 1981. This figure rises to 200,000 t in 1982, again to 600,000 in 1983 and maintains a regular increase to more than 800,000 t in 1988. See YARSYB:86 and 88.

[4]Corrugated iron was at first moderately used in small elements in the building - in lieu of the *kunna*, for instance, or as shading devices, mostly seen in Tihama towns. However it soon became widely adopted for ancillary constructions, market stalls and substandard or emergency housing, as that used for the victims of the 1983 earthquakes.



Top left - Bayt al Faqih, 1976; *right* - Sana'a, 1990; *centre and bottom* - Petrol stations at Arhab, Yasla, Sana'a and Al Mahwit; *opposite* - New mosque, Sana'a, 1990.





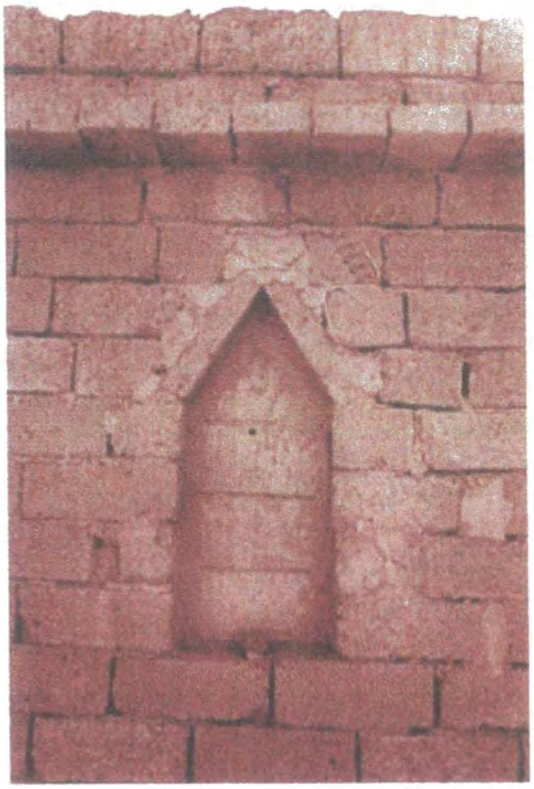
The initial concrete blocks were hollow and either produced on the building site or in vacant lots, in much the same way that has been seen for mud blocks. Solid concrete blocks were produced later, providing an improved performance in walls and being widely used for arches in concrete or earth walls.

Large arches cast with formwork in poured concrete walls were first seen by the writer in 1990. Small moulded arched forms in canopies and balconies were however a common early application. Cement grills are widely used for roof parapets, balconies and, in the warmer zones of the south and coast, for staircases. They have also been incorporated in stone or brick houses and have even replaced decaying plaster screens and arcades in older buildings.

The structural possibilities of reinforced concrete are explored at an elementary level by the ever present cantilevered floors and balconies. Petrol stations illustrated another equally early stage of profitting from its capacity to cover wide spans, requiring only the essentials of open slab and supporting poles, simply decorated with motifs of the popular imagery developed with the availability of coloured paint.

At the other extreme of complexity, domes, always evocative of classical forms, are only recently reaching sizeable dimensions and are still mainly associated with mosques. Applications to public buildings have however also appeared, a pioneering example being the dome of the building for the Ministry of Justice in Sana'a, completed in 1975. Domes in private houses were a most recent innovation in 1990.

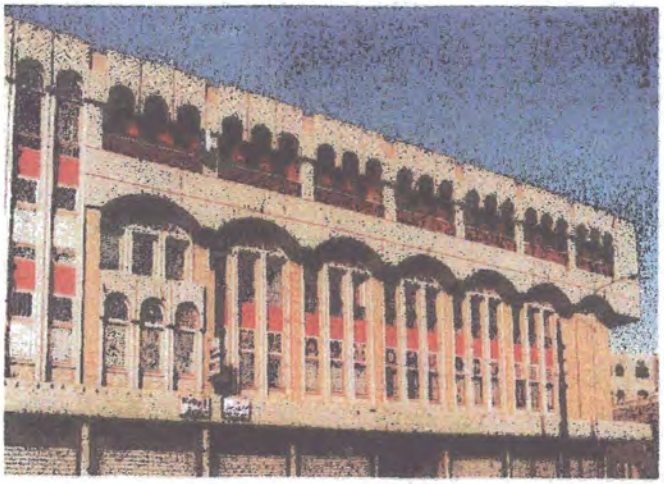
Top left - Traditional language in concrete block construction, Al Khawkha; *right* - Rada'; *centre left* - Guard house, Shibam; *right* - New tower by the road, Huth; *bottom* - Sana'a; *opposite left* - Hajja; *right* - Sana'a



Normally, concrete is rendered and painted but, in the countryside and in the lower cost houses of towns, blocks may be left exposed. Load bearing exposed concrete block buildings are in some cases rather evocative of pre-existing construction, particularly in *libn*. One interesting aspect of this is seen in guard houses in qat fields built, rebuilt or enlarged in concrete blocks, some having the appearance of small quadrangular houses with the same finishes as the main dwellings of which they seem to be an extension. New towers in concrete block maintaining the same formal principles of their older stone neighbours, were seen in Bani Ghutaymi, an area remarkable for its white stone watchtowers punctuating a landscape of desolate magnificence.

Concrete soon appeared combined with such materials as stone and baked brick. Originally, structural elements such as ring beams along the facades might be left exposed, or at the most painted; beams and slabs of cantilevers were similarly left unrendered, as they had been when built in wood. In the last twenty years an evolution appeared well illustrated from leaving bare the structural essentials to develop forms of covering concrete surfaces and critical junctions with other materials. After rendering and paint, other opportunities for decoration were presented by machine-cut stone facing and imported glazed tiles on the customary ring beam and cantilever surfaces. A few entire walls, rather than linear elements, faced with glazed tiles were seen at Dhamar in 1990. In Sana'a and Dhamar a hybrid technique developed in which concrete blocks were used for the inner skin of walls faced with baked brick or cut stone.

In 1990, one of the problems was still designing for climate. In tropical and sub-tropical areas the comfort of concrete buildings depended to a great extent on air conditioning and no examples were found of simple improvements such as cavity walls. Stone facing was considered to provide sufficient thermal insulation by those builders interviewed.



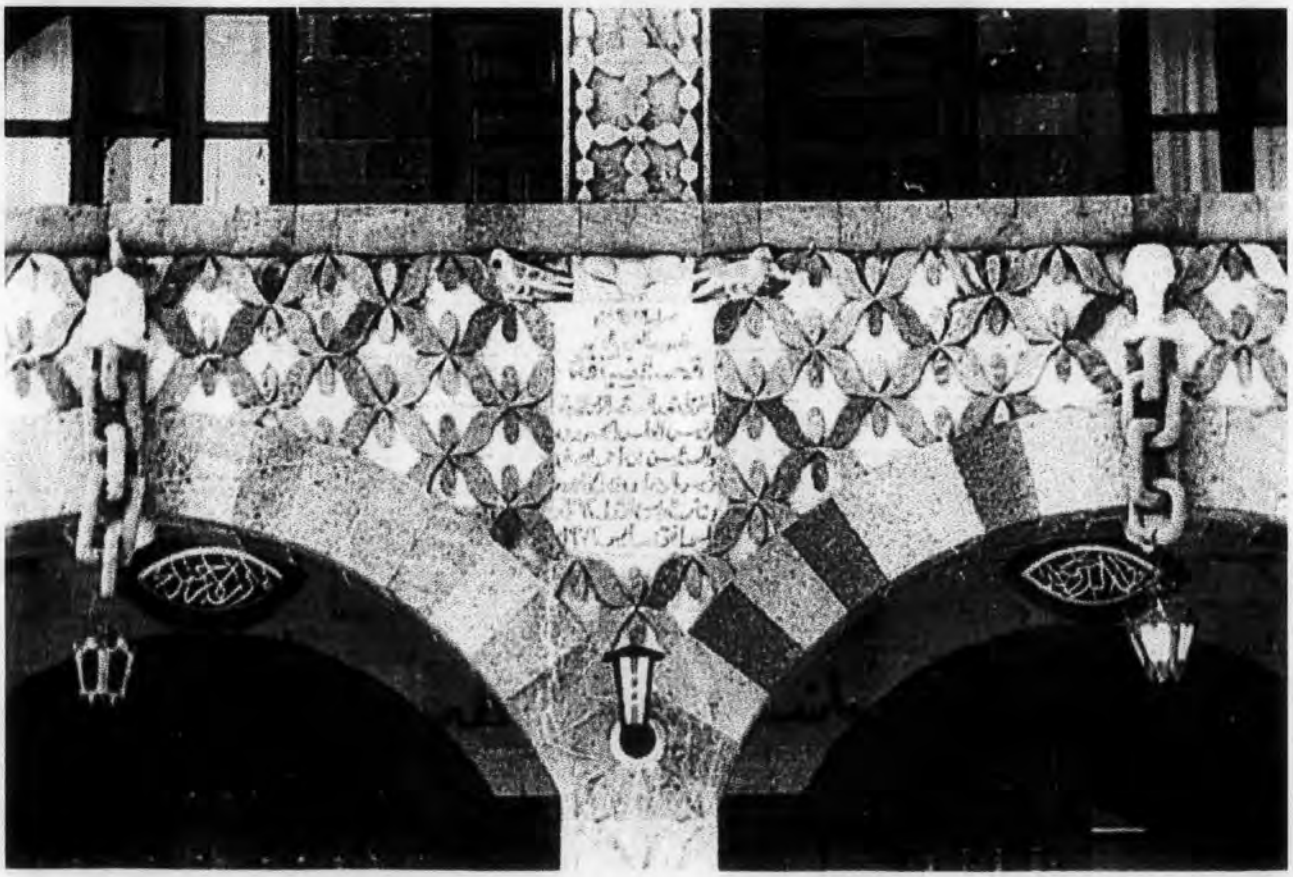
Top - Sana'a; *centre left* - Hajja; *below* - *Jubban* ; *right* - Rada'; *bottom left* - Al Dahi, Tihama; *right* Wadi Surdud; *opposite* - Al Khawkha, Tihama

The results so far obtained by strictly industrialised concrete construction are comparable to those seen in other Arab countries with various versions of "muslim arch" adorning what would otherwise be simple concrete canopies, cantilevers or balconies. In the main cities the concern with quality of finish is progressively more evident but no examples had yet appeared to be particularly innovative or imaginative.

In the countryside, however, distinctive patterns are more freely applied. Concrete may assimilate the general local morphology as it happens around Rada' where concrete block constructions have adopted the forms of the pre-existing severe, but rigorously executed, earth block and stone architecture. At the same time that it may offer a surface where more or less idiosyncratic painted decoration is applied. Some stereotypes appear, with a definite rule of design and execution (such as simple round motif stamped between windows) but mostly they are the work of the tenants or of the local handyman and, as such, highly personalised interpretations of the classic rhythmic patterns or attempts at a new imagery.

The present picture is still insufficiently developed to identify constructive trends in what often appears to be a confusing process of dissolution and re-combination. Nevertheless, solutions, imaginative in their simplicity, are worth noting such as the examples seen in Khawkha, on the coast, and in Wadi Surdud, at the foothills, the former repeating volumetric models of the traditional brick houses, and the latter bringing forth a decorative individuality that is all the more striking when compared with the very simple transition forms that predominated in that area. In Al Zuhra concrete appears at the same time as a major factor of desaggregation of the traditional fabric and a new pretext for decoration, bringing to the outside the painted decoration that was characteristic of reed house interiors.

Stone quarries at Al Mahwit *(top)* and Ibb *(centre); bottom* - Detail of Government Guest House, Sana'a, 1972



2.2- Stone

QUARRYING

Stone was originally quarried on the site itself or from its immediate vicinity. In the early 'seventies men would still go to the quarry with a pick-hammer and donkey. Although traditional stone quarries were not specifically researched by the writer and may therefore have been overlooked, the most obvious scars left by quarrying are those of recent origin. Stone quarried within sight of the road is now common: small slopes or rock outcrops provide a convenient resource for the limited demands of a small area, while larger sites satisfy almost countrywide needs.

Stone quarrying peaked between the mid 'seventies and the mid-'eighties but during the next decade dropped to less than half this peak.[5]

CONSTRUCTION

The bad quality of reinforced concrete construction in the early 'seventies worried both foreign advisors and national leaders and a reversion to construction in local materials was recommended, as exemplified by public buildings then being erected.[6] However it may be that, rather than the official position, it was the identification of stone with permanence and status that was responsible for its widespread adoption in the private sector and its rapid countrywide acceptance, although increasingly combined with reinforced concrete.[7]

Concrete slabs became in any case a common way of building floors and roofs, justified mainly by the scarcity and spiralling costs of timber. A mixed technique evolved, in which concrete columns existed only at the ground floor when wide contiguous spaces, such as commercial showrooms, were required, the rest of the building being of load bearing walls braced with concrete ring beams and slabs. Other elements formerly made in wood - such as window and door lintels - were reproduced in concrete, regardless of the material in which the walls were built.

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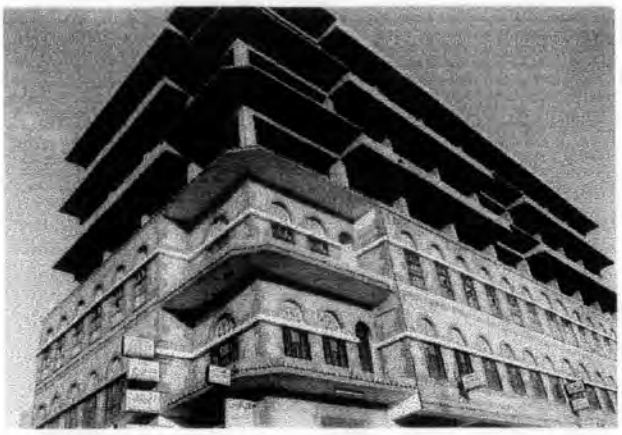
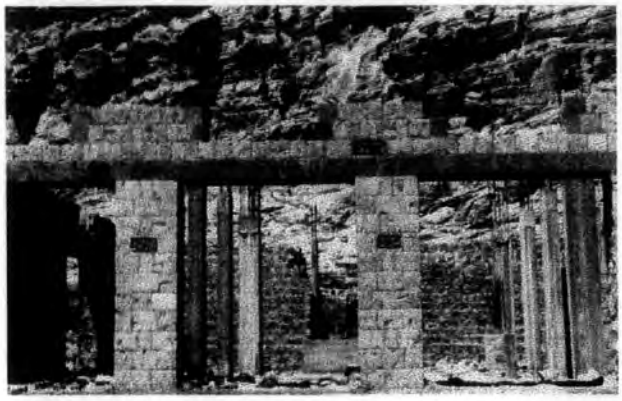
[4]Corrugated iron was at first moderately used in small elements in the building - in lieu of the *kunna*, for instance, or as shading devices, mostly seen in Tihama towns. However it soon became widely adopted for ancillary constructions, market stalls and substandard or emergency housing, as that used for the victims of the 1983 earthquakes.

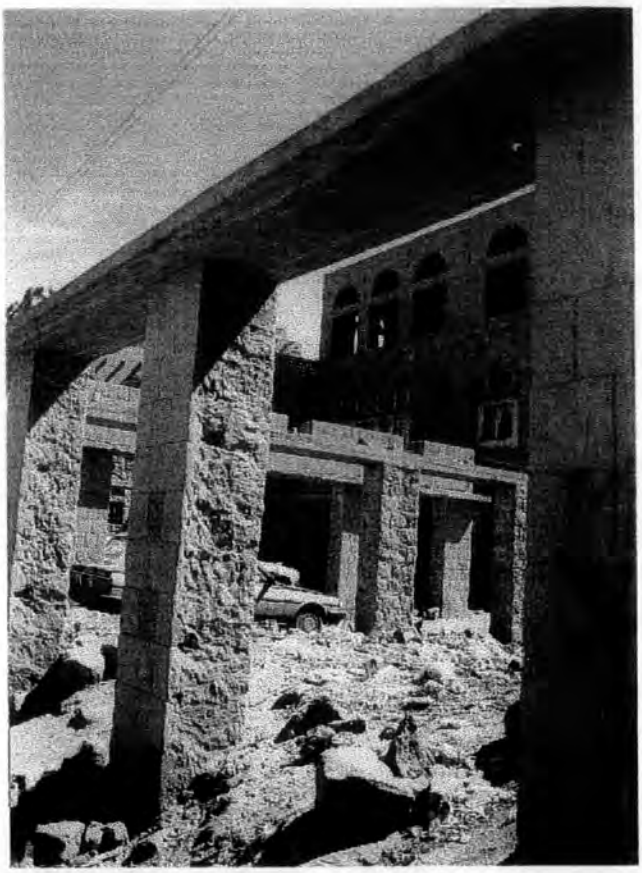
[5]Stone production was measured in units (blocks) in 1969 (128,800 units); in money value in 1971 (1,418,000 Y.R.) and 1975 (24,300,000 Y.R.). In 1975 this corresponded to 750,000 tonnes, i.e., approximately 280,000 m3. The measure adopted later was cubic metres, this being the production of the eighties: *1984*: 509,000; *1985*: 478,000; *1986*: 360,000; *1987*: 247,000; *1988*: 233,000. To facilitate comparison the value of 2.7 tonnes - equivalent to 1 m3 of limestone - was adopted to convert the values of 1975. (YARSYB:71 to 88).

[6]The paragon of stone masonry of this time was the government guest house annex to the Republican Palace, built by a skilled mason of a Sana'ani lineage of *'usta*, a project supported by the UNDP at the Ministry of Public Works.

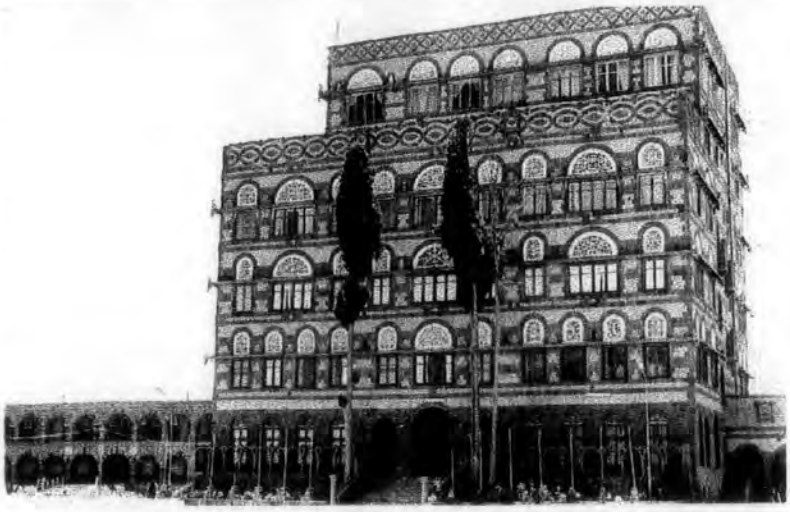
[7]The apparent redundancy of concrete frame concurring with stone load bearing walls was a frequent object of criticism by foreign experts.







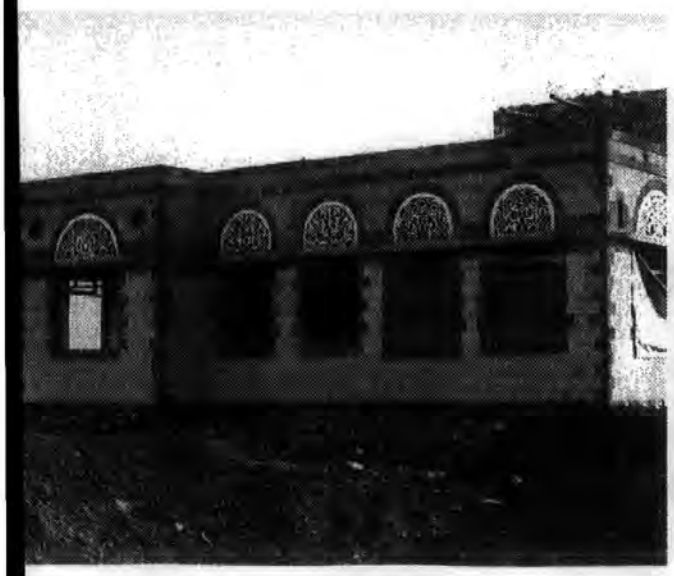
Top left- Sana'a and, *below*, Al Tawila ; *right* - Dhamar; *centre*: Sana'a; *bottom* - Imams' buildings: entrance of mosque part of Ta'iz palace; and former palace in Sana'a (now Republican Palace); *opposite* - Characteristic stone masonry in the mid 'seventies at Sana'a *(left)* and Bajil, Tihama *(right)*



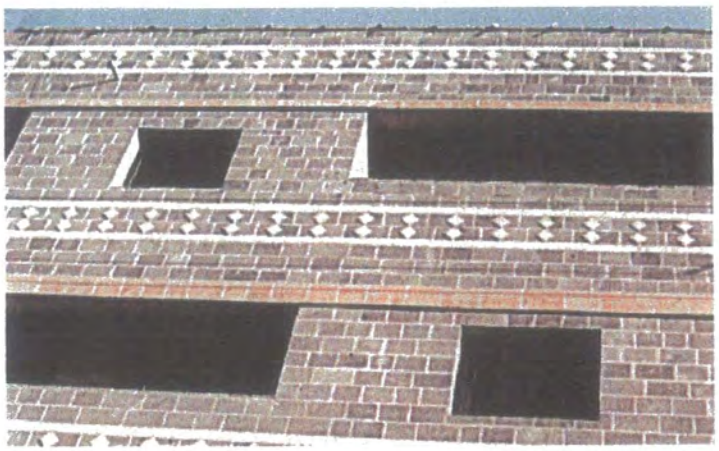
In the larger towns, one important standard of stone architecture was set in the time of the last Imams - Yahya and Ahmad - and exemplified in their former residences and public buildings, mainly in Sana'a and Taiz. They display some fairly bold structural features, such as arches for wider interiors, typifying as well a model of smooth finish and hairline joint stonework with a preference for black lava stone in quoins, friezes and around openings.

In the countryside, local typological and formal variations resulted from the increased facility for transportation and expanding road network. They were seen either to adapt traditional volumes to the characteristics of cut and colour of new stone, or to reflect the influence of the formal conventions of the larger towns. At a later stage the opposite also became true, when many individual constructions in the major centres adopted the vocabularies of the original regions of the new residents or showed personalized versions of the urban idiom they found.

The northwards migration to the main towns by southern masons contributed to the formation of syncretic styles. Their technique was coarser but faster and more showy, introducing open joints and unusual cuts, such as hexagons, which were perfected with time and mechanization. Initially they might have been used only for the lower floors or urban yard walls but eventually they were largely adopted in the flamboyant creations that are particularly obvious in the south and in the coast.

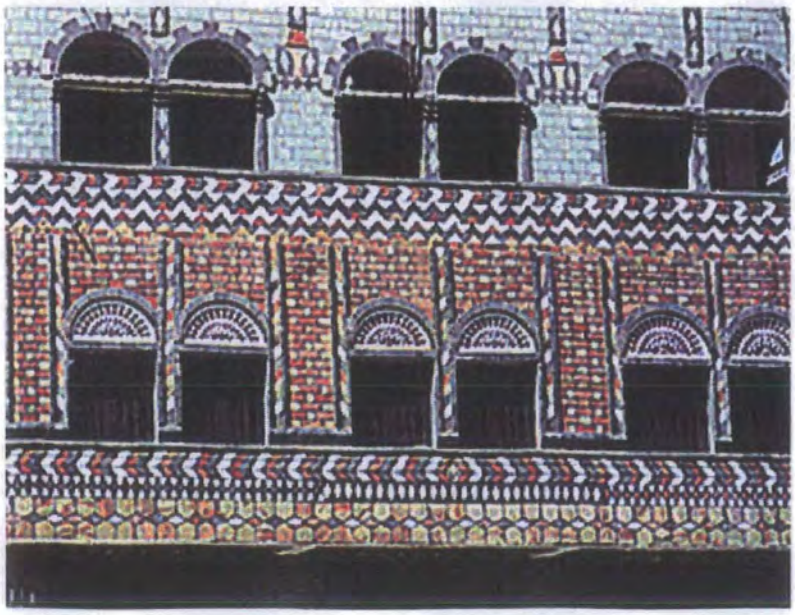


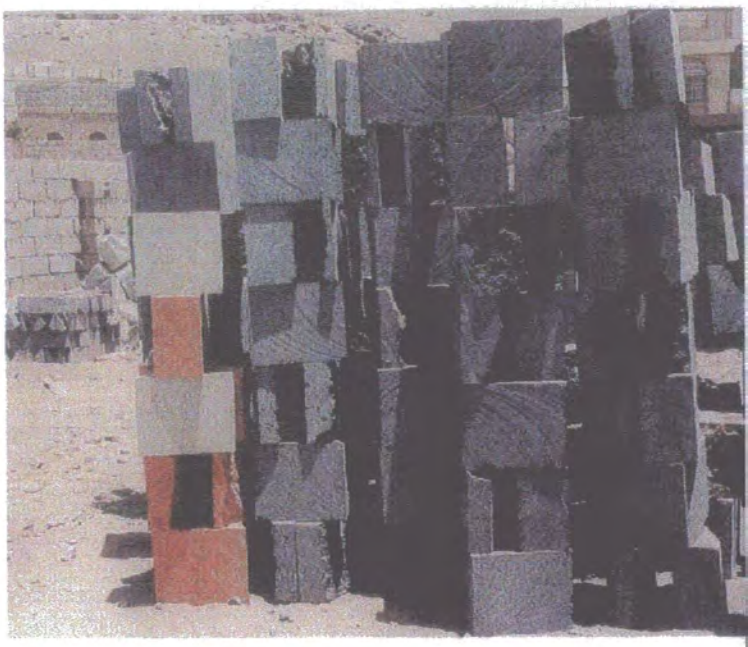
Top - Traditional and recent stone masonry, Hajja; *centre* - New buildings in Sana'a *(above)* and Ibb; *bottom left*- Jubban; *right* - Al Dahi, Tihama; *opposite, top left* -Rada'; *right* - Early example of exotic stone work, Sana'a, 1974; *bottom left* - Jubban; *right* - Ta'iz



From the early 'seventies to the mid 'eighties, major trends appeared to be established. Both in urban and in rural areas, dry stone masonry or masonry with mud, lime or gypsum mortars, tended to be replaced by masonry using cement mortar even in dressed stone with hairline joints; ashlar masonry became widespread, with a variety of finishes and treatment of joints ranging from rough mortar to painted stripped and straight lined joints; various colours of stone in the same building were widely adopted; and mechanical sawing of stone was introduced.

The variety of coloured stone available in the country - from black basalt to white sandstone, with grey, green, orange, yellow, brown and pink lavas in the middle - increased the possibilities for inlaid designs, juxtaposed courses or simply random patterns of different colours on the same wall. Mechanically cut stone facilitated this process and some of the new buildings use almost deliriously the full range of available colours.





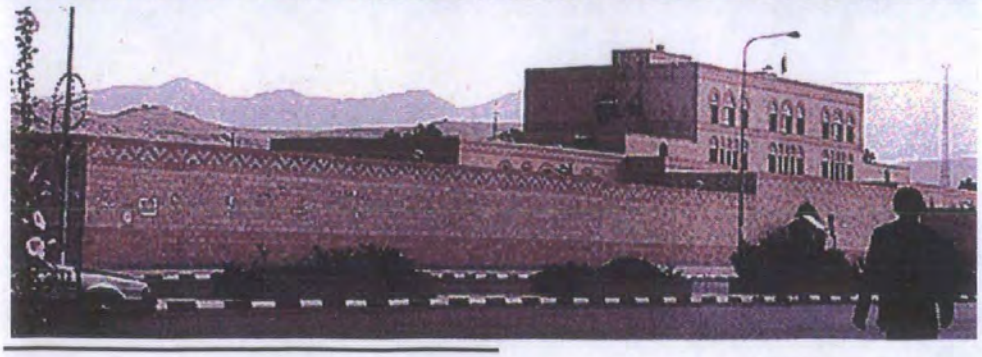
Top- Stone cutting workshop, Sana'a; *centre-* Machine-cut blocks *(left)* and facing, Sana'a; *bottom left* - Stone facing, Sana'a; *right* - Marble facing, Sana'a; *opposite top* - Finishing machine cut blocks by hand, Dhamar; *bottom* - Building of hand finished machine cut blocks, Sana'a

MACHINE CUT STONE

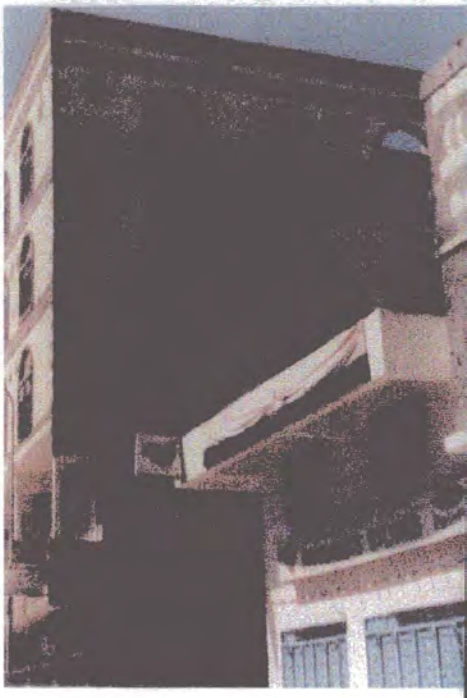
Machine cut stone appeared around 1984 in the major towns and has contributed to a revolution in the construction methods and appearance of the buildings: if former stone reliefs could be compared with woven patterns, the inlaid work developed after the introduction of cutting machinery is rather more evocative of marquetry. Stones are cut in blocks, for solid stone walls, or in thin tiles to face up concrete block walls and form decorative motives, usually in friezes. Often only the main elevation of the building is clad in stone the other walls remaining in concrete block. The standard designs borrow both from traditional stonework, such as the ubiquitous simple diamond rows, and the themes that used to be specific to brick decoration, typically in Sana'a and Dhamar.

Polished marble for wall facing or flooring is a recent industry.[8] In 1990 the facing of whole buildings in marble was still unusual, but its use in the composition of decorative motifs was already fairly common in Dhamar where it was a distinctive feature.

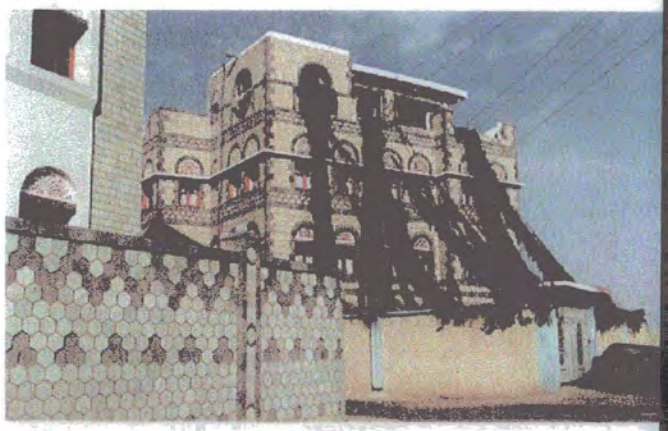
Hand hewn stone has continuously developed in the countryside, especially since the late 'seventies, whereas in the main towns it was at a certain point taken as a sign of rusticity, with machine cut stone preferred. Then, once again, it became a symbol of the good workmanship only affordable by the prosperous. A recent sign of greater distinction is to hand-finish the stones that come machine cut from the shop.

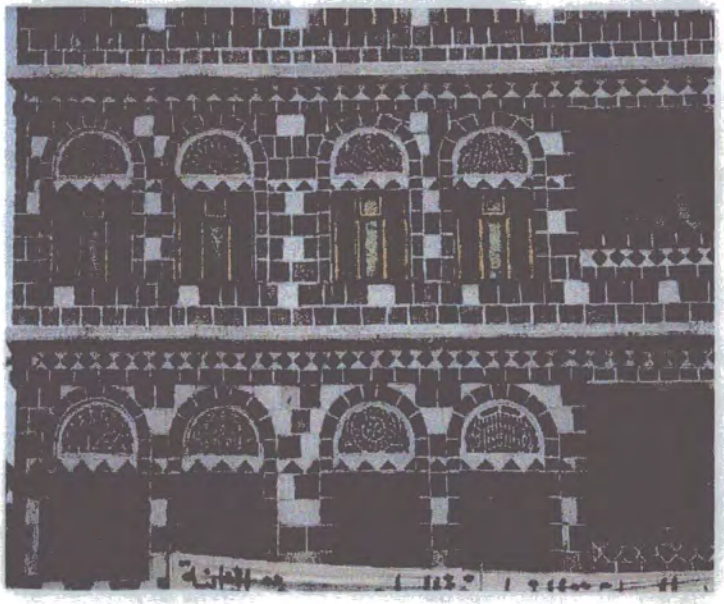


[8]Production of marble in m2: *1975*: 171; *1984*: 69,000; *1986*: 10,000; *1987*: 32,000; *1988*: 39,000. (YARSYB:75 to 88)



Top and centre- Sana'a; *bottom* - Ibb; *opposite* - New forms in friezes of 1974 *(top)* and 1990, Sana'a



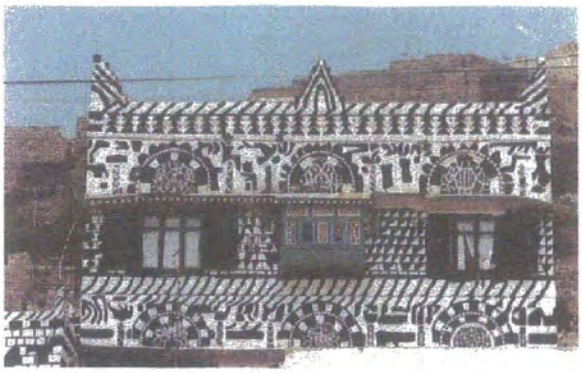


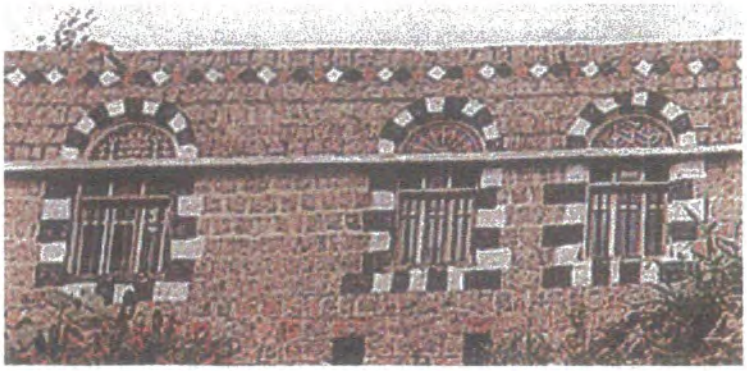
The distribution and the quality of stone work reflect the general economic framework of those years: on one hand, the influx of cash revenues led to increased production; on the other, outmigration reduced the labour force. Building in stone, whether in the most expensive hand cut blocks or the cheaper machine cut facing , has consequently increased in cost and become prohibitive to most of the urban population.[9]

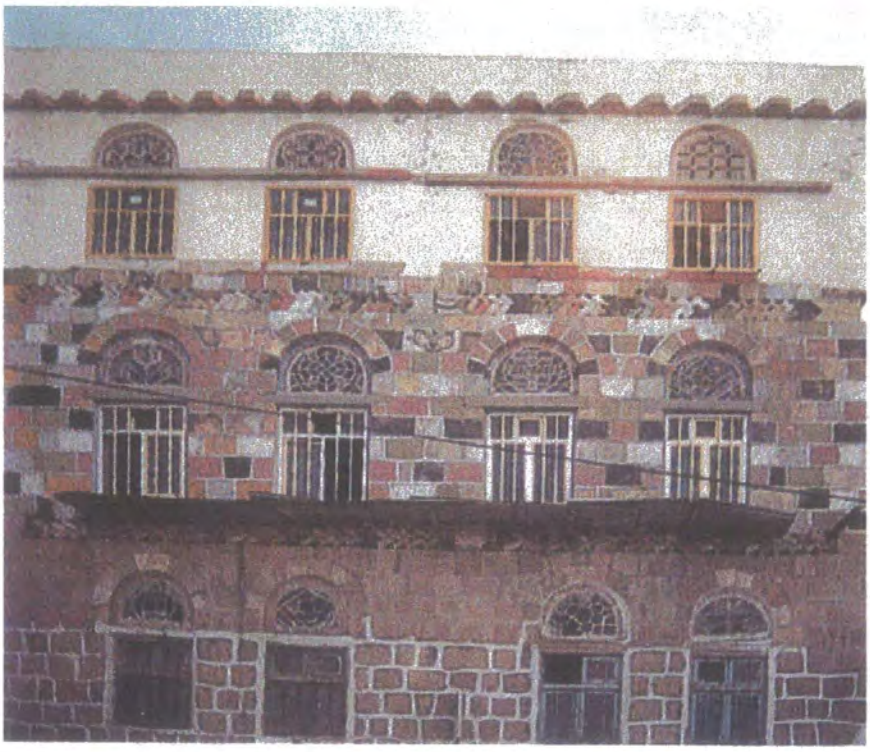
In some cases new stone has replaced the material that once defined the style of an area and even its dominant colour. For example, in Sana'a, the architecture of cream coloured stone and brick, with reliefs enhanced in white plaster, resulted in the golden ambience that was part of the city's beauty. The multiplication of brown /grey lava walls adorned with black lava at the corners, around windows or in friezes, even if affiliated in an established local model, gave the city a more somber tone. Ibb, on the other hand, went from an imposing austerity of light stone volumes and subtle embelishments to bold coloured stone and inlays, painted cement and golden aluminium frames.

Stylization of the traditional vocabulary usually tends to simplify the designs, sometimes deliberately attempting new forms. Recent examples have abandoned traditional motifs in favour of greater simplicity, with occasional elaboration in selected areas such as the entrance.

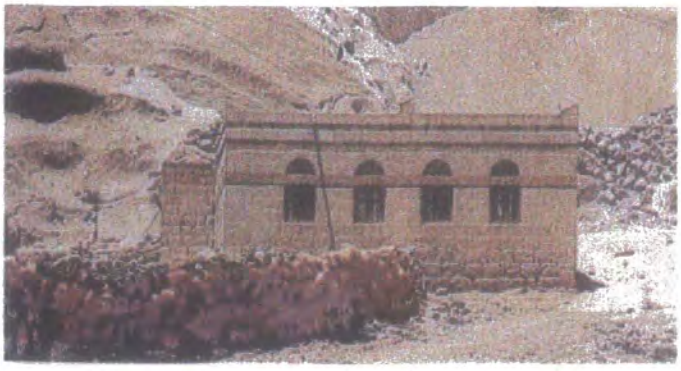
[9]The cost of some "villas" designed and built by a variety of teams - Yemeni, Chinese, German, Korean - in the new quarters of Sana'a, neared the million dollar mark in 1990.







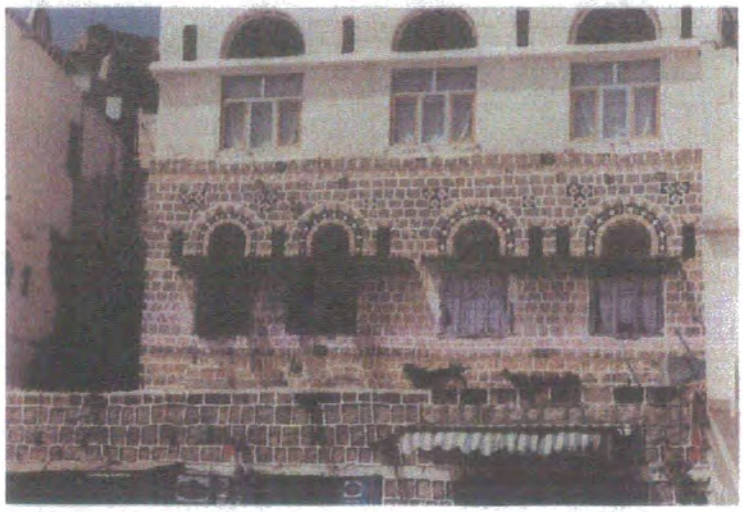
Top – Hajja; *centre* - Ibb and, *below* , Bainun, Al Hada; *bottom left* - Jubban; *right* - Mithal, Al Hada; *opposite*- Dhamar: marble and lava inlays



The composite language developed in the last twenty years is not peculiar to major towns, stone being part of the new physiognomy of settlements everywhere. Sometimes, and mostly in the countryside, coloured paint is applied directly on the stone wall, either in overall patterns or painting individual stones in different colours. Characteristically simple provincial decorations consist of using coloured paint to create motifs in friezes and by the openings, a trend that was maintained and developed throughout the period covered by this study. More remote areas have kept their standards and procedures integrated into buildings whose modernity is shown in the adoption of new types. Openings may be discreetly enlivened in bright colour as seen, for example, at Al Hada.

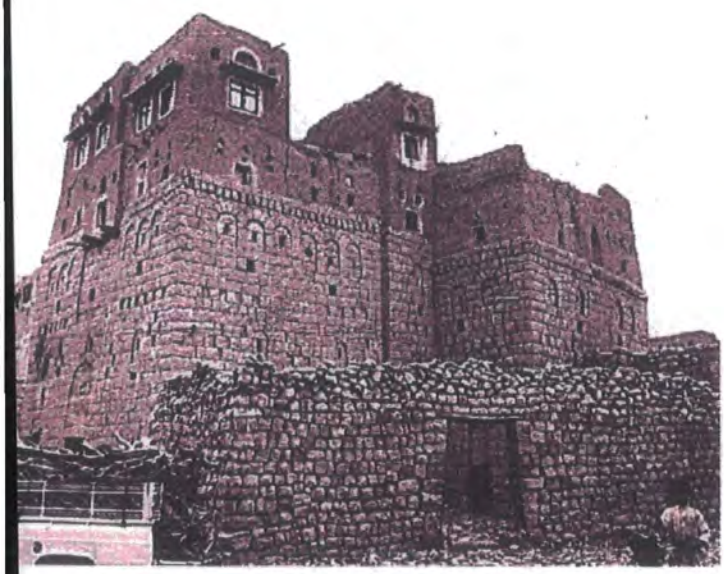
At this point the originalities shown from one region to another are not sufficient to encourage definitive statements on developing regional styles. Nevertheless some trends are now, in themselves, clear enough to place, at the first sight, a building in its regional context.

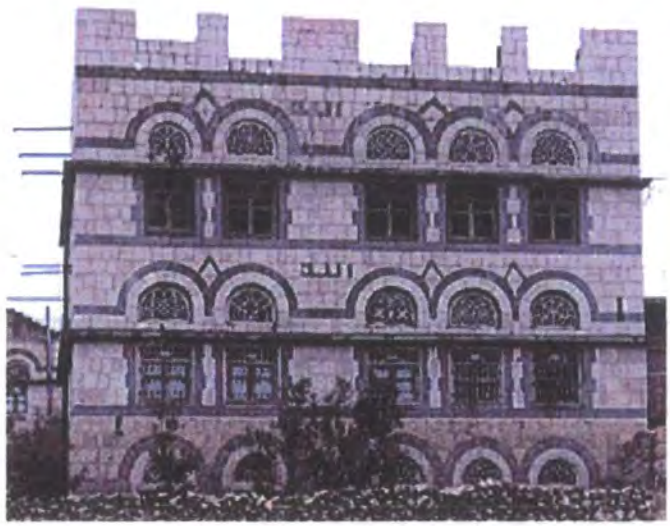
Thus one can safely say that there is a treatment of materials and decorative options which is characteristic of the southern half of the country, centred around Ibb and Taiz, and that the stone construction developed in the Tihama is closer to this than to the more sober conventions of the major central highland towns of Sana'a and Dhamar. These in turn show their own peculiarities owing to conventions inherited from their pasts, such as the alternance of black and white bands at Dhamar, seen in century old buildings, and which has become part of a more effusive decoration with common aspects with the capital.

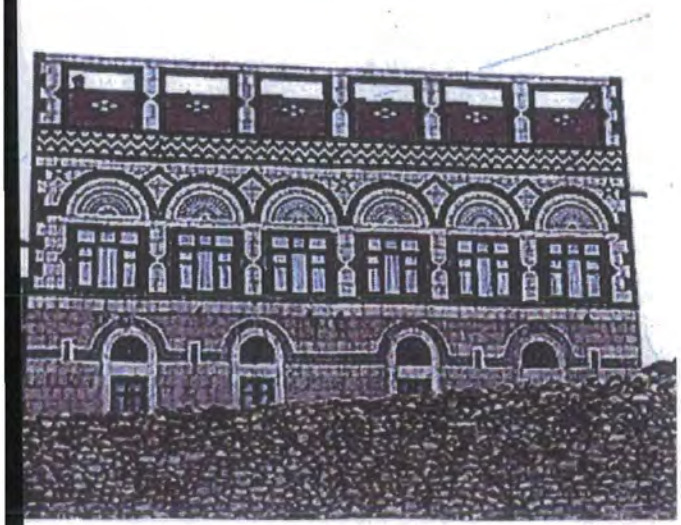


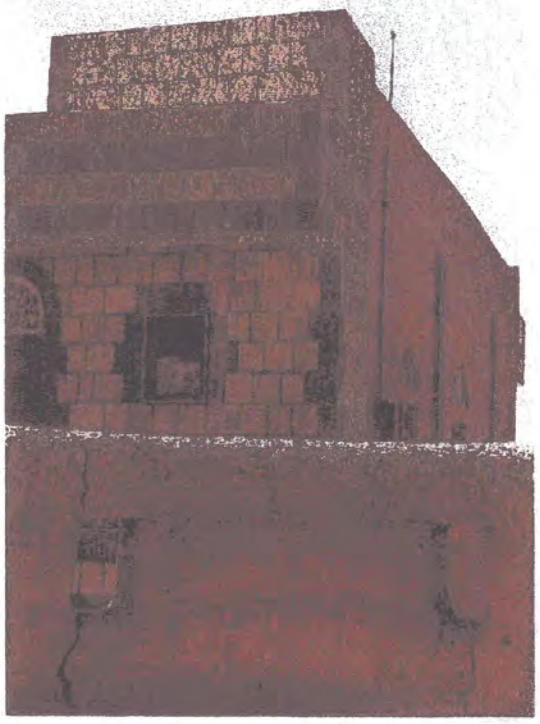
Traditional and modern forms at Hajja *(top)* and Jubban *(centre and bottom)* ; *opposite* - Traditional and modern buildings at Khamir

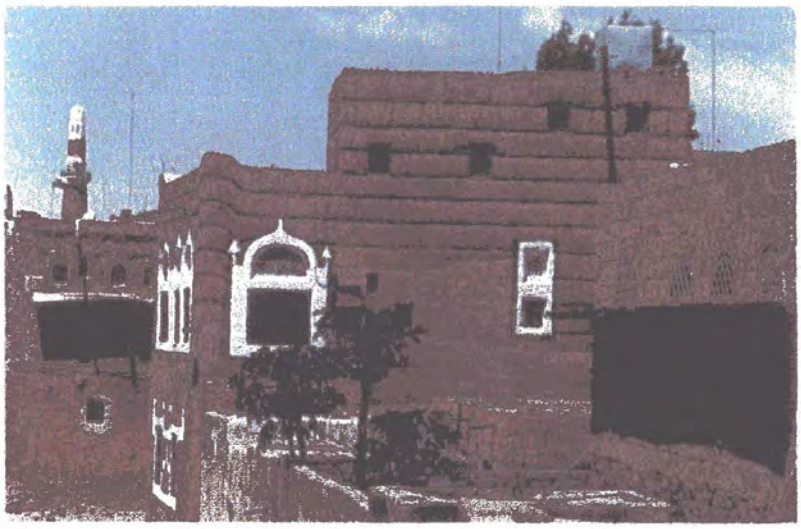
In the Western mountains, as at Hajja, an urban stone idiom has been developed, divested of much adornment but emphasizing secondary features such as the enlivening of joints on new types of ashlar masonry. At Rada'/ Jubban, a region that has for a long time provided emigrants for the United States and the rich countries of Arabia, the new architecture is remarkable for the quality of its finish and the judicious combination of pink and darker stone, grey or black, in restrained alternate bands, but sharply contrasting with the severity of traditional construction. At Huth and Khamir the austere towerhouses, subtly adorned with slightly recessed stones in friezes or around openings, have given place, after a phase of whitewashed designs on the stone wall, to a much more flamboyant decoration, involving reliefs in black stone, and colour applied to secondary elements in other materials.











This page and opposite - Zabur, stone and concrete in Sa'da, 1990

2.3- Earth

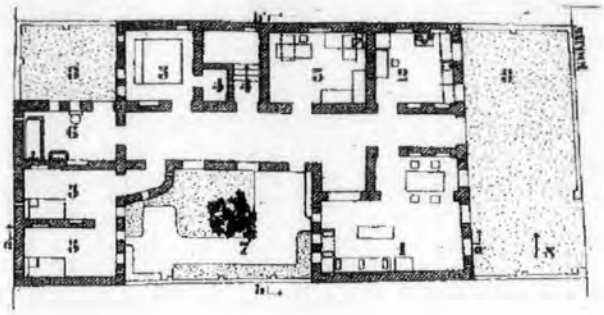
Earth construction was in many ways the most affected by the impact of new materials, procedures and fashions.

In the areas of predominantly coursed clay (*zabur*), the technique continues active but its cost, if entrusted to a professional builder, has become as high or higher than stone.[10] Concrete blocks have been used not only to make new constructions, but also for additional floors in existing buildings and to provide an increase in the number and width of openings. The blocks are laid on a reinforced concrete ring beam resting on the *zabur* wall.

In some cases, the writer had doubts about the structural soundness of some combinations when the desired effect appeared to ignore the structural behaviour of the materials.[11] This aspect of the builders' attitude - a degree of adventurousness and apparent carelessness - has been mentioned in relation to traditional construction. One fears however that extrapolations to insufficiently matured techniques risk not being as successful.

[10] In 1990 stone cost 2,400 Ryials/m2 and *zabur* 2700 Ryials/m2.

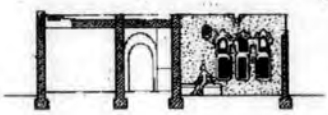
[11] For instance, in some new *zabur* walls, instead of the limited fenestration of the traditional buildings, additional and larger windows were framed with lintels or concrete block arches, the intermediate small sections of *zabur* performing as the load bearing wall for the ring beam and roof or floor above.



1 living dining 5 bedroom
2 kitchen 6 bathroom
3 office library 7 garden
4 storage 8 yard

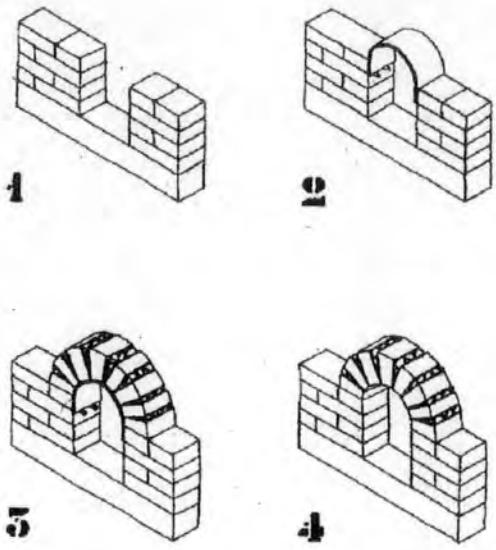
scale 1/100

section a-a'



section b-b'

BUILDING OF A MUD BLOCK ARCH WITH A FLEXIBLE STEEL SHUTTERING



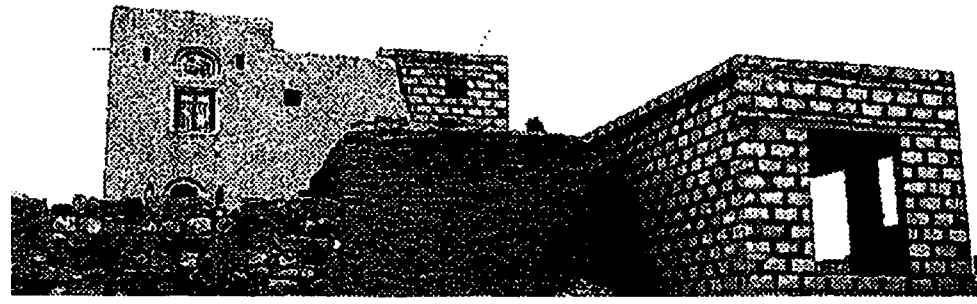
Top and centre - Plans of demonstration house in *libn*, Sana'a, and building a mud block arch with flexible steel shuttering, Sana'a, 1972 (source Bertaud:71); *bottom* - stone and *libn* building, Rada'; *opposite* - stone, *libn* and concrete block, Rada', 1990

Radical changes are most evident in the use of earth in blocks, especially sun-dried blocks (*libn*), whose production has been visibly reduced in the rural areas to be nearly extinct in the major towns.[12]

In the early 'seventies, Alain Bertaud, the U.N. expert at the Ministry of Public Works, led a campaign to encourage the continuity of *libn* construction, based on its performance and cost versus that of concrete,[13] which was already taking a share of 20 % of the houses built in Sana'a during 1970.[14] Further arguments against concrete involved the inadequacy of the sand in Sana'a - being too rich in organic material - and the dryness of the climate.

Bertaud demonstrated the value of *libn* in terms of cost-benefit by the construction of prototypes such as the house where he lived and a shop for the Tourist Corporation, for which he devised a flexible shuttering to build relatively wide structural arches in mud block. The quality of these buildings was generally recognized but, unlike what had happened with stone, the authorities did not accept the idea of large scale projects in *libn*, which they considered a sub-standard material. The utilization of *libn* decreased so much that by 1990 the possibility of using earth in large scale urban construction was slim. With the expansion of the city, the best places to extract mud were built over and the kilns of Sana'a abandoned.

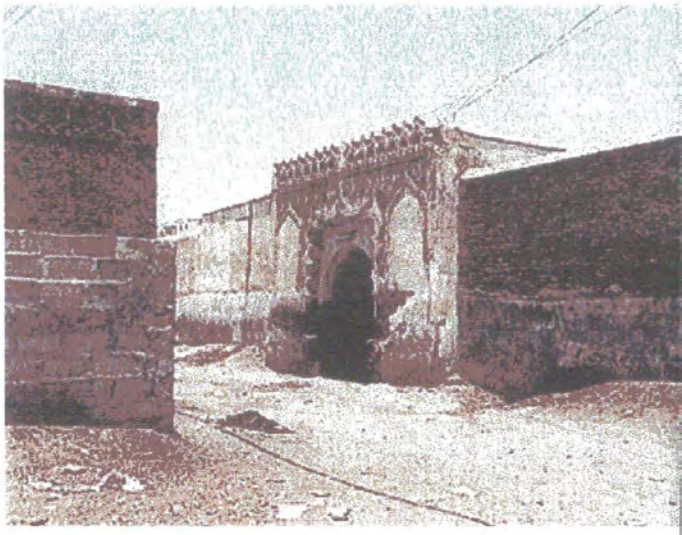
The comparative cost of concrete is now lower and, even in the remote countryside, the less status conscious buildings are in exposed concrete block load bearing walls, with wood and earth roofs. As such they are often built using the methods of traditional mud construction except for the material of which the blocks are made and the way of bonding them.



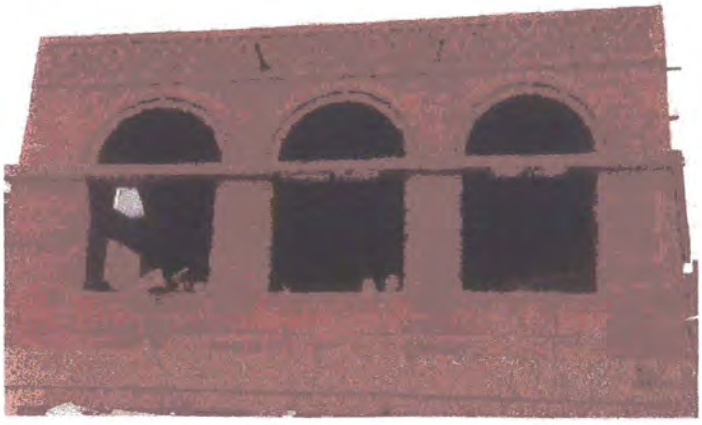
[12]In 1969 production registered in the YARSYB was of 33.800 units, in seven establishments; in 1972, 22 establishments employed 192 workers, producing a value of 1,862,000 Ryials versus 2,838,000 Ryials and 308 people engaged in the production of cement blocks, tiles, etc.; the following YARSYBs do not mention clay bricks in the country's industrial production.

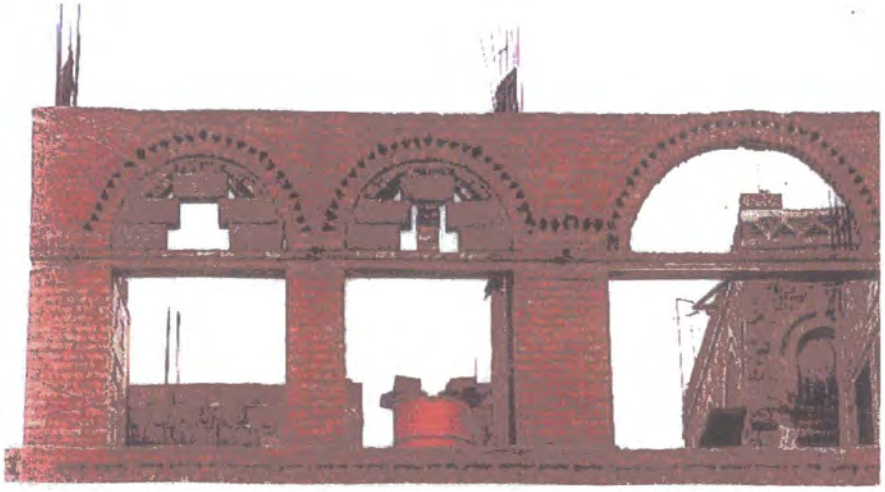
[13] Concrete replacing timber in roofs, lintels and tie-beams was, however, considered acceptable for its economical advantages.

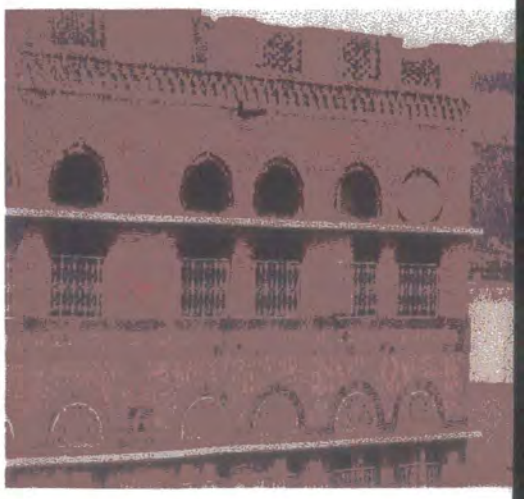
[14]Bertaud:70.



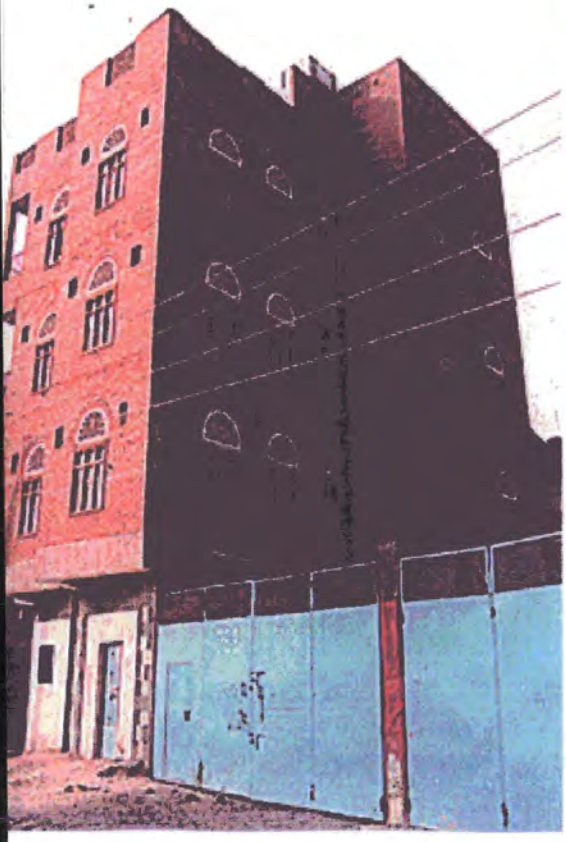
Top - Al Dahi, Tihama, 1990; *centre, bottom and opposite* - Sana'a, 1990



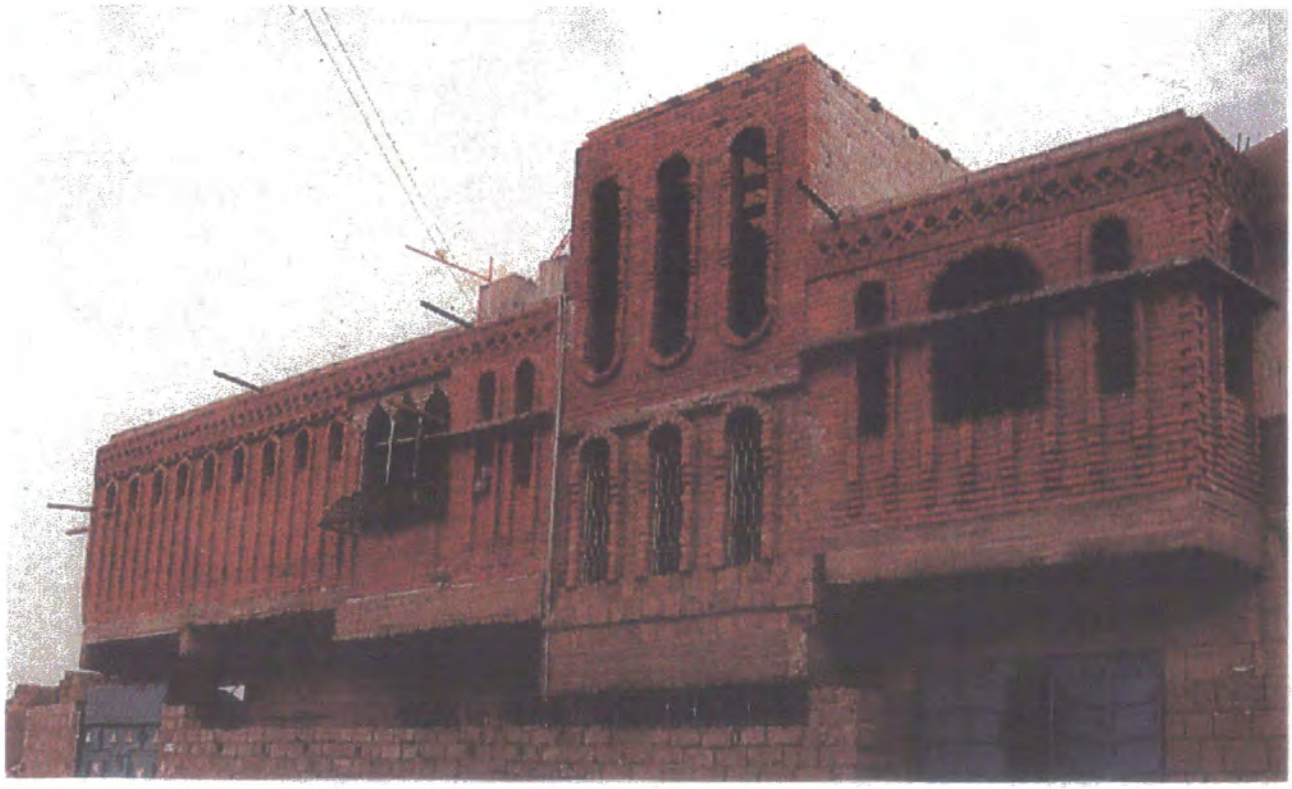




Construction with bricks baked in artisanal kilns was much reduced and areas of brick predominance, such as the Tihama, sorely show the encorachments of generally poor quality concrete construction. Yet baked clay brick, alone or facing concrete block, has not been totally abandoned and has even made a "come-back", often as a sign of the house owners distinction and taste. Its cost has reached the same inflated levels of stone construction. Examples seen in the new neighbourhoods of Sana'a and in Al Rhawda were built either in the traditional structure of load bearing walls and wood joists in floors and roofs, or else combined with concrete for floors, tie-beams and window lintels, with or without columns. Reliefs in friezes but also in panels are generally of a simpler design or of coarser execution than those of the traditional houses .



Top - Recent construction in handcrafted baked bricks, Al Rhawdha; *bottom* - Industrial bricks, Sana'a, 1990



Industrial brick began to be produced in the mid 'eighties, accounting for the peak values recorded for that period.[15] Hollow blocks were occasionally seen, but in 1990 most of the production appeared to be solid blocks. Production increased almost 50 % from 1975 to 1985, but in 1988 it had dropped to half the 1975 values. Industrial bricks have a redder hue and more polish than those of artisanal manufacture. They were seen together in the same building in cases of repairs and additions, but in none of them appeared this combination to work visually well. In Sana'a industrialised bricks tend to be considered less "classy" than the original kiln fired brick; nevertheless a formal grammar of their own might develop. In this as in other materials, the process has only just begun.

2.4- Summary of Trends

In this way, at the end of 1990 these were the trends observed :

Concrete was firmly established and included all forms of building throughout the country from the large businesses representated in the capital to guardhouses in the fields. Its association with traditional materials consisted mostly of having concrete frames and blocks lined in the outside with solid brick, stone blocks or stone facing.

Stone in structures and as a finish was creating a public image of the predominant material in the country, as ubiquitous as concrete. Stone facing had so far been confined to the major towns whereas in the countryside stone block construction mushroomed, along common structural and decorative conventions, although regional variations were already distinguishable.

Construction in *zabur* was still active in its traditional areas of the northern and northeastern Highlands, but the result was often debased by the concurrent appearance of concrete and stone. Construction in *libn* was confined to the most remote areas, being everywhere else increasingly replaced by cement in the least costly constructions and by stone and baked brick in the others. Baked brick from traditional kilns was returning to a limited extent in its traditional areas, alone and combined with stone or concrete. Industrialised brick was giving its first steps.

Corrugated iron used in canopies for windows and for market stalls, was as conspicuous as ubiquitous. Its use in rural ancillary constructions, yard walls and substandard housing was rapidly increasing.

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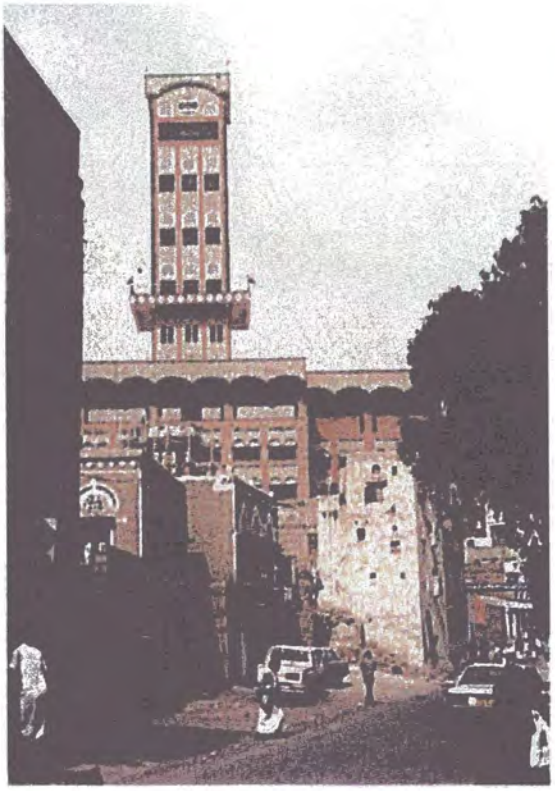
[15]Production of red brick and cement block in thousands of units (Four clay bricks take approximately the volume of one cement block). Source YARSYB.

	1975	*1980*	*1981*	*1984*	*1985*	*1986*	*1987*	*1988*
Red Brick	4,454	4,800	150	5,130	6,328	5,776	3,800	2,361
Cement block	4,797	1,280	1,916	2,021	1,835	1,466	1,647	1,595



Top left - Ministry of Communications, Sana'a; *right* - Ministry of *Awqaf* , Sana'a; *centre* - Office and commercial complex sheltering Ministry of Physical Planning and other government dependencies, Sana'a; *bottom* - New governorate office, Dhamar; *opposite* - New type of mosque appearing in the mid 'seventies (Pakistani project)

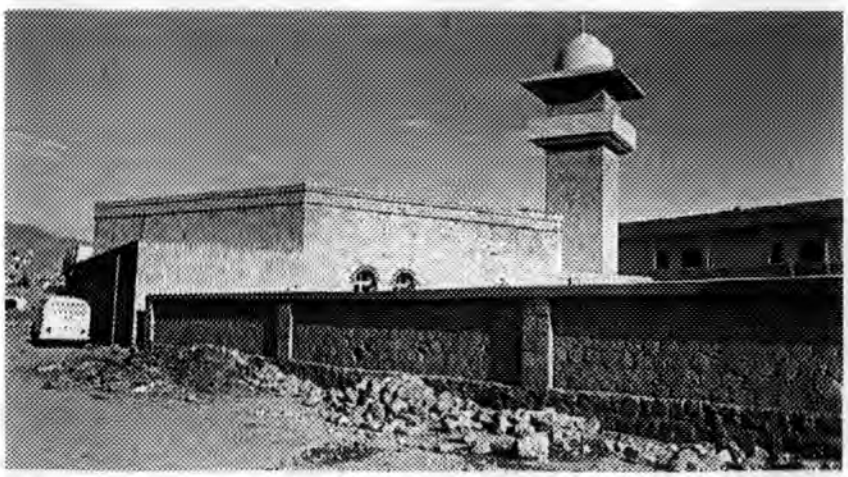
Section 3- New Typologies

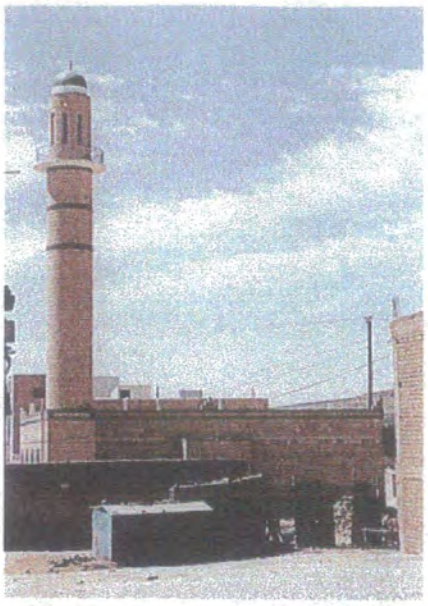
3.1- Institutional buildings

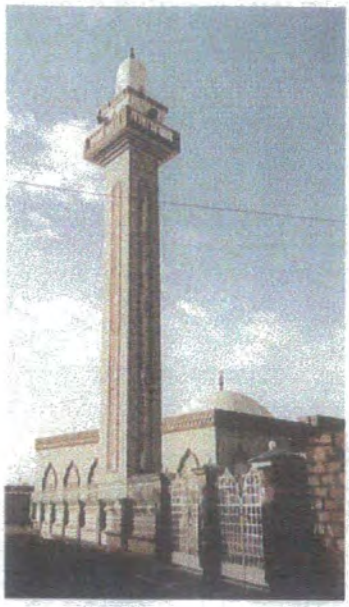
The fairly modest expressions of the traditional places for trade and polity have given place to the forms inherent in the post-revolutionary culture where modesty does not appear to be the principal concern. Initially, the administrative structure of the new times was accomodated in the large buildings inherited from the Imam's time. The trend in the main towns, however, was to move to new quarters in peripheral areas, involving in some cases the abandonment and even the demolition of the old buildings as it regrettably happened with the Dhamar governor's office in the mid 'eighties. Public buildings have so far followed the basic architectural formulary of large corporations or banking institutions, with similar volumes, quality of finish and occasional singularities.

The contemporary design of mosques in the main towns reflected at a point the architectural ideas common in the country of origin of the designers or donors from the Muslim world in general. This meant exotic arches, minarets and domes, built largely of concrete. Large concrete domes are features of mosques in the most recent urban developments but traditional materials have come back to be mostly used in walls and minarets. These never lost their emblematic value and, as such, they eventually reflected the state of the art in terms of workmanship in the major towns.

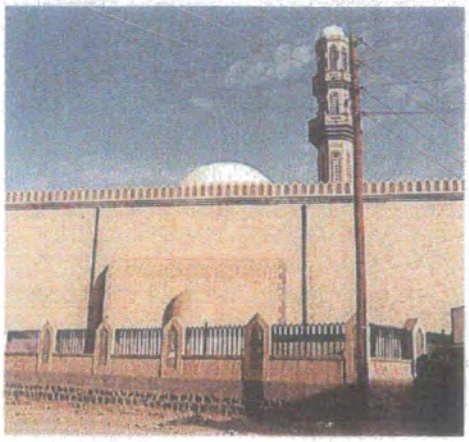
Trellised structures, used to support the loud speakers instead of minarets and first seen in Dhamar in 1975 or 1976, have developed predominantly between Dhamar and Taiz, with original characteristics. In some cases the trellised pyramid gave place to a masonry or metal piece with a fantasised minaret form. They were part of the small mosques, both in stone and in concrete blocks, of the type that proliferated throughout the countryside with or without other rudimentary distinguishing features.

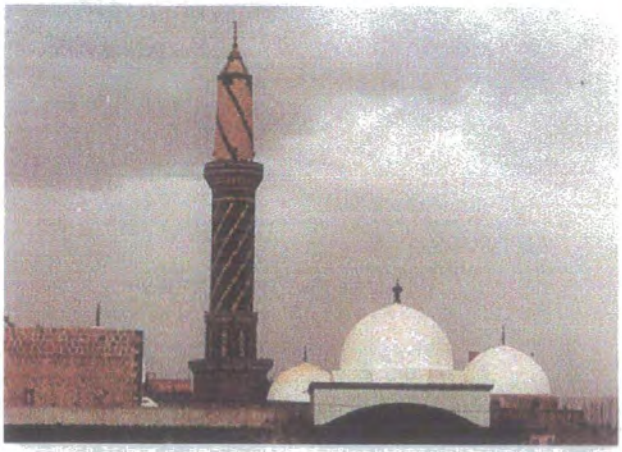


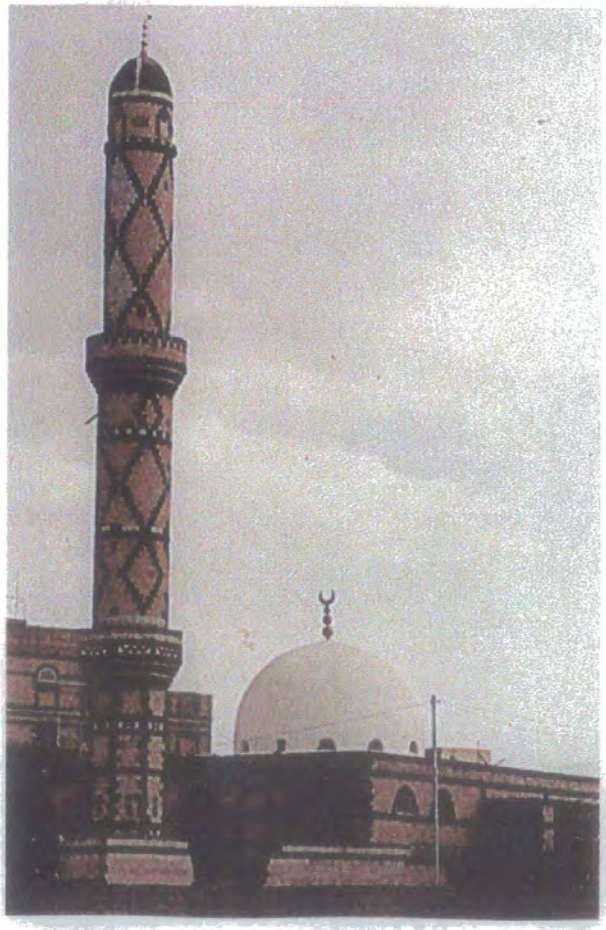


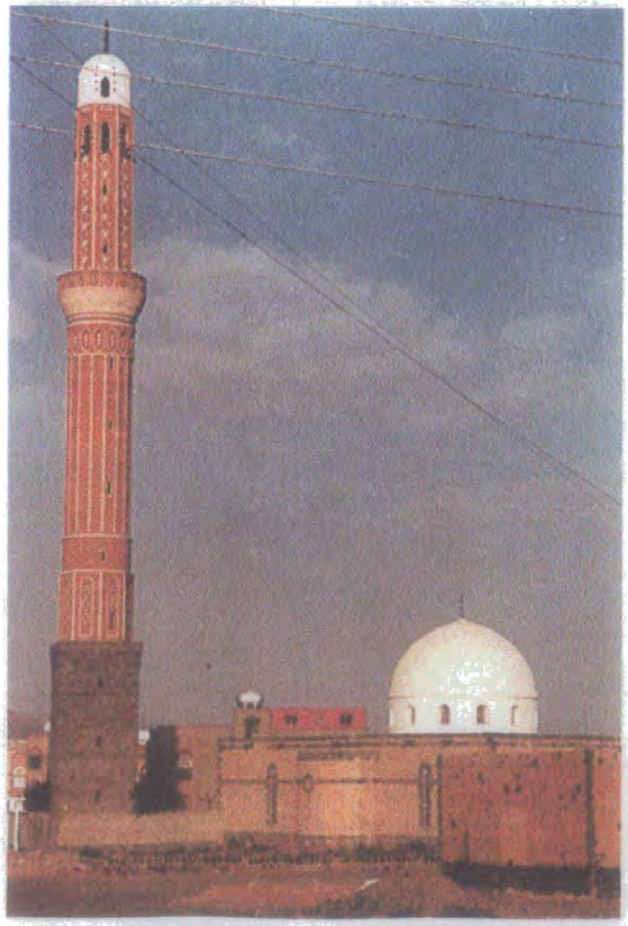


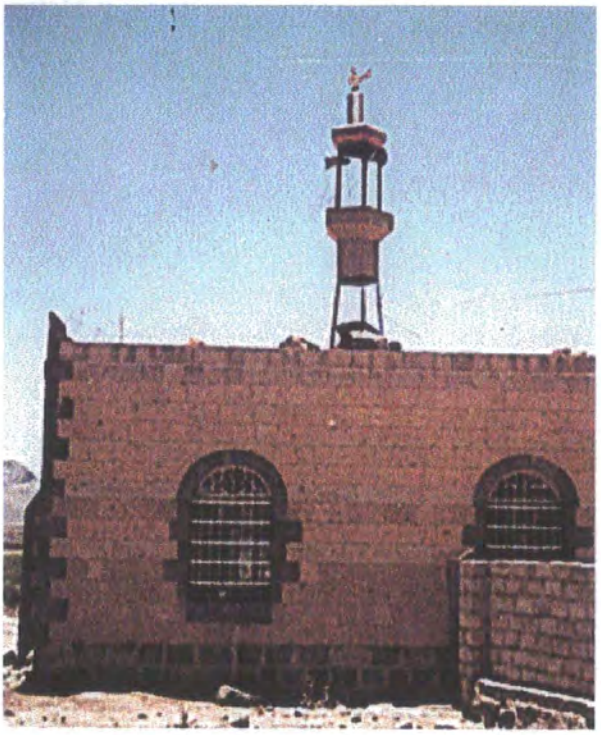
This page- New mosques at Sana'a; *opposite top* - New mosques at Al Qanawis, Tihama *(left)* and near Jubban; *centre* - Dhamar; *bottom* - Ibb

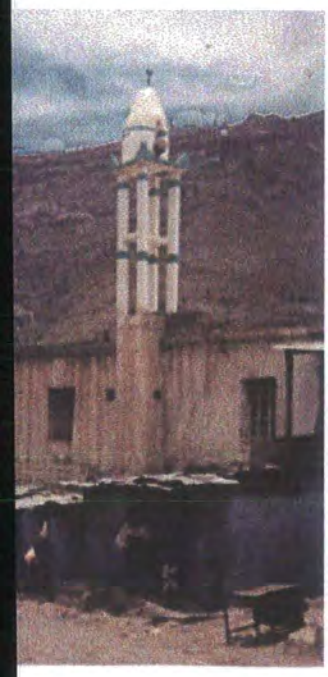


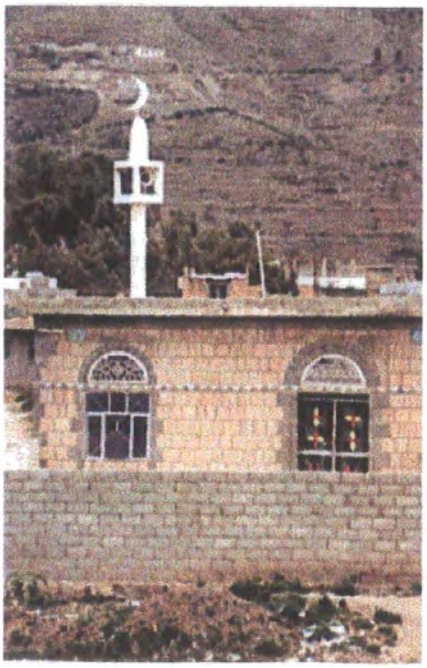


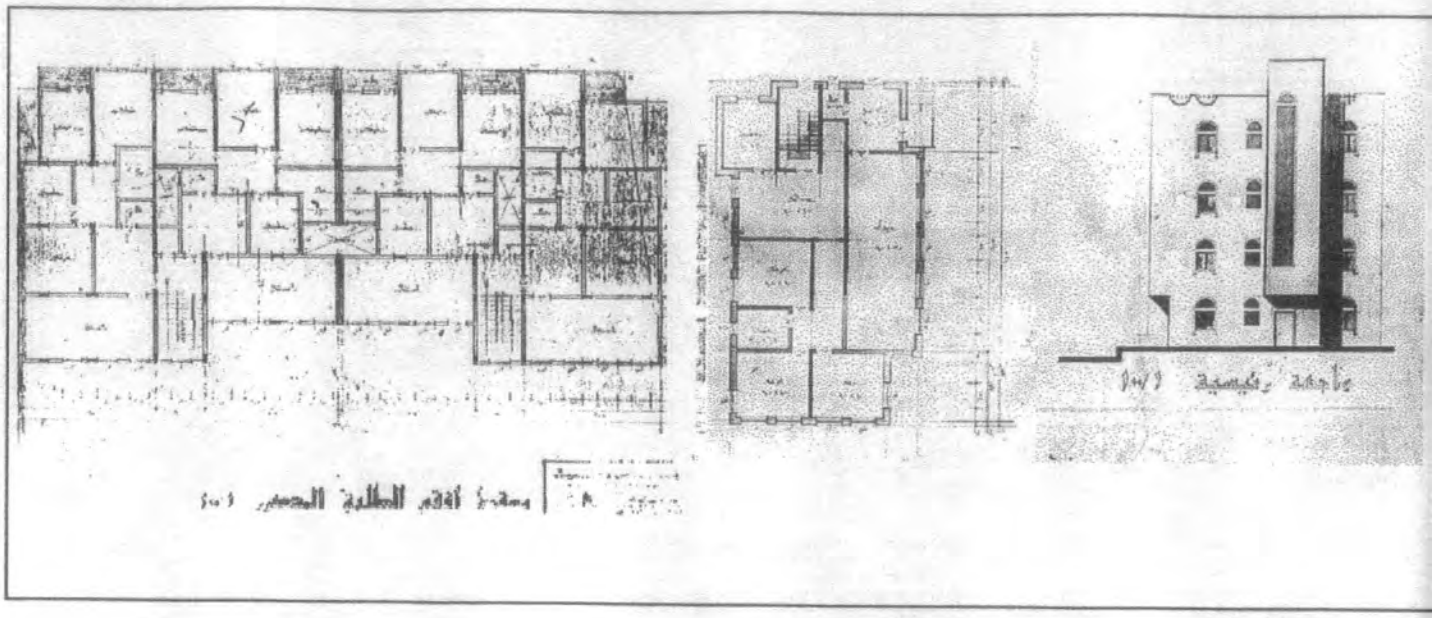


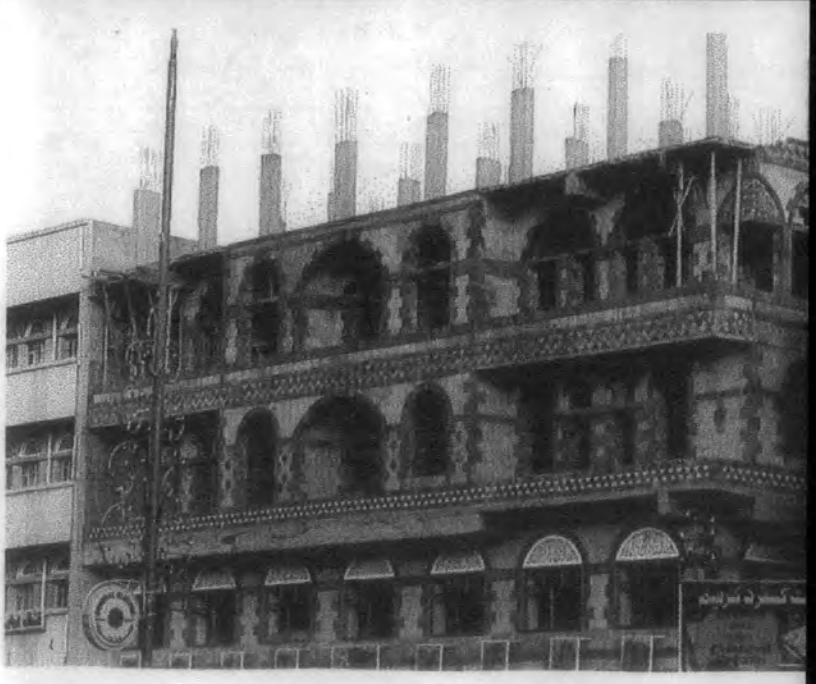












Top - Plans and elevation of buildings of flats, Sana'a, 1989/1990 (source Municipality of Sana'a); *centre and bottom* - Sana'a. Notice, *bottom*, corner windows and arched porches; *opposite* - Roadside building near Bajil

3.2- Houses

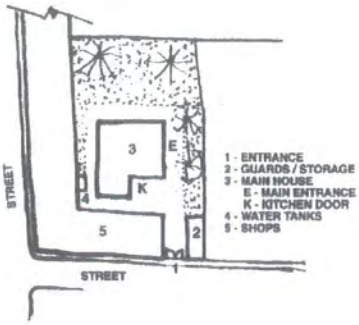
NEW TYPES

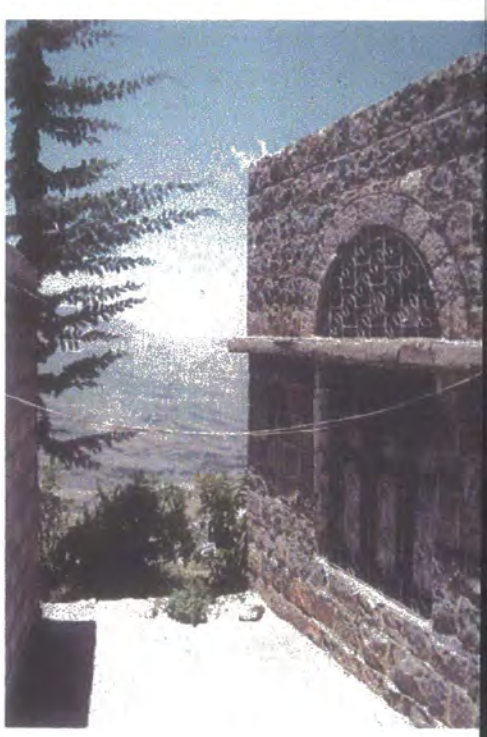
Unlike traditional Mountain houses, the houses developed after the Revolution may be part of a typological classification which depends as much on materials as on space organization, with more obvious identifications with social status and proximity to the larger regional centres.

In the main towns of Sana'a, Taiz and Hodeida, adaptations of western models introduced by the Egyptians created two basic types: multi-family, multi-storeyed buildings with shops on the ground floor; and single-family, initially single-storeyed houses within a walled yard, the exponent of which is the "villa", but with impoverished versions in the populous fringe quarters of the city.

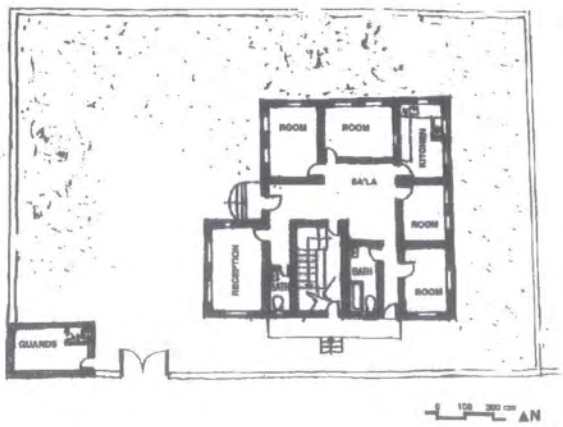
The first, appearing with the introduction of reinforced concrete was a new dwelling concept represented by three or four storey buildings lining the streets opened at the same time. The internal organization of the flats corresponded with that found in single storey houses and described below. Eventually the number of storeys increased, at the same time that stone for solid walls or facing, and even baked brick, became widely used. Originally these buildings were exclusive to the largest towns,[16] where they also served the office needs of the liberal professions or small businesses, but they have spread to the countryside, usually as road side development along the edges of settlements.

[16]Flats were not favoured by North Yemenis who now inhabit them by necessity rather than for preference. They provided however a good housing stock for the thousands of South Yemenis who migrated to the North in the aftermath of the bloody events of January 1986 in Aden.





Top - House built in the 'sixties outside of Bab al Balaqa, Sana'a; *centre left* - Rada'; *right* - Hajja. Notice grilles; *bottom* - "Villa" plans of the mid 'seventies and mid 'eighties; *opposite* - Villa in Ta'iz



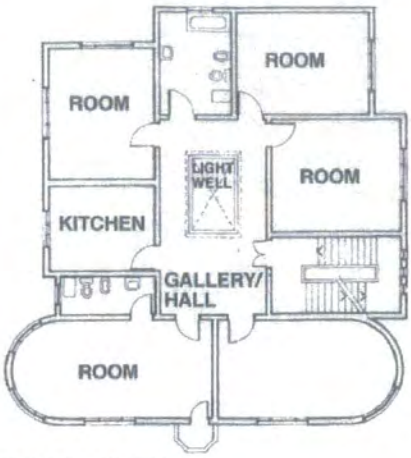
GROUND FLOOR

FIRST FLOOR

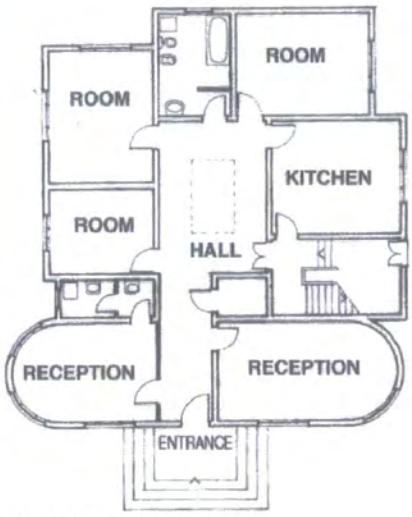
Single family houses have developed in town and countryside, often reflecting the breaking down of the traditional multi-storeyed dwelling nuclear family. A common form has developed in the countryside and corresponds to the model found in suburban Sana'a in the 'sixties and before, having the basic quadrangular plan of tower houses, with a larger floor cover but with fewer storeys and living rooms in the ground floor. This model has been especially well represented ever since the 'seventies in Rada'a, apparently for the new houses of returned emigrants, being basically assimilated within the overall volumes and textures of the settlements. Early in the process the traditional materials of the region might be adopted but the general tendency was soon to build in stone.

The particular urban version known as "villa", fancied by the new elite or by foreign executives was initially one-storey but with an internal stair to the roof, making it capable of expanding upwards. The first examples had regular quadrangular plans, stone being early adopted as the preferred material for walls. The use of the ground floor for living multiplied security and privacy devices, such as grills in windows or high yard walls.

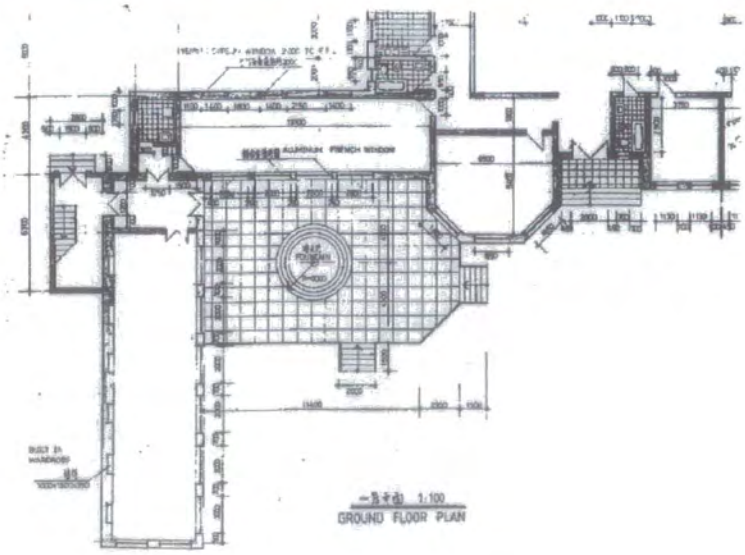
"Villas" present the basic space organization of any kind of new single family unit, basically adopting a central corridor plan - widened to become a hallway/ dining area, the *sa'la* - onto which the family rooms open, the main reception room being close to the entrance, with an adjoining bathroom. A door usually separates this area from the *sa'la* and the rest of the house. Storage space is, by traditional standards, substantially reduced in all but the largest houses. The entrance may be recessed into the building or may be fronted by a porch, which may run along the whole house front. Ancillary buildings are storage and guard houses at the gate and occasionally a row of shops along the wall on the street frontage.



FIRST FLOOR (TOP)



GROUND FLOOR



Top left - Compound of four villas, Sana'a; *right* - Plans of villas with central light well or clerestory, Sana'a; *centre, above* - Villa with central dome; *below* - Villa with central top room (*mafraj* ?) resembling a clerestory, Sana'a; *bottom* - Detail of entrance and front yard plan of villa, Sana'a; *opposite* - House built as a stone wall villa in the 'seventies and extended in reinforced concrete frame and baked brick during the 'eighties

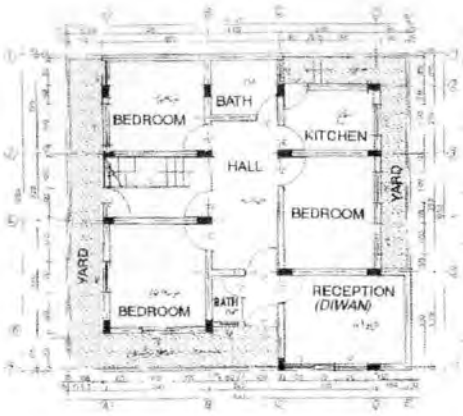
Basements or semi-basements are a recent feature, profitting from the technology applied in large commercial or institutional buildings, and are used for storage, including supplies of food.[17] Semi-basements allow for a raised ground floor, which is advantageous for the traditional sitting arrangement.

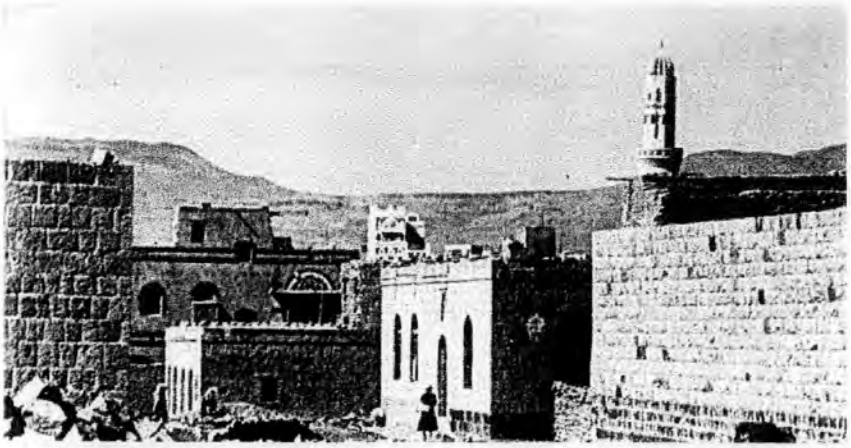
More than any other type, "villas" display a progress toward diversity of floor layouts rather than following the plan stereotype of traditional housing. Some new features became quite generalised, like recessed entrances and covered first floor porches, which have been found even in revivalist examples. Then, models from elsewhere came to be adopted as the examples, seen in 1990, of two storeys with a central hall lit by a clerestory or similar device.[18] Compounds consisting of various houses within the same walled yard have appeared in the new neighbourhoods, particularly in those that are expected to be favoured by foreign agencies or diplomatic representations.

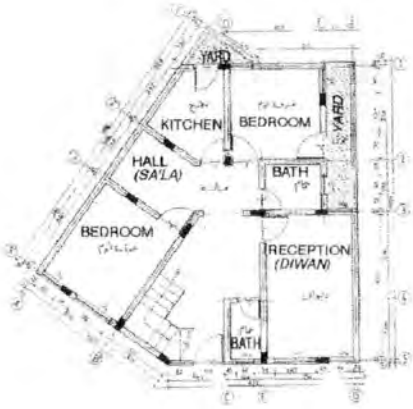
By the end of the 1980's the prevailing trend was to have two or three storeys at the outset. Floors had been added to single-storey buildings repeating the basic ground floor plan and "villas" tended to assume the bulk and functional disposition of pre-Revolution suburban houses.

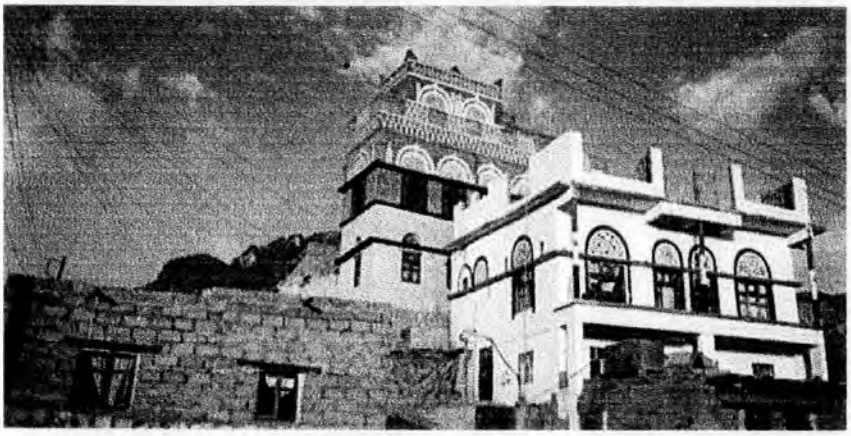
[17] Apparently San'anis still have the habit of stocking large quantities of food, probably a sequel to the 70 day siege of San'a at the end of the Civil War.

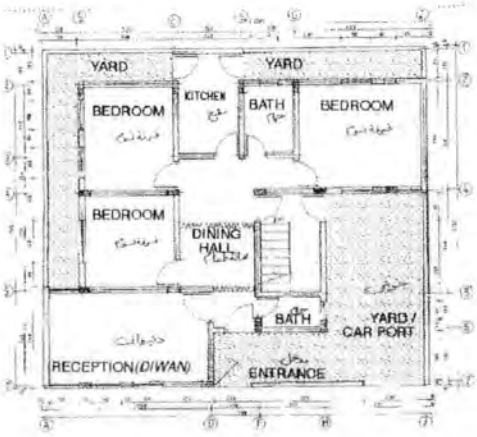
[18] This resembles a type seen in 1984 in contemporary architecture in the Gulf, which was allegedly inspired in the local court house tradition.

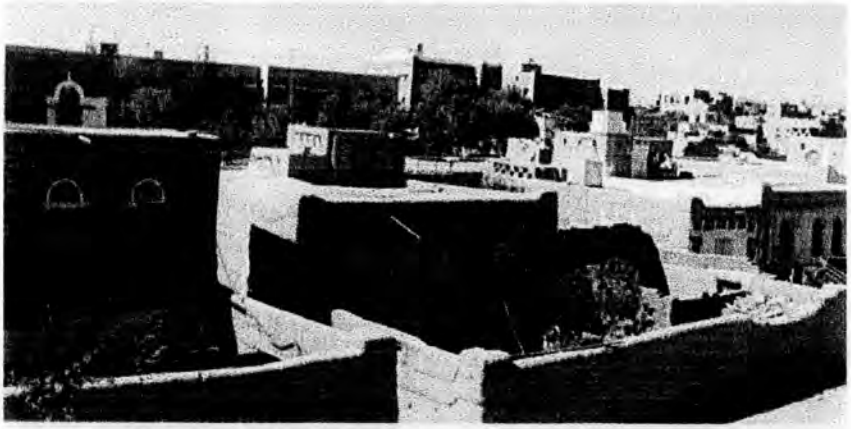


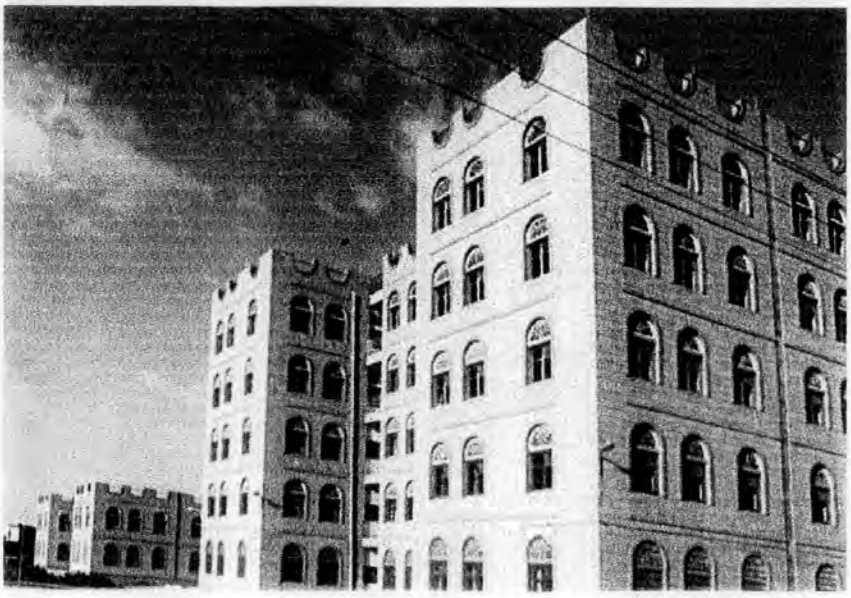








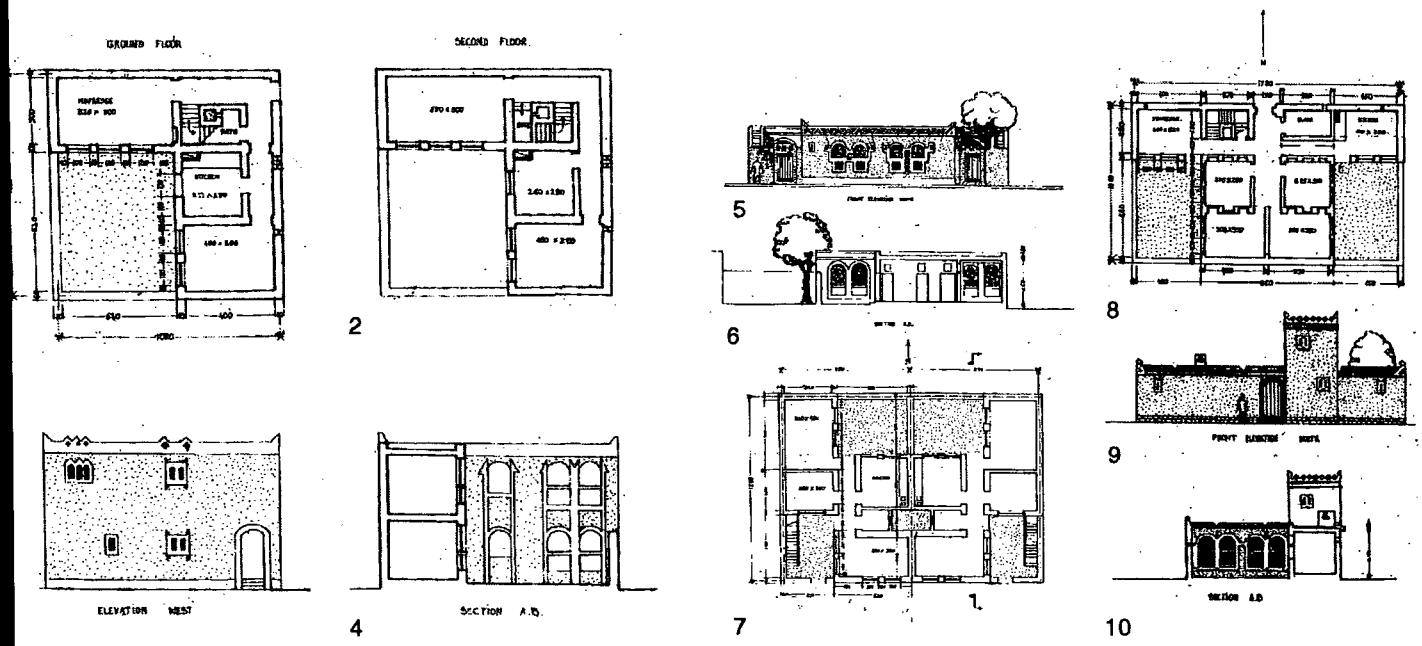




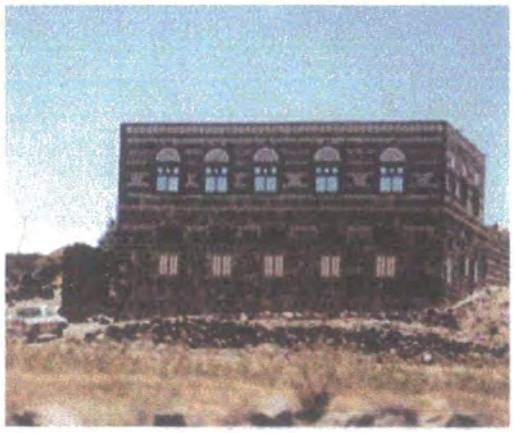
Left - House plans for small lots (100 to 150 m2), Sana'a (source: Municipality of Sana'a); *top right and below* - The development of the eastern slopes of Sana'a in 1976 and in 1990; *centre right* - Single storey houses in Sa'da; *bottom*- Government housing, Sana'a; *opposite* - House types for a proposed low cost housing complex in the early 'seventies, Sana'a (source Bertaud:71)

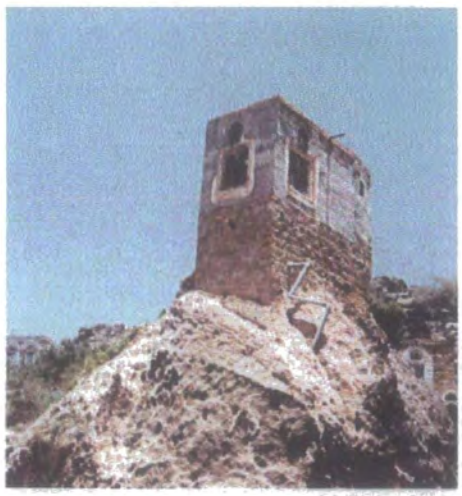
A modest version of single family houses, built in stone and occasionally mud blocks, with often narrow side or back yards, has the houses opening directly onto the street and was adopted in the development taking place at the town edges. The first models were set in Sana'a and Taiz, but other provincial capitals such as Ibb, Hajja or Sa'da were developing spontaneous solutions for dense urban dwelling. Additional floors, made in concrete or stone, tend to fit with the surrounding volumes but reflect new preferences for wider windows and smoother finishes.

Housing promoted at the institutional level has followed the basic models so far presented - flats or single family detached. Proposals for different single-family types, maintaining density but at the same time adding yard space to the house, were made by the UN town planning expert in the early 'seventies. However, the authorities were not receptive, apparently, among other reasons, because of the choice of mud blocks for these low cost layouts.



First row - Al Tawila; *second row left* - Dhawran; *right* - Dhamar; *third row* - Enlarged guard houses, Al Tawila; *bottom* - Al Khawkha





In recent years and throughout the Mountains, a single storey type has evolved with an elongated plan and a large number of uniformly sized windows. The entrance may be recessed but porches are exceptional. The usual material for the walls is regularly cut and finished stone or, sometimes, concrete blocks. The external treatment varies but there is always a measure of decorative intention, possibly with coloured stone in bands, quoins and arches or painted enamel motifs on the stone around the openings. Quite often, marks of distinction are introduced by the mason or by the owner - commonly the name and date of construction, but also the usual post-revolution imagery and simple calligraphic inscriptions. Preferred locations are the tops of small easily accessible hillocks with a certain distance kept between houses. In closer groupings, a yard with a high wall surrounds the house. Again, these buildings are prepared to expand vertically and therefore it is probable that they may become the ground floor of future multi-storeyed structures.

A new feature in the countryside concerns the qat field guard houses to which a top room with wide windows was added. This is occasionally finished according to its new function as a "garden *mafraj*", where one can chew with friends and at the same time survey the surrounding fields.

In the Tihama, buildings of flats and villas in concrete and/or stone have quickly developed, particularly in Hodeida and in the areas within its influence. However in the interior region new houses tend to adopt the traditional "brick house" model, baked clay brick being substituted by concrete block. Variations of the provincial mountain type just described appear in the foothills, built mostly in concrete block with characteristic painted decoration.

In this way, throughout the twenty years covered by this study, two basic types were developed in the urban context and two in the countryside. It appears that the same basic functional model has been quickly adopted in places at large distances from each other and that the differences lie mostly in textural treatment. No regional distinctions, from the viewpoint of functional organization, have been noticed. Furthermore the single-storey type in its rural or urban versions increasingly appears as the ground floor of a multi-storey structure which basically repeats a traditional model, with living quarters on the ground floor and ancillary constructions for animals and storage when necessary. Therefore typological distinctions based on number of storeys and family composition may not be valid for long.

Top - New *mafraj*, Sana'a. Notice television and video set on the background; *centre and bottom* - Sana'a

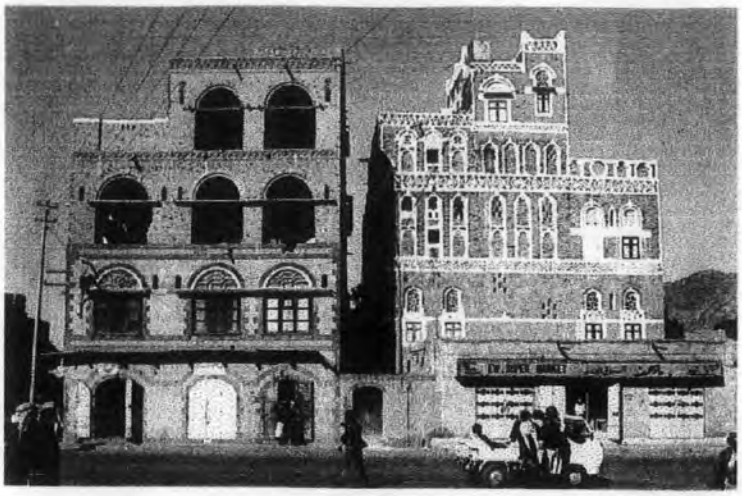
SPACE UTILIZATION

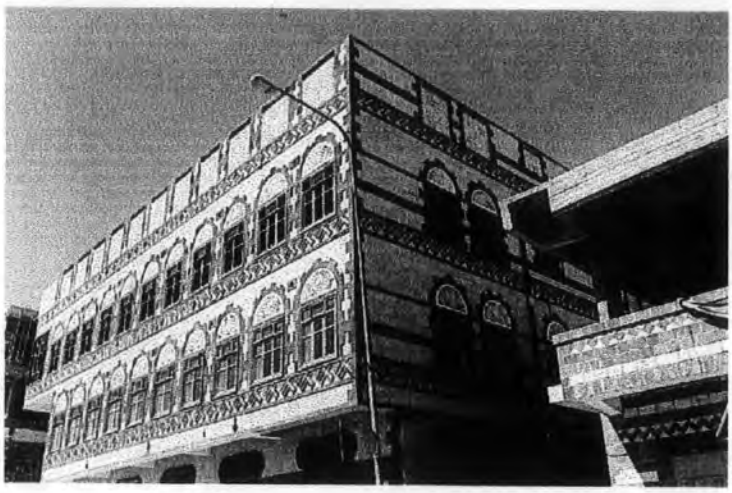
Reinforced concrete allowed for wider spans and thus the room proportion tends to change for the same net area; for example, a reception room that was 3.2 x 6.2 m, would be now 4 x 5 m. The introduction of western furniture - beds, tables, sofas, and so on - supplemented rather than replaced Yemeni furnishings. The reception area with the traditional seating on mattresses around the wall continues and remains associated with qat chewing. Sophistication and wealth are expressed by the introduction of velvet covered rubber foam for the mattresses, back cushions and arm rests, keeping their regular form better than the traditional straw and compacted cotton versions which had regularly to be beaten into shape. Modern upholstery is however less appropriate to the traditional ways of sitting because of the way rubber foam yields to the weight of the reclining body.

Thinner walls and the cost of labour eliminated shelves, niches and built-in cupboards from most of the new constructions. Western and traditional furniture may co-exist in the same house, such as in separate reception rooms furnished differently, and in the same room, as when there is one part of the room for floor sitting and another for easy chairs or bed. In traditionally furnished new sitting rooms, the space along the walls is reserved for sitting, whereas indispensable pieces of modern furniture - stereo or TV set - occupy the central part of the room. The ways of decorating interior space are a question of personal taste, but a growing tendency was noticed to embellish with objects such as pictures, knicknacks and interior plants.

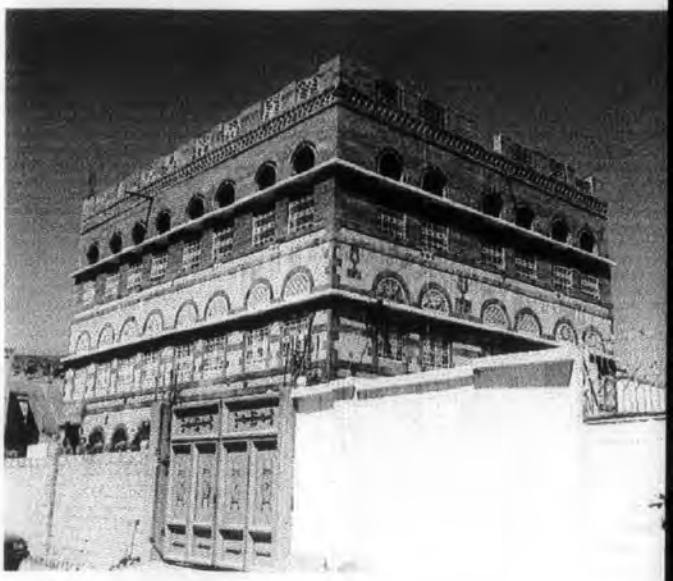
New bathrooms are tiled and incorporate western fixtures plus a squatting toilet, made in the same glazed ceramic, next to a source of water - tap and pail, hose and nozzle - for personal cleanliness and scouring the floor fittings.

Kitchens now have standard sized windows and may be equipped with factory made furniture and fittings, often including a locally made gas heated *tannur*. Smoke leaves through the windows or additional wall vents: chimney flues had not developed by 1990.





Top and centre left - Sana'a; *centre right* - New version of *shubbaq* at remodelled house, Mithal, Al Hada; *bottom left* - Ta'iz; *right* - Sana'a



Section 4-Formal components

4.1 Openings

PROPORTION AND SIZE

Foremost, among the components of the building image, is its fenestration, and the changes suffered in the period covered by this study are evident in the proportions, dimensions and rhythm of the openings.

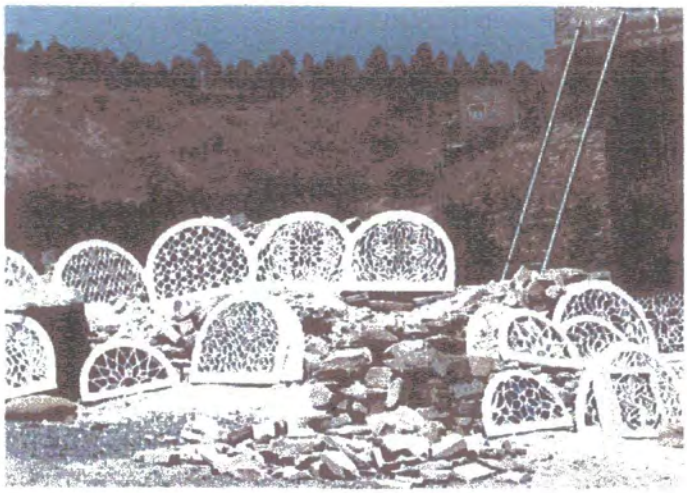
Former constant features were made obsolete by modifications to the life style as, for example, the *shubaq* , which never re-appeared anywhere in the urban context, not even as a formal atavism, or the extensively decorated wall panels between windows.

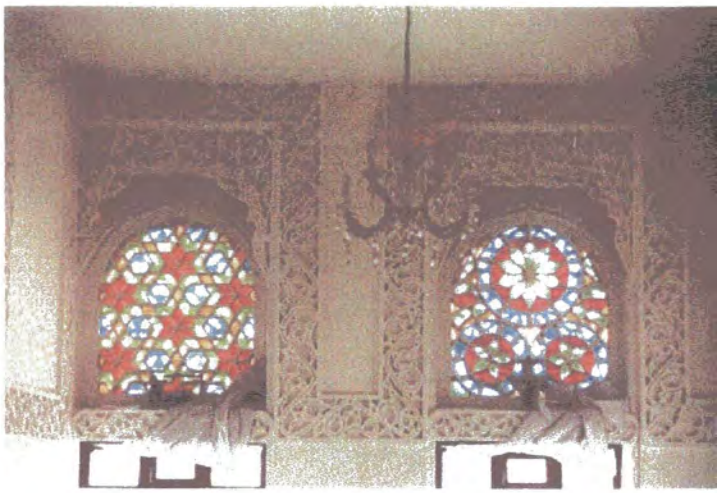
In the 'seventies stilted window arches were giving place to semi-circular and segmental arches but returned and become popular again throughout the following decade. New formal conventions settled in, such as the dark "hanging " frame around the windows, often encompassing various floors and underlining the vertical components of the elevation. Corner windows were fashionable in Sana'a and Dhamar in 1990.

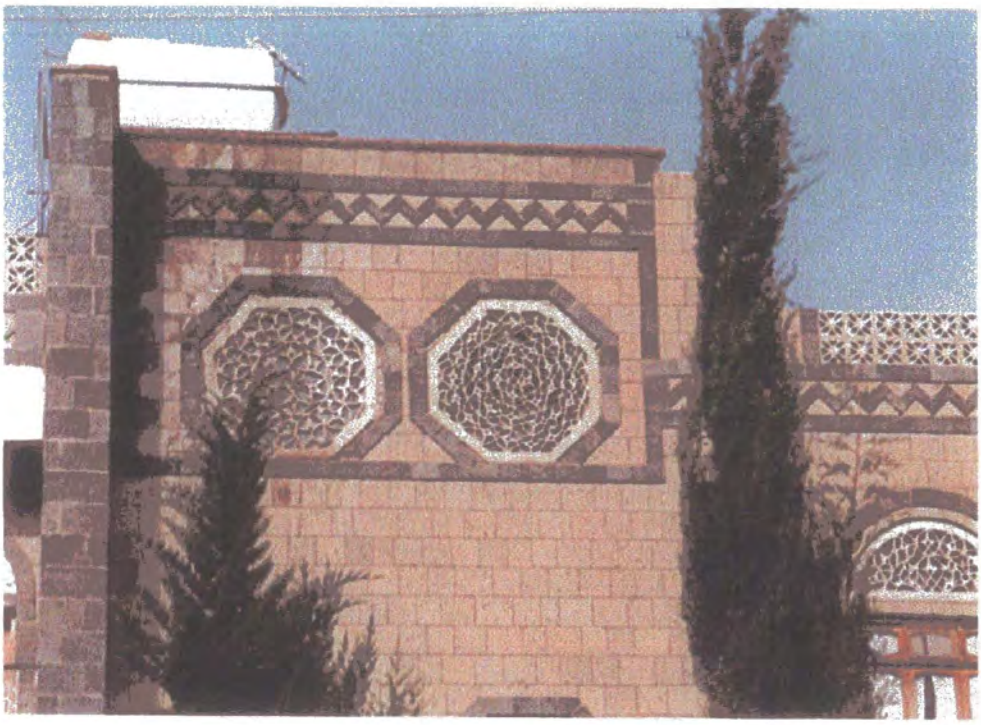
Post Revolution construction stresses the tendency of windows to enlarge and associates with it the uniformity of window size and proportion and their regular disposition in the elevation. This is recognizable from the very first examples and has continued as a trend, particularly conspicuous in large urban institutional buildings but also common to the rural houses. Whether this conforms to a new aesthetic prejudice or results from a simplification of methods dictated by cost is not evident since it is common to examples where the availability of money was obviously not a problem. Later, windows may appear in groupings of two or three with intermediate differently shaped openings.

Reactions that go to other extremes, such as elevations enlivened by a variety of windows, glass surfaces and plaster screens, are typical of the exuberant displays that villas often take on. In most recent examples, however, an opposing trend is recognizable, in which the treatment of openings has the obvious intention of an elegant sobriety, the visible outcome of a deliberate discipline .

A consequence of the introduction of concrete in substitution for timber, even in buildings with walls of traditional materials, is the continuous lintels at the springline of the window arches, made wider to oversail and perform like the traditional *kunna*, replacing it and the same time becoming a new constructional stereotype. Windows thus, rather than appearing as punctuations in the wall texture, become subordinated to the strong horizontal lines of the concrete lintels.







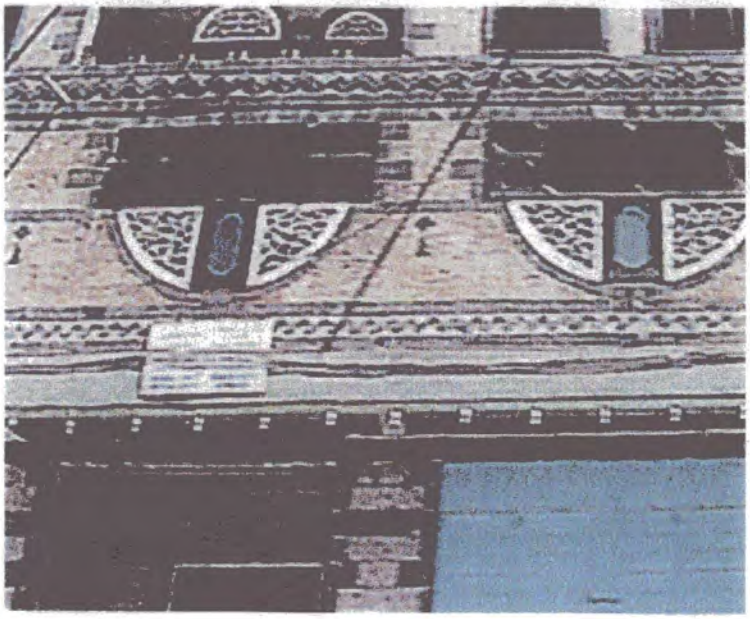
Top left - *Takhrim* shop, Sana'a; *right* - New *takhrim* and plaster carvings, Sana'a; *centre* - Sana'a; *bottom left* - Rada'; *right* - Sa'da; *opposite* - Al Zaydiya

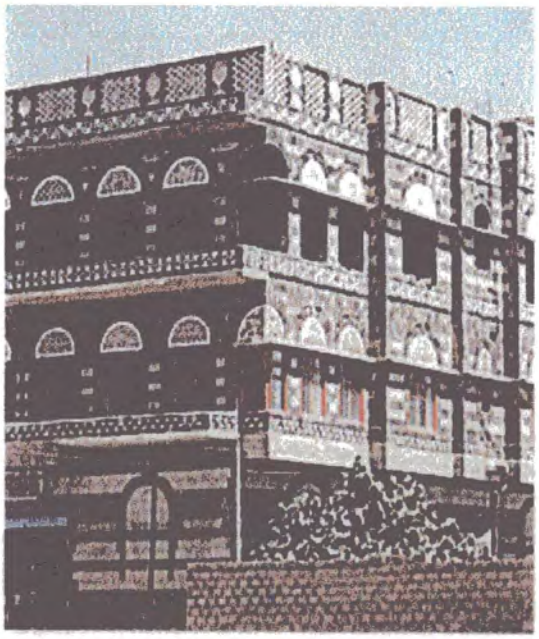
FANLIGHTS

Coloured glass and stucco tracery fanlights (*takhrim*) have contributed much to the aspect and role played by windows in new buildings. In a previous chapter it was seen how *takhrim* was replacing consolidated forms, such as the multiple openings in stone or brick tracery and single alabaster plate fanlights. Alabaster went out of fashion and ceased to be found in the market.

The simplicity of the technique, the low cost and availability of the raw materials, together with its possibilities of easy embelishment, made *takhrim* an expanding business in the construction boom that followed the late 'seventies, appearing to many as an exemplary adaptation of a traditional technique to modern construction. A great diversity of forms - arches, circles, squares, octogons, and even carvings on the tracery itself - has been created to satisfy new decorative needs. Figurative models and attempts at naturalistic representation, usually characteristic of provincial situations, have been added to the conventions adopted by the master plasterers, as illustrated in the last chapter.

In the Tihama, *takhrim* of the Mountain type was introduced with the 1970's, both in new buildings and occasionally adapted to the traditional "brick house" form. In this instance they may appear as circles with radial patterns, set high up in the wall. These have, in turn, originated a *sui generis* form of decoration, in which the design of the *takhrim* is merely plastered over the external walls, the parts corresponding to the glass being painted in bright colours. Other paintings, above the yard wall line, often concur with this device.





Top left - *Takhrim* in balconies, Sana'a; *right* - Hotel lobby, Sana'a (source: commercial advertisement); *centre left* - Dhamar; *centre right, bottom and opposite* - Ibb

From the 'seventies onwards *takhrim* was also used as a decorative atavism, in the interiors of prestigious buildings such as the Sana'a airport and large hotels. In a domestic context the technique was applied to make parapets of balconies or fill the space between beams in concrete cantilevers above shops.

The fascination for new technologies, apparent in all other sectors of the building industry, has also reached this one. A case in point was for the writer to see *takhrim* made with an electric drill rather than a knife. More important however is the use of aluminium for the tracery. This was the latest fashion, in 1990, flourishing especially in the area of Ibb, but with outlets already established in Sana'a, a city not only closer to the sources of gypsum supply but reputedly also of more conservative taste.

Top and centre - Aluminium windows and doors, Sana'a. Notice new wood door on *centre left* ;*bottom left* - New painted metal windows, Jubban; *right* - Standard wood window frames, Sana'a; *opposite* - Main entrance, Ministry of Awqaf, Sana'a

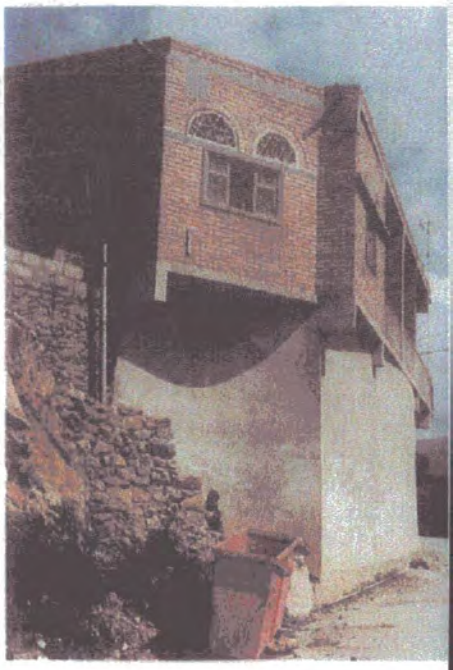
CARPENTRY OF WINDOWS AND DOORS

The decadence of traditional carpentry was felt well before the Civil War. In the mid 'seventies mechanized carpentry gained impetus but concentrated on glazed window frames, with thicker sections and heavier ornament, with embelishing features often consisting of arched, rounded or hexagonal frames. A standard was developed consisting of a frame with two parts, the top being about 1/4 of the height and divided into three elements, one or more of which opened separately, for ventilation. The lower part had two or three leaves and, in the latter case, one or possibly two of the leaves might be fixed.

Although the production of traditional shutters with wickets was completely abandoned, recent quality conscious houses in the countryside have adopted a new and simpler model with rectangular panels. In the cities, some new houses now sport louvered blinds and metal balcony rails. Painted metal window blinds were making their appearance in the countryside as at Jubban during the writer's 1990 survey.

Wood for entrance doors was largely abandoned in favour of metal for most of the 'seventies and 'eighties decades. Imported wood doors were a feature of recent examples identified with situations of status and wealth.

Aluminum frames, for doors and windows, came on the scene during the 'eighties, and soon became widespread, both in new and old buildings where they replaced traditional frames. In some cases this material has been approached with a certain degree of creativity, limited however to exploring the possibilities of its smooth finish and a reduced number of tone combinations. Anodised golden aluminum alone or combined with black seems to be preferred, particularly in the southern half of the country.

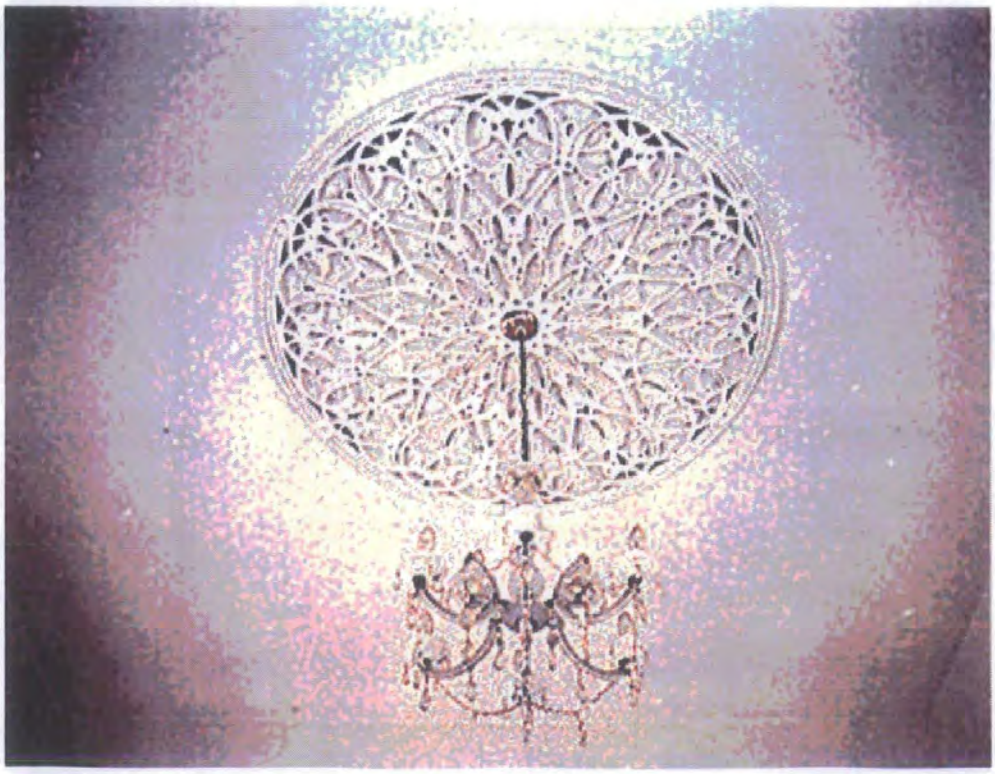


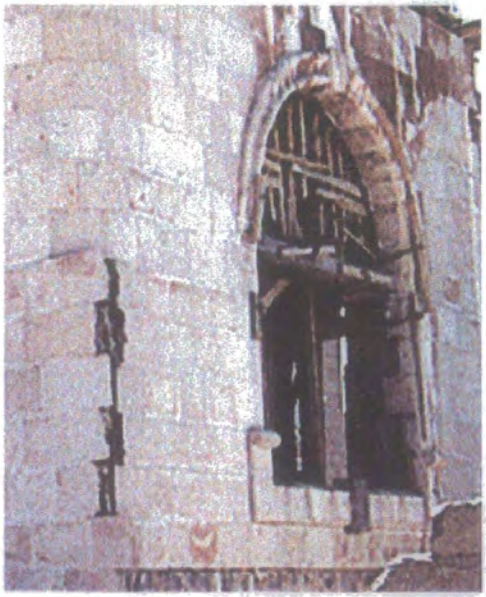
Top - Hajja; *bottom* - Bir al 'Azab, Sana'a; *opposite* - Al Hasaba and Ring Road, Sana'a

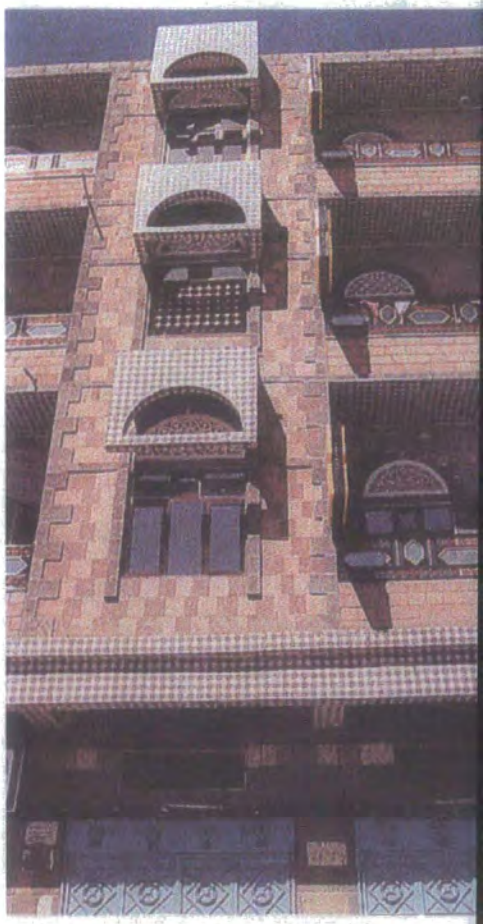
4.2 - Interiors

As for interiors, the greatest differences lie in the proportion of rooms which tend to be wider and less elongated and in the passage from wood beamed to flat ceilings. Rendering in cement and paint at a certain time replaced plastering with gypsum; niches and wall cupboards were suppressed, although this did not at the outset necessarily equate with lower cost constructions. Gypsum plastering nevertheless continues to be active but adopts modern standards of surface regularity and smoothness. Carvings are still fashionable but now costly to produce, tending to be rather intrincate when they affirm the owner's wealth or status. The mid 'eighties saw the introduction of pre-fabricated ceiling centrepieces and skirtings, reminiscent of early 20th century European bourgeois decoration.

A marked improvement concerned electric lighting. Early adaptation of light fixtures and wiring to existing buildings was, to say the least, careless and one could not help but wince upon entering a splendid *mafraj* with a neon light fixture dangling precariously from the ceiling. At least in the urban centres the technique is now better mastered and the taste more refined. In flat ceilings the place for the light fixture can be identified by carved or moulded plaster.





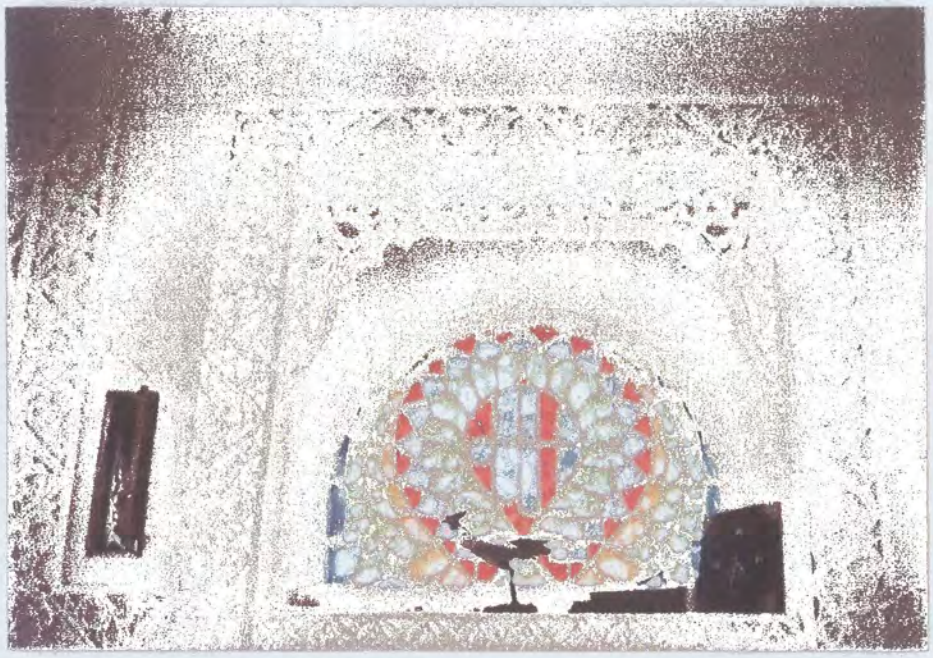


This page - Sana'a. Notice round corner and sophisticated treatment of window on *centre left* ; *opposite, top left*- Sana'a; *right* - Mithal; *bottom left* - Dhamar; *right* - Stairway of villa, Sana'a

4.3 - Composite forms

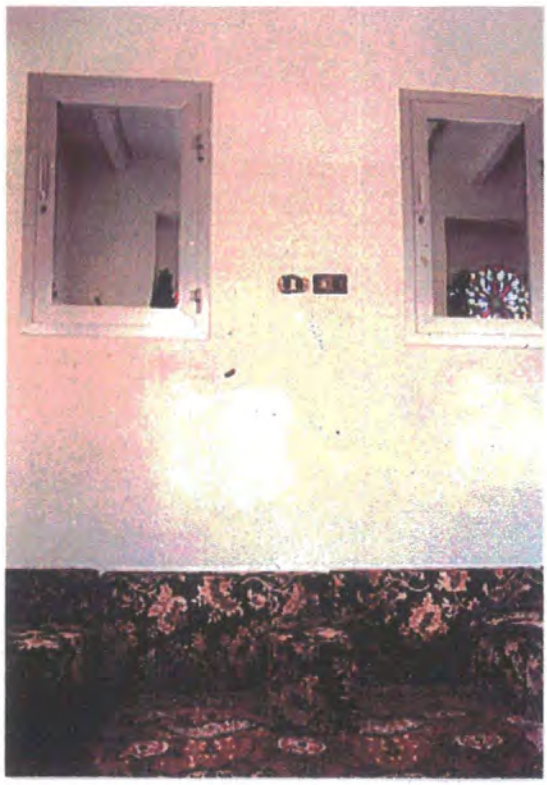
Formal variety in the buildings naturally resulted from combining materials and experimenting with the structural possibilities of concrete. Some features have become standard or at least fashionable: cantilevered floors, balconies, window lintels and corner windows. There is also the textural variety that comes from the assemblage of diverse materials and from different periods and which is part of the undisciplined side of the construction taking place as the nineties began.

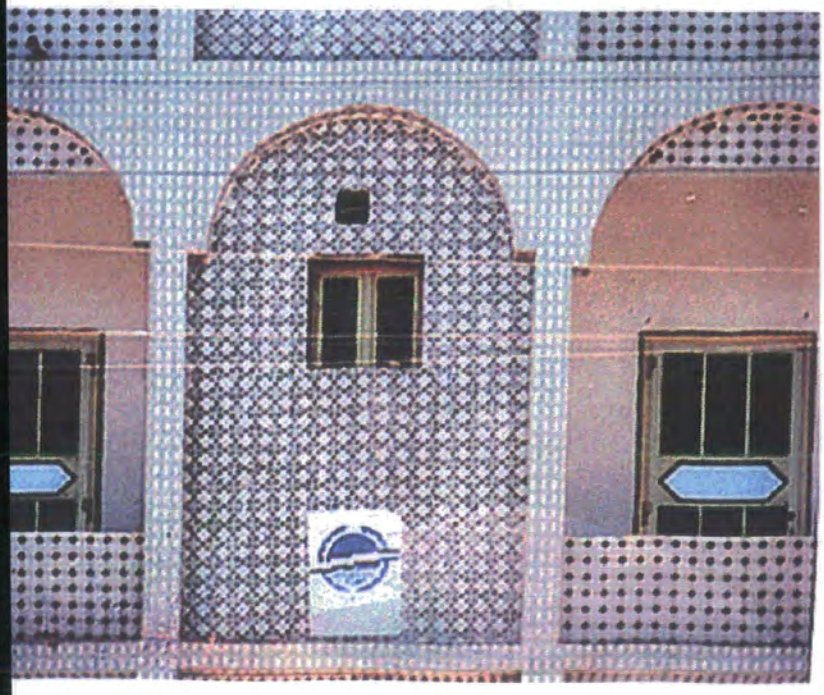
In 1990 there was already a significant run-of-the-mill urban production and some vigorous individual examples of buildings in which all the major current materials co-existed. Provincial manifestations came forward with surprising combinations of materials and conventions imported from the main towns or elsewhere, according to the owner's or the builder's fancy. Buildings done by contracting companies often presented stylizations of the traditional grammar in combination with market innovations such as pre-molded balusters and glazed tiles, or new design concepts, including inverted arches and round openings, which adopted a common formulary in the Middle East.

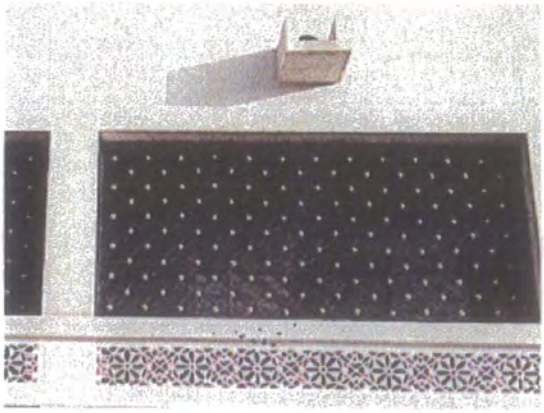


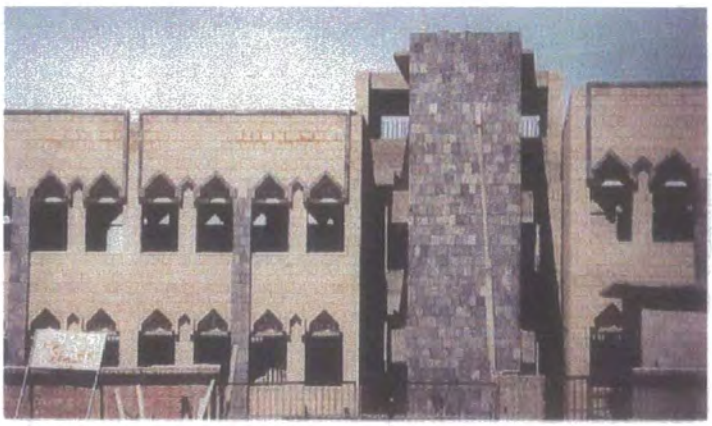
Top left- New *majraj* rendered with cement and painted enamel, Mithal; *right, centre and opposite* - Carvings in new gypsum plaster rendered *majraj* , Sana'a; *bottom* - Mouldings, Sana'a

There was a natural enrichment in colour, from the natural hues of the combined materials even when colour was not intentionally applied. The tendency to polished, even glossy textures is recognizable in the favour gained by some materials, as for example marble and glazed tiles in Dhamar, and occasionally demonstrated in extremist manners in out-of-the-way places. Such is the case of a new *mafraj* in Mithal, in the Eastern Highlands, rendered in cement and painted in semi-glossy white, having built-in cupboards (*mugharaf*) with aluminium framed mirrors for doors.







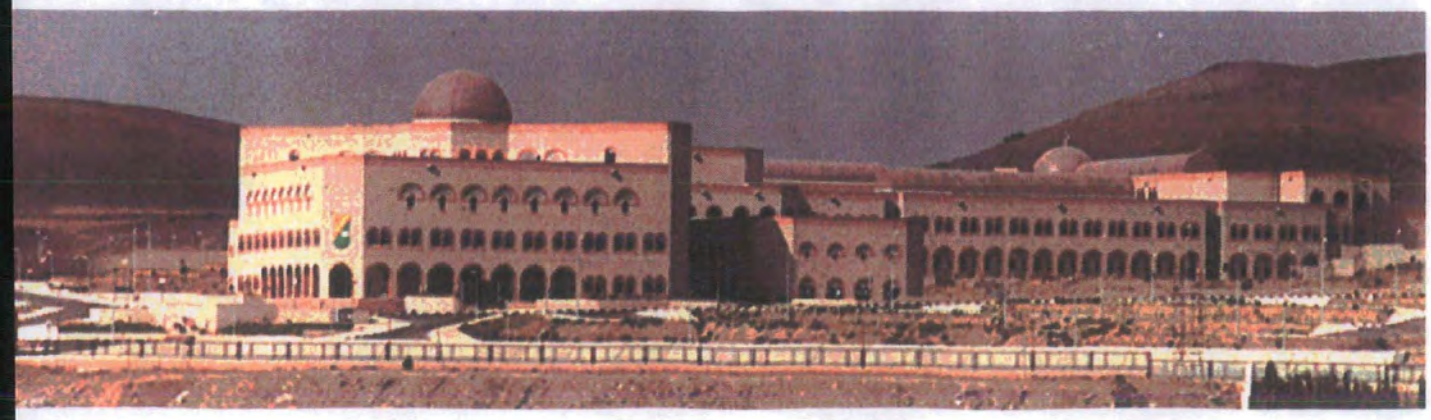


Top and centre left - Office building, Sana'a; *top right* - The Yemenia building; *centre right* - New school in Dhamar; *bottom* - National Bank, Sana'a; *opposite* - University buildings, new campus at Wadi Dar Road, Sana'a

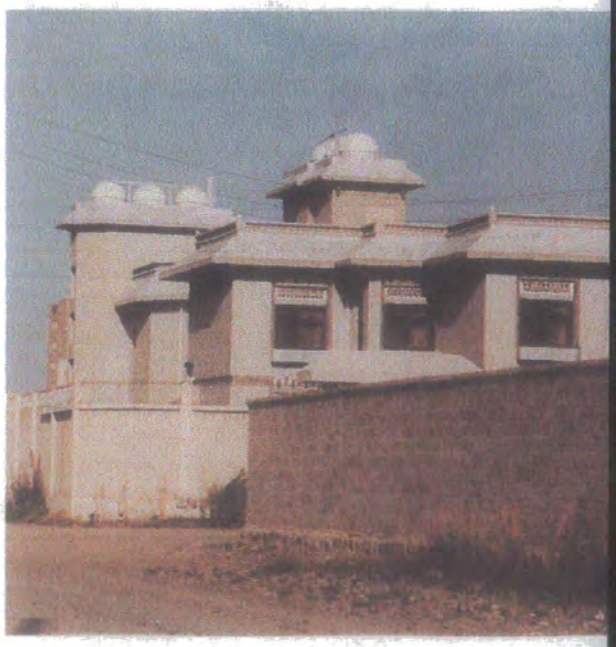
4.4- Signs of distinction and whimsicalities

The last two decades affirm, as never before, the need to identify the function, sponsor or ownership of the building. Buildings for the administration and buildings by the administration for the public; headquarters of financial groups; foreign embassies; and large hotels, seem to compete in the search for some imposing formal expression.

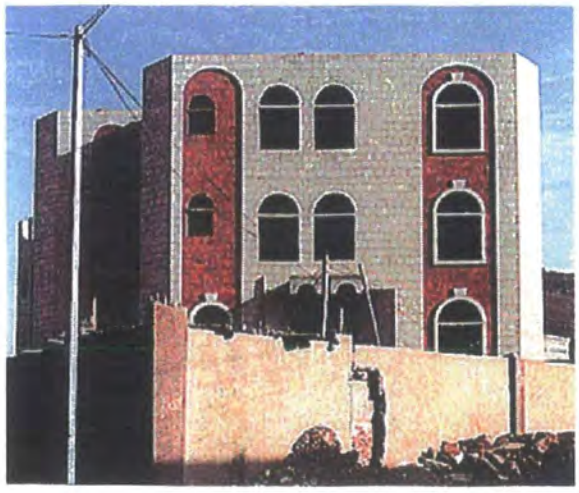
The representational value of corporate or institutional buildings has been conditioned by the convention, tacitly admitted by most, that they should reflect the traditional sources of inspiration: stone, arches, friezes and plaster screens. Other conventions have already been mentioned as for example, identification of smoothness, rigorous patterns and commendable execution with quality of the building.



This page and opposite - Sana'a, 1990;



In domestic architecture, the search for originality of form and quality of finish is, in the main towns, strongly associated with the villas, which initially display as much of an assemblage of materials and forms as it is possible to imagine. Glazed tiles, marble and balusters, a profusion of plaster screens with new forms,[19] aluminium frames and doors, concur with features like reversed arches and colour stone in a variety of cuts Then, in a common reaction to excess, distinction becomes associated with sobriety and difficulty or cost of execution. In this category must be included the fashion of rounded corners on houses, faced with stone, with friezes of very simple design or no friezes at all, and, ultimately the recent examples where there is obviously a designer's effort at an expurgated original language.



19 An upsurging novelty in the late eighties was tiled sloping roofs.

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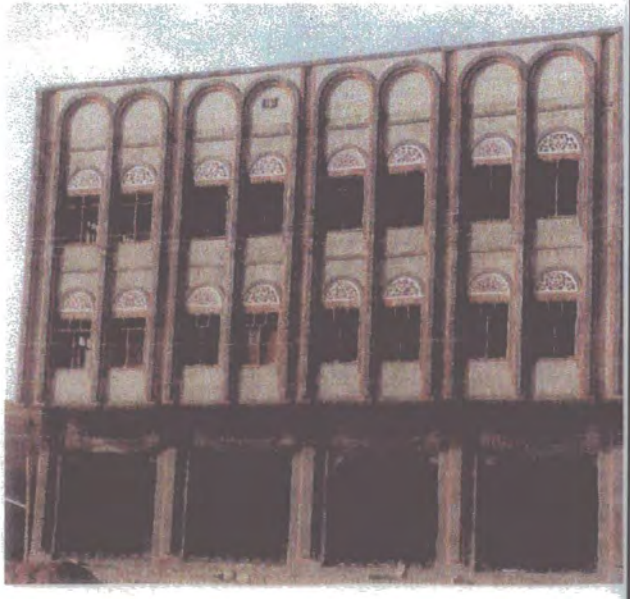
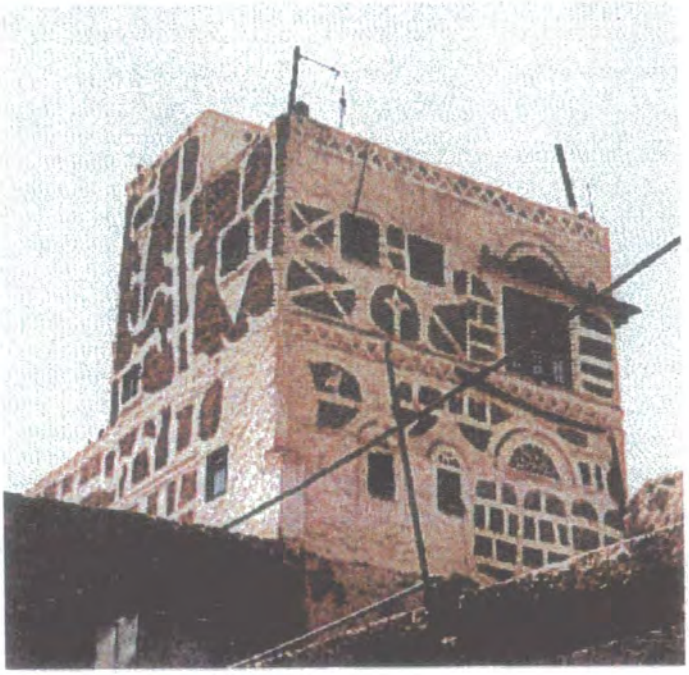
Sana'a, 1990;



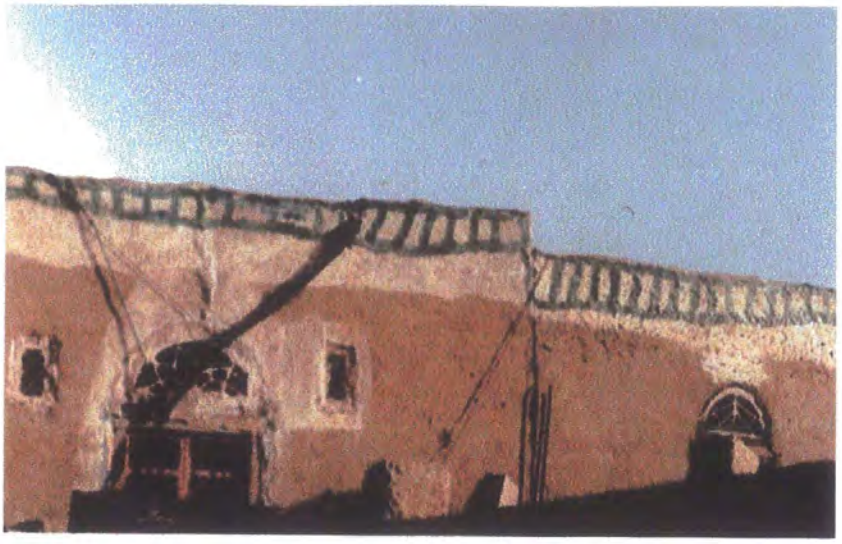
Entrance gates, of both private and public buildings, are now more evident, being often outstanding features in otherwise neutre buildings. Some have been designed by architects independently of the rest of the building.

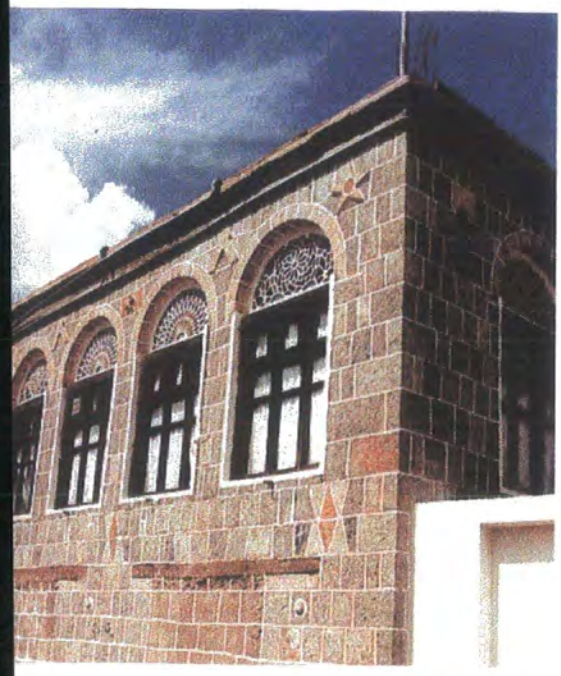
Secondary identification elements may appear above the gates of shops such as cantilevers and bull's eyes or, in a more modest manner, in a variety of gates, water tanks and the whimsical contributions of personal intervention.

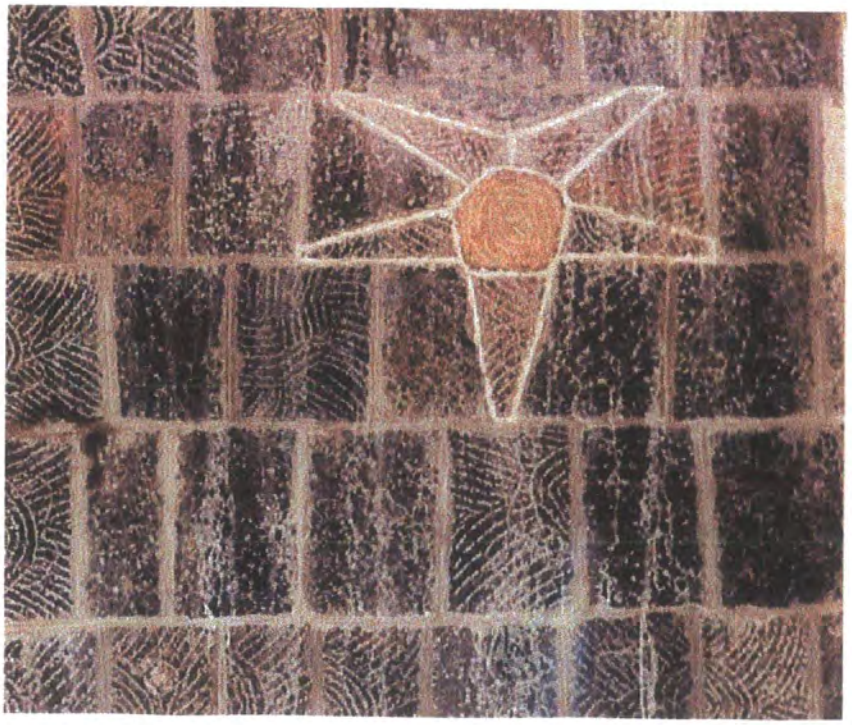
It is in the countryside that these take on an important role. The direct intervention of the owner or his agent in the beautification of the house, using the available skill and unconcerned with the discipline of tracing and subjection to rules, has been part of the building process so far observed; but now, more than ever, and perhaps justifiably so given the easy access to convenient materials such as paint, unaffected signs of distinction have come to punctuate the rural building scene.



Top left - Repairing of cracks associated with random decorative effects, Sana'a; *right* - Sana'a.The covered roof terrace suggests a tenant from the Tihama. Notice model of Sana'ni house at the roof corner;*centre left* - Dhamar; *right* - Rada'; *bottom* - Jubban; *opposite, top left* - Jubban; *right* - Hajja; *centre, left* - Hayma; *right* - Al Dahi; *bottom* - Hajja







The depiction of aeroplanes and missiles, is an early ingredient of popular post- Revolution imagery, with quite naturalistic representations occuring especially in rural areas. A type of inlay, applied especially around the *shaqus* and appearing as a stylised missile, has become common throughout the country. Obvious and more skillfully painted stylisations were seen in 1990 in a recent concrete building in Sana'a. After the Gulf War, a fashion was to add fins and nose cones to the water tanks to make them look like SCUD missiles.

Top - Al Beshar, Al Hada (source Varanda:82); *centre* - Al Tawila; *bottom* - Sana'a.

Opposite: colour and pattern in the Tihama.Left - Hodeida (photo S. Kennedy); Right - Al Khawkha. Notice linoleum used as ceiling (*top*)

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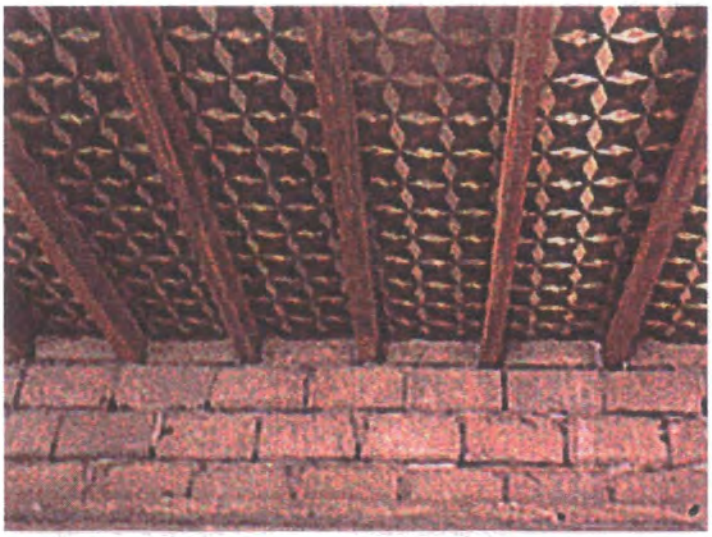

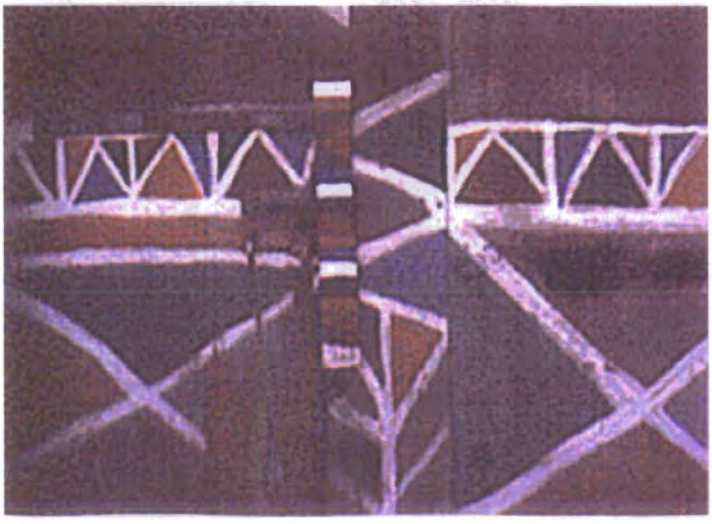

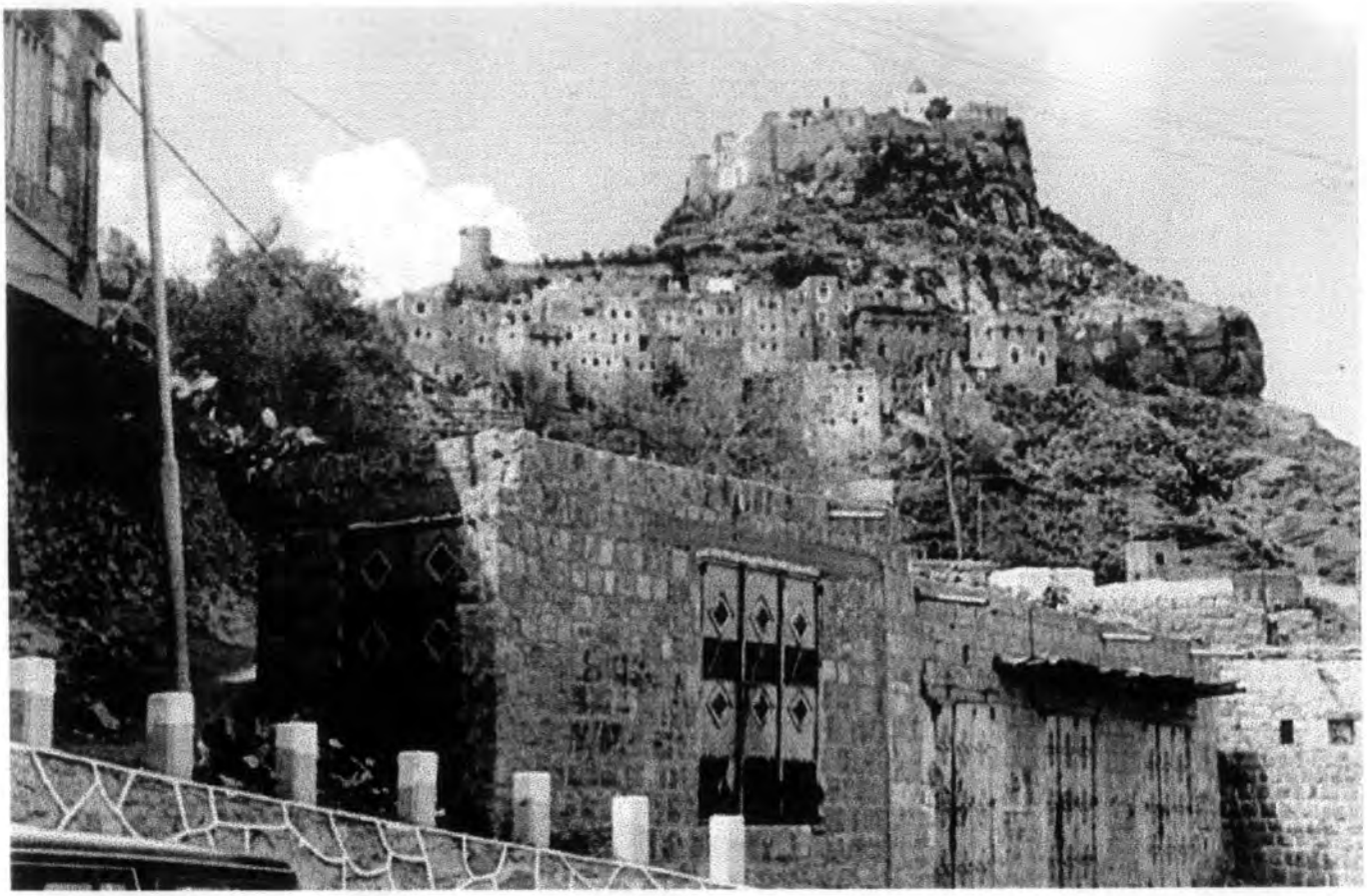

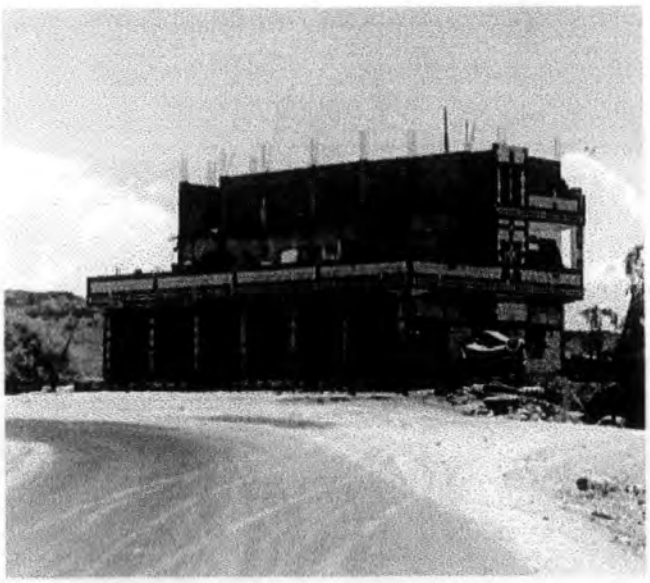

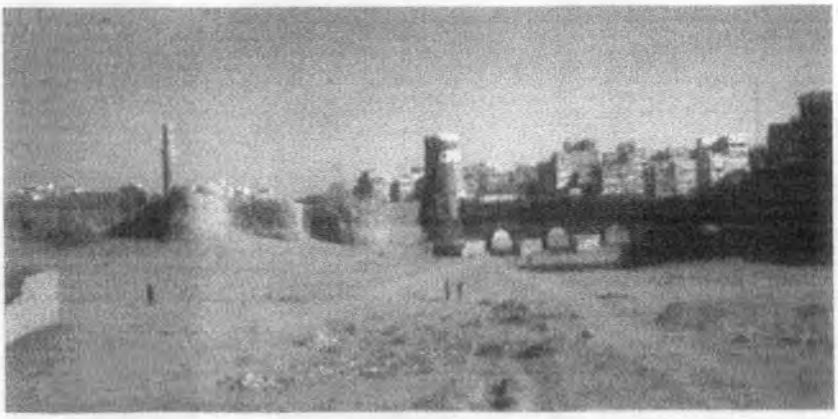

Top - Fort, old cluster and new development, Hajja; *centre left* - Fringe development, Al Tawila; *right* - Roadside building south of Sa'da; *bottom* - Bastions and bridge over the Sayla, Sana'a Old City, demolished at the end of the 'seventies.

CHAPTER 6: URBANIZATION

Section 1: Expansion

1.1- Deconfinement

The Civil War dramatically showed that vulnerability from the air - to planes and rockets - made impregnability on land futile.[1] On the other hand, the progressive consolidation of the Republican government meant that inter-tribal warfare would not be of the extent that had formerly justified the containment of settlements by sites and walls. Safe living was now possible outside the protection they once symbolized.

One of the components of this centrifugal pull was the attraction of building near the qat fields, partly because of a more pleasant environment, but mainly to ensure greater security from qat theft. Another was the growing tendency, as much in the country as in the towns, for younger couples to live in their own house rather than share the extended family dwelling.

The development of the road network in proximity to small settlements meant expansion alongside roads, initiated by shops. Ultimately residential building occurs on both sides of the road, infilling the original cluster on one side and dispersing on the other, where houses tend to have large yards.

Initiatives by way of mass housing - such as the relocation of the 1982 earthquake victims - have concentrated on flat areas, away from the original clusters. They are as dissociated from earlier siting considerations as they are from the use of former materials and styles.

This outward drive represents a formal break with the mimetic component in the siting of traditional settlements. Symbols of rupture could be identified with the opening up of new streets involving the breaching of old walls, with the directness of a revolutionary ethos. Later, ring roads appeared as the modern planning equivalent of walls, insofar that one of their main intentions was to define the limits of urban development as much as to direct and distribute vehicular traffic. In practice this intention was contradicted by the constant tendency to build on both sides of the road as soon as it was laid out .

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[1]Painted or inlaid representations of aircraft around the entrance of rural houses were also occasionally seen associated with signs like the "hand of Fatima", which was suggestive of their value as a charm.

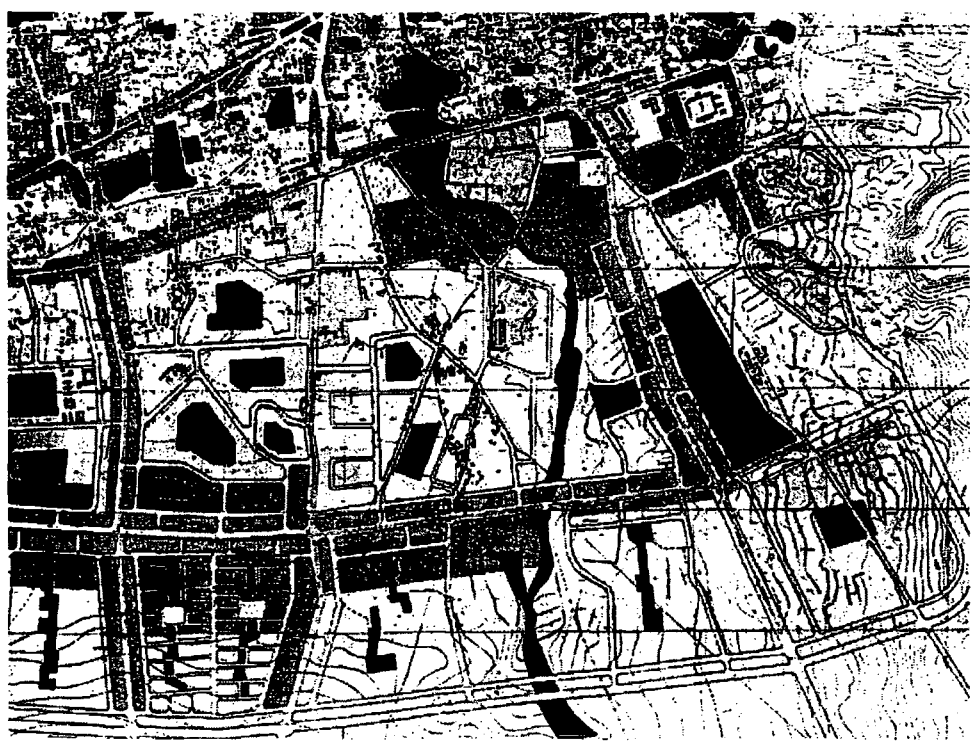
Top - Farmland and expanded settlement, Mala, Rada'; *centre and bottom* - Orchards in the Old City and Bir al 'Azab, Sana'a; *opposite* - Extract of the Master Plan for Sana'a, 1975. The dark patches indicate areas (former farmland and *Sayla* bed) to be kept as green spaces (source: Italconsult)

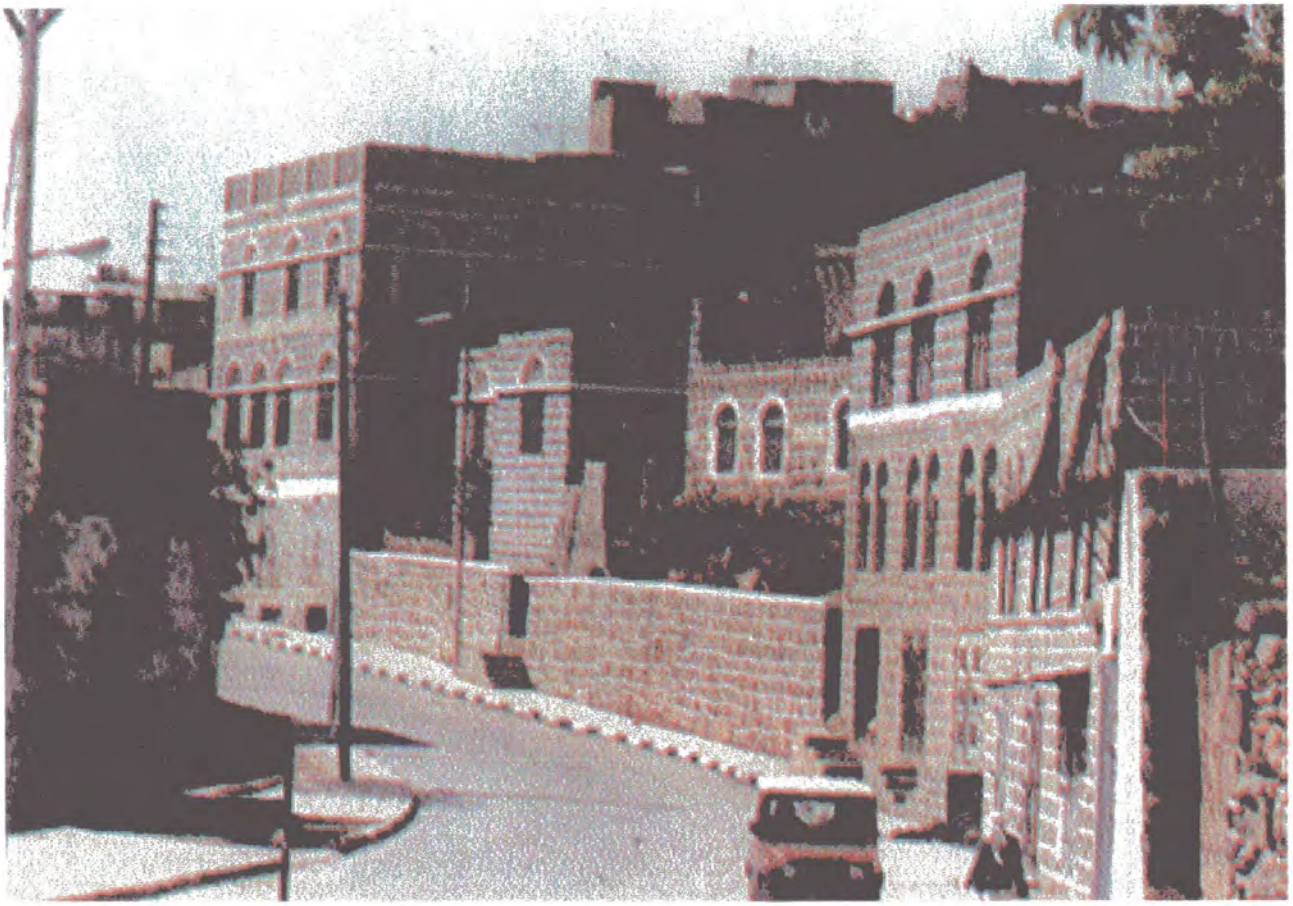
1.2- Farmland

Farmland becomes built up in direct proportion to its proximity to urban settlement. Contemporary Yemen tends to illustrate a concept in which there is no farmland within the limits of an urban area.

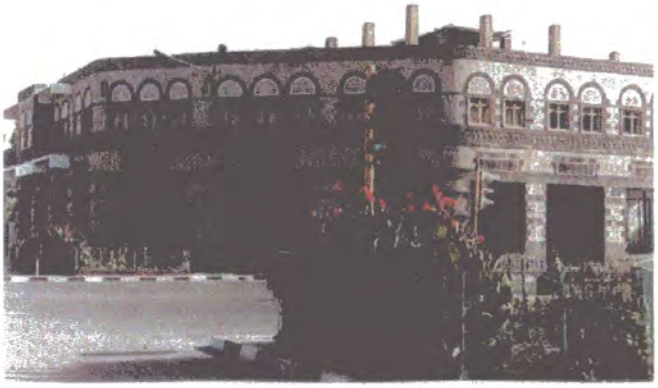
We have seen that it has not always been so. As recently as the early 'seventies, various types of farmland lay within the urban area specifically to serve its population. In Sana'a this is represented by the small "intra-muros" gardens of the Old City, the larger orchards of the walled suburbs as at Bir al Azab and the peripheral farms with their own farmhouses extending north and south beyond the city walls to small villages a few kilometres away.

In the early 'seventies, the UN expert in charge of the Sana'a Plan, faced with the imminent explosion of development within the city, proposed a scheme of land control whereby farming would be maintained as the city's main green open space. This approach was in line with the example of the Old City and the traditional principles of settlement on sterile land, with good land saved for farming. The administration rejected it, probably due to pressure for high density development on central area land and being pre-disposed to accept the more conventional urban model of extensive subdivision serviced by a tight street network.





Top - New street in Hajja; *centre and bottom* - Development in the south side of Sana'a; *opposite* - Development in the western fringes of Sana'a



Section 2: Urban image & urban problems

2.1- Urban image

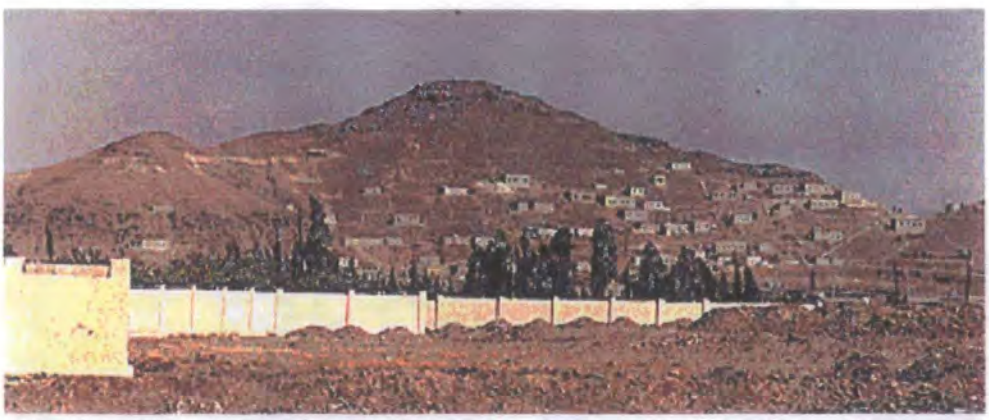
DISPERSION

Two decades after the end of the Civil War, the impression given by town expansion was that of an enormous construction site with buildings occupied before they were completed and of noisy traffic raising clouds of dust on unpaved roads. It was for the future to see streets paved, walls completed and piles of construction materials removed from the public rights of way, with trees growing in yards, sidewalks and public gardens.

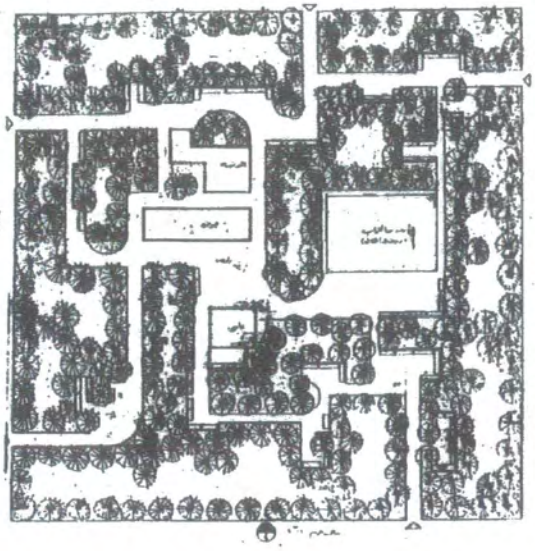
As areas were completed, their character was established, first of all, through the quality of the buildings. However, consequences of urban design notions could already be seen in the expanded areas of both the capital and provincial towns, sometimes with pleasant results.

Sana'a typifies the co-existence of a variety of new typological concepts. Generally, development is heralded by single-storey commercial frontages along major arterial as much as in local streets. Upper floors may be added later, displaying various degrees of aesthetic treatment ranging from complete indifference to determined formal expression. In contrast, the "villa" neighbourhoods[2] are characterized by a regular layout of streets, wide enough for the expected traffic, lined by the high yard walls surrounding one or two-storey houses.

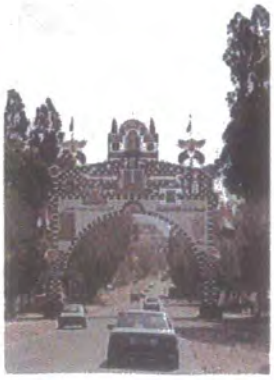
Flat land in central areas is the most costly and it is therefore on the slopes of the surrounding hills that quarters for the low income population have spontaneously developed since the end of the Civil War. Essential building space is filled in as the population arrives and narrow twisting streets appear in consequence with no evident primary concern for motorised traffic.

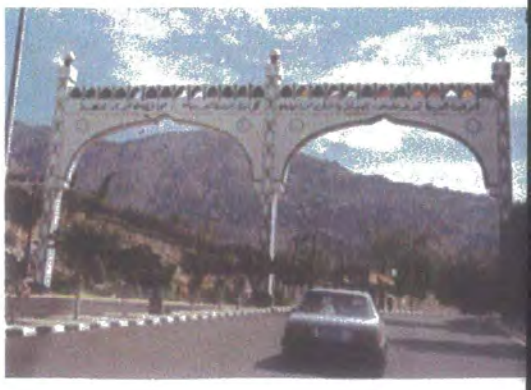


[2]The word neighbourhood, as used in this context, implies more or less homogeneously developed tracts of land which may have been designed in some detail. It does not yet entail the notions of neighbourhood inter-aid that formed part of the consolidated areas of the town.



Top left - Public garden at the former market square, Sa'da; *right* - Plan for a public park in Al Baydha, designed at the Ministry of The Municipalities, 1974; *centre*- Midan al Tahrir, Sana'a; *bottom left* — Ibb; *middle and right* - Ta'iz





BEAUTIFICATION

Streets were not primarily intended as objects of beautification of the settlement and their aesthetic quality resulted mainly from the combined effect of the buildings. Maintenance and care of the public areas were undertaken as needed and could be shared by the community. The overall result was seen to be satisfactory but proved to be vulnerable to the impact of post-Revolution development.

At the same time that ugliness appeared as a side effect of urban growth, administration-led efforts were made to improve matters in aspects such as street tree planting. One of the first indications of municipal concern for the public spaces in towns was the creation of public gardens or municipal parks. Early in the 'seventies, most municipalities wished to have a public garden in their principal town. In some cases these gardens replaced the open area traditionally intended for the weekly overflow from the market place. The effect was often the opposite to that expected, because, rather than adding to the public space, the walled enclosure of these gardens brought congestion to the surrounding areas particularly on market days. In other situations however - particularly in the larger towns- the design of landscaped spaces, such as neighbourhood and central or peripheral city parks, has in fact created pleasant areas.

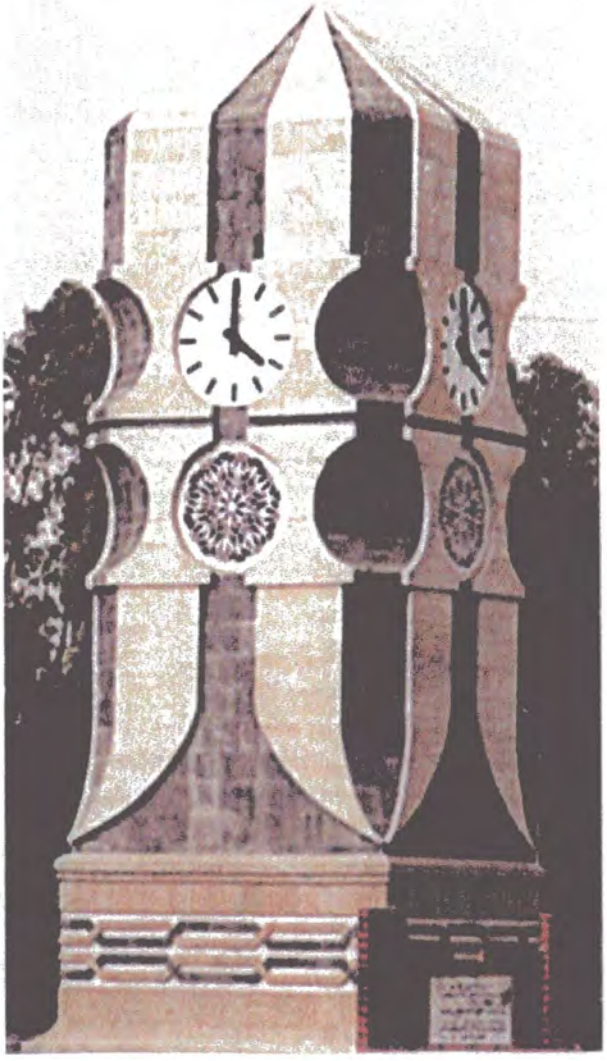
Ornamentation of streets for a variety of public activities appears first in the form of temporary arches erected on the occasion of major political celebrations, such as Revolution Day, and are comparable with those seen in other states of the Peninsula. Originally they were made of dismountable metal structures covered with light panels inscribed with brightly painted exhortations, symbols and the portraits of political leaders based on photographs.

As so often happens, these structures remain longer than necessary, eventually becoming unsightly in consequence of wear and tear. Later structures have been made to last, and some have achieved the scale and finish of permanent features in the new townscape. As such they could easily be interpreted as the incipient monuments of political power.

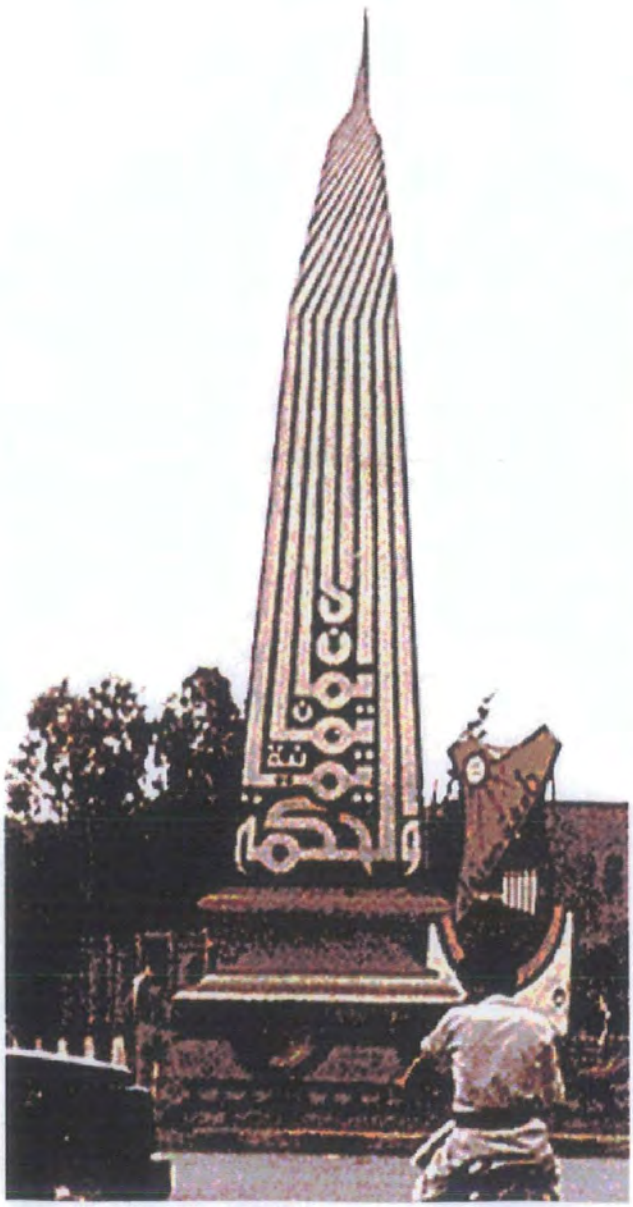
Another category is presented by the street sculptures seen at their best in the capital where they first appeared during the 'eighties.[3] The few

[3]The first modern large scale monument built in Yemen was the "Chinese Pavillion" built on the hills overlooking Sana'a from the Hodeida road, as a memorial for the Chinese workers dead during that road construction.

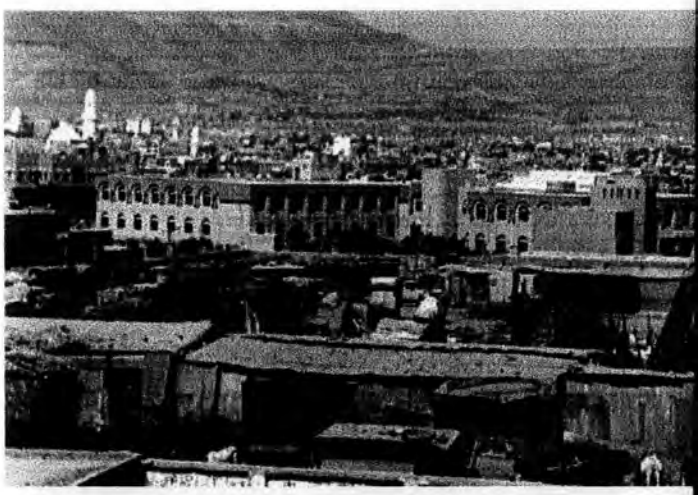
Top - "Chinese Pavillion" *(left)*, and Midan Al Tahrir, Sana'a; *bottom and opposite left* - Sana'a; *right* - Outcrop left by the cutting of the 'Amran - Hajja road on the mountain side and integrated in a belvedere, a form wich evoques the recent category of "land art".

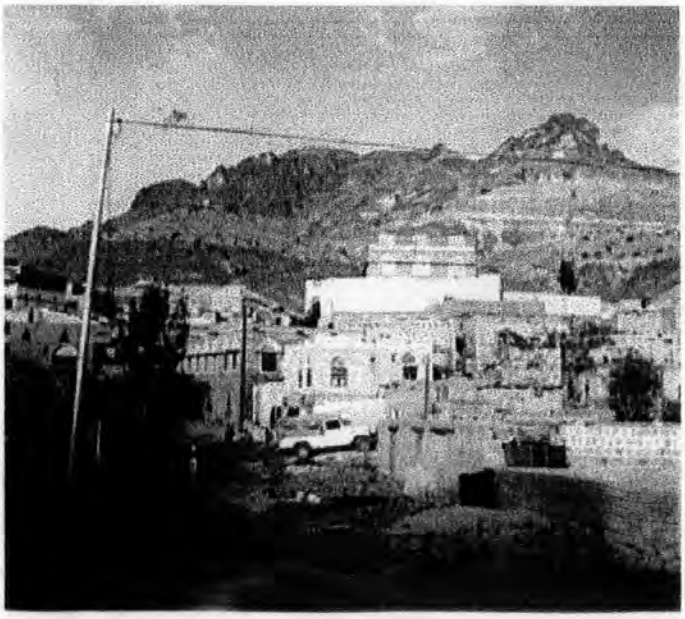


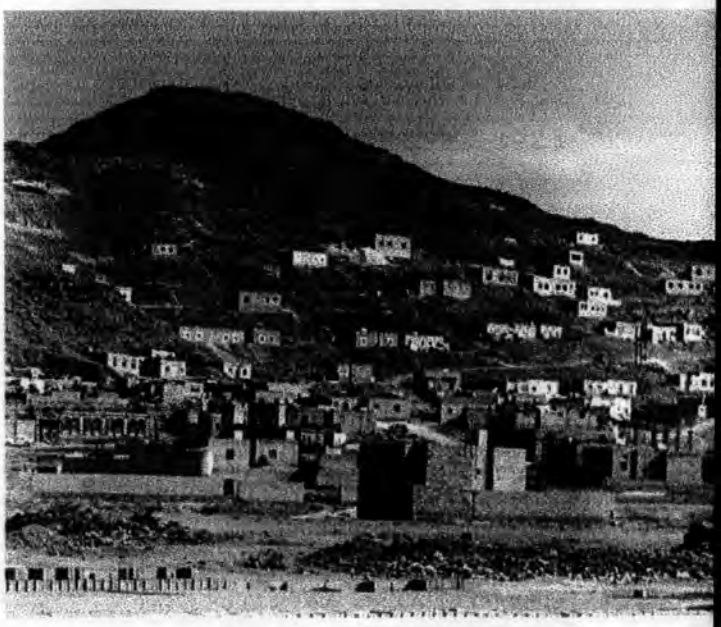
examples produced in the following decade reflect various tendencies, from free-form western-influenced monumental placemarkers to enlarged stone versions of objects in common use, such as the *janbyia*. The later approach echoes that seen for instance in the cast concrete coffee pots in the road roundabouts of some Gulf States. The same can be said about forms, such as obelisks, suppporting calligraphic exercises. In either case, the examples seen in Yemen place a strong emphasis on the display of skill required in fashioning the stone work as, for example, by cutting large stone chains out of a single bloc.



Top - Early 'seventies *akhdam* camp, outside of Bab al Yemen, Sana'a; *centre* - Development on the eastern side Sana'a in 1975 *(left)* and in 1990; *bottom* - The eastern *(left)* and western *(right)* fringe development of Sana'a , 1990







2.2- Urban problems

RATE OF GROWTH

The problems that afflict both large and small Yemeni towns fit in the cadre of consequences of rapid urban growth as experienced in developing countries elsewhere. Once again, Sana'a serves to demonstrate the impact of the post revolution period, by way of population movement from countryside to towns, increased land costs, motor vehicles, water consumption and domestic refuse. The capital's rate of growth[4] has greatly exceeded the planners' early 'seventies forecasts although remaining close to the revised estimates of less than ten years later.

In 1962 the city had 55,000 people occupying 300 ha. Fifteen years later the population had tripled and was spread over over nine times that area. At the beginning of the 1990's the resident population was about half a million with an additional population of daily commuters estimated at half of that total. The developed land of the city had again more than doubled in the previous decade and grown 25 times in less than 30 years.[5]

The relationship between the cost of land and social stratification became sharply defined as the city developed. As forecast, the flat land in the northern and southern expanses of the Sana'a basin became occupied by the affluent and the eastern slopes outside the Old City by a low income, mostly rural migrant population which, at the begining of the

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[4]Estimated at 7.7% a year in 1984 (YARNWSA:84) and stated as 4.62% between the census of 1975 and of 1986.

[5]Estimates made between 1970 and 1986:

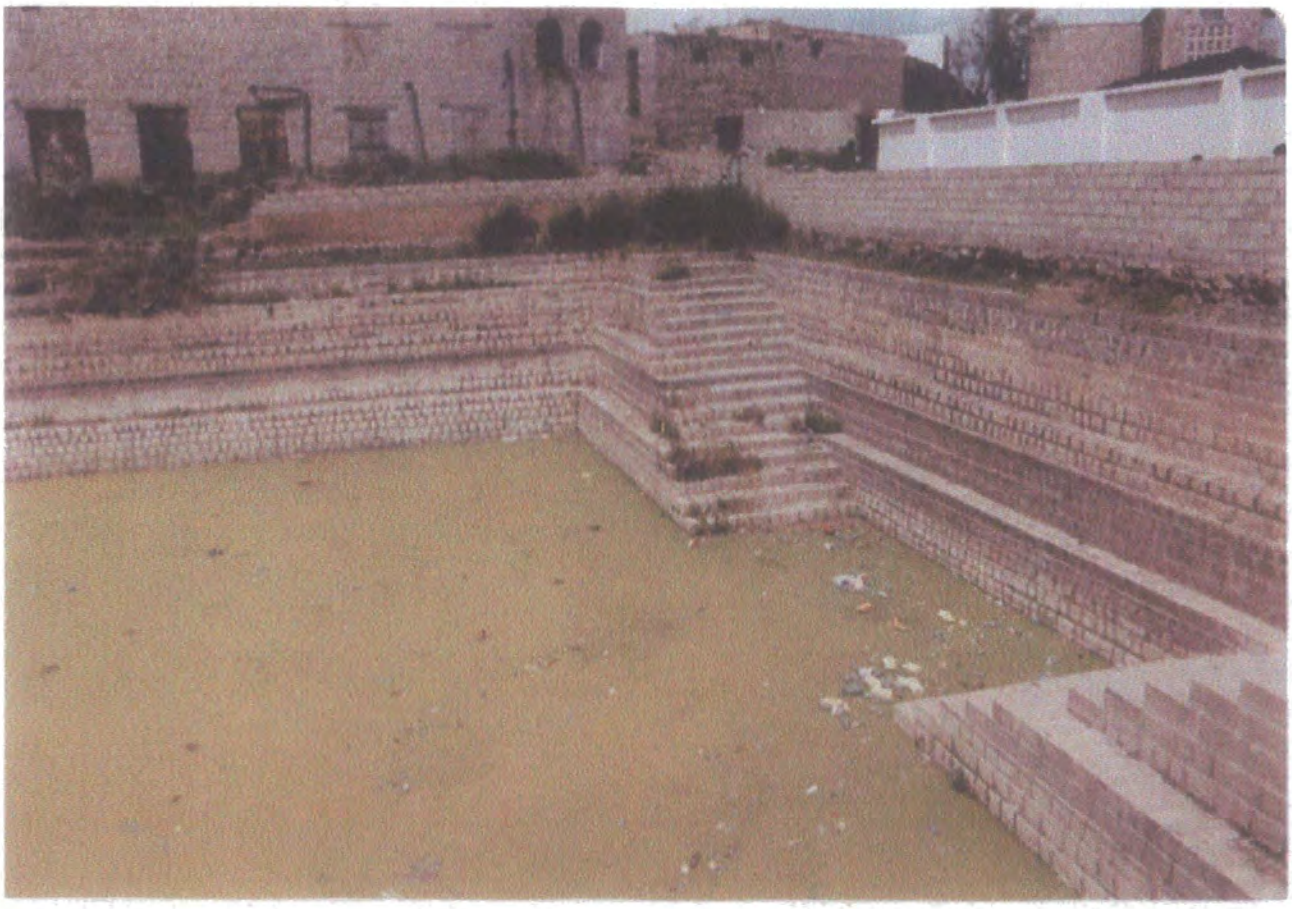
Bertaud (1971)
1962: 55,000 over an area of 296 ha
1970: 80,750 + 40,000 semi migrant (arbitrary figure) over 513 ha
1975: ? over 750 - 850 ha
1980: 181,000 (25% nat. increase , 6% migration) over 1100 -1350 ha
1985: 221,200 over 1600 -2100 ha
1990: 317,000 over 2200 -3100 ha
1992: 366,700

Berger/Kamsax (1978)
1977: 160,000 over 13560 ha? 21% of land developed
1983: 278,000 35% of land developed
1990: 480,000 54% of land developed
2000: 985,000 75% of land developed
(regular 20%/ year increase)

USSR Group (1984)
1986: 350,000
1991: 515,000
1996: 690,000
2006: 1070,000

YARSYB (1988)
1986: 427,502

Ma'jil in Hajja in 1976 and in 1990



'nineties was already expanding at the other end of the city, on the slopes near the new university campus.

The increase in the volume of traffic caused regular traffic jams, dust, exhaust fumes and noise. Yet at least the usually corresponding problem of public transportation seemed to have been satisfactorily resolved, due to an extensive taxi service, supplementing the official bus network.[6]

WATER SUPPLY

Water, countrywide, is scarce and water sources do not necessarily coincide with the main concentrations of population requiring increasing supply for domestic and agricultural use. However, surface water now generally runs to waste. The construction and maintenance of storage and irrigation works is part of a forgotten craft. Open cisterns seen clean and active in the mid 'seventies were ten years later abandoned and full of rubbish.

In Sana'a, the first modern central water supply system, created in the early 'seventies, abstracted water from the Tawila sandstone formations, which were expected to be adequate for the city, up to and beyond the year 2000. However the aquifer was also used for private extraction mostly for farming but also for industries authorized to drill their own wells rather than connect to the public supply. Thus, by the mid 'eighties, 75% of the aquifer reserve was already being used, farming taking 41%, Sana'a 29% and the remainder being for rural domestic supply. The water extracted by the private sector was already exceeding the forecasts made for the city's needs 15 years later. The water table was lowering at the rate of 2.5 m a year and wells continued to be drilled at increasing depths. An aggravating factor was that the aquifer was not being replenished by rainfall, which had dropped from 450 mm a year in 1955 to less than 200 mm throughout the 'seventies and the 'eighties.

In 1984 the National Water and Sewerage Authority consultants reappraising the situation, considered that "*it was not possible to aspire for a metropolis of one million and full scale irrigated agriculture at 2,400 m altitude in one of the arid zones of the world* ".[7] To have high quality water in these circumstances was by "grace of God" and should be respected as such. They predicted that, if the growth of Sana'a continued at the rate of

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[6]As in other eastern countries, taxis can be hired for individual service or function as limited capacity public transportation, by making pre-determined runs and taking passangers along the way.The fee is higher than in a bus but passengers have, besides added comfort, the possibility of asking to stop outside of the conventioned points of collection. Until the early 'eighties motorcycles performed taxi service, which was convenient for locations in narrow streets inaccessible by cars, but at that time the government severely curtailed the use of motorcycles in an attempt to discipline traffic.

[7]YARNWSA:84.

Top- Spring, Arhab; *bottom -* Motor pump and tank adapted to a traditional well, Sana'a

the previous decade, within a period that could be as short as five years, its water requirements would exhaust local sources. A transfer would be necessary from other regions at necessarily huge economic costs, and its impact would be felt on the agricultural economies downstream of the water sources to be diverted. Strong reactions were to be expected from the users of secular water rights.[8]

The recommendations of the reappraisal team involved, mostly, containment measures. A protection zone was defined, and proposals made to restrain indiscriminate access to the aquifers, implement water-saving modern irrigation methods and introduce less water demanding crops. Specific urban controls were suggested, such as the decentralization of government and institutional services, the updating of tariffs to penalize excessive water consumption and the growth of Sana'a reduced by limiting building permits and enforcing the control of unlicensed construction and slum formation. Water for irrigation should be sought for in formations of lesser quality, such as the Amran limestone aquifer.

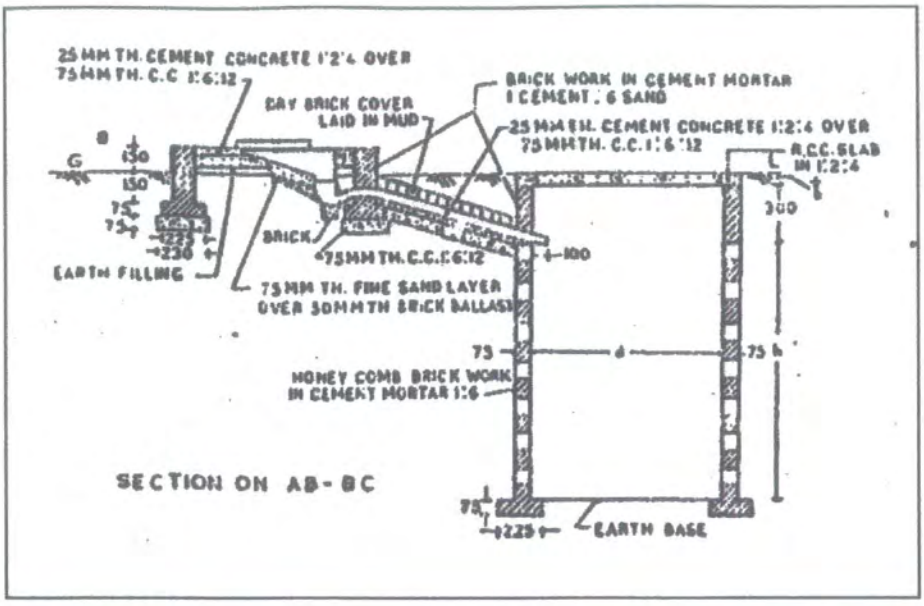
The USSR assistance to the National Water and Sewerage Authority was at the same time initiating a project to catch the streamflows of wadis on the western slopes. This involved the construction of four or five long term reservoirs for Sana'a alone. Dams 80 to 150 m high with capacities between 400 million and 800 million cubic metres were required, complemented with the necessary pumping stations to raise water 1 km over a 100 kms run, together with pipelines, power stations and roads. The first of these dams should be in operation in the early 'nineties. For irrigation purposes 15 sites were selected with dams between 15 and 40 metres height, and capacities of between 0.2 and 2.6 million m3.

The size of this enterprise speaks for itself. By 1990 none of these projects had been implemented and the location of external sources to supply the capital was but the subject of rumours.

SEWAGE

The pollution of aquifers by liquid waste from the proliferation of urban cesspits was already evident in the early 'eighties and government consultants repeatedly insisted on the costly and sophisticated technology required to purify the water if pollution levels continued to rise. Nevertheless critical levels were being reached by 1990 when it was

[8]The expected increase in comsumption - 180 million m3 a year - would be as much as the base flows of three major wadis - Mawr, Surdud and Kharid - combined; in compensation treated sewage effluent hence derived - 3800 l/ second expected in 2006 - would be able to irrigate an area of about 8000 ha downstream of the treatment plants. See YARNWSA:84.



Top - Diagram of pour-flush waterseal latrines proposed by the Reapraisal Team to the Natural Water and Sewerage Authority (source YARNWSA:84); *bottom* - Thula

established that liquid waste had already affected the quality of the subsurface water supply.

Modern flush toilets have upset the traditional patterns of water comsumption and methods of waste disposal. Alternative toilet systems, needing less water, were proposed to the authorities, but the writer has no knowledge of this being yet applied.

The disposal of raw sewage through lagoons has become a major hazard for its surrounding areas, with noxious effects of sight and smell and risks of infiltration into the usable water levels. In Sana'a the situation was particularly critical because a major lagoon had been located near a well established affluent community at Al Rhawda. Plans for later treatment plants met with opposition from local people due to the association of any large treatment plants with the Al Rhawda example.

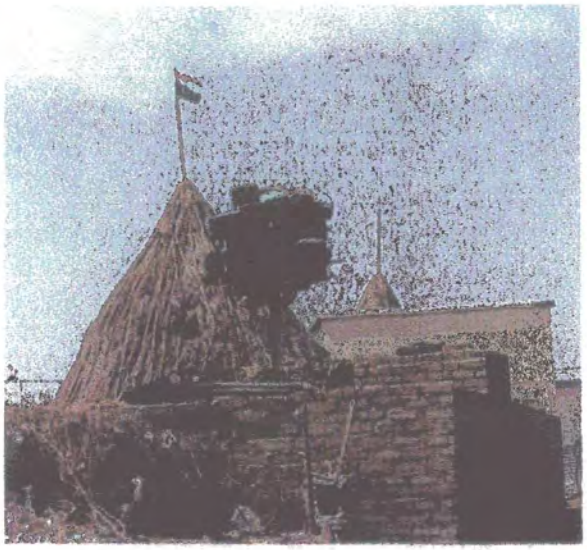
WASTE DISPOSAL

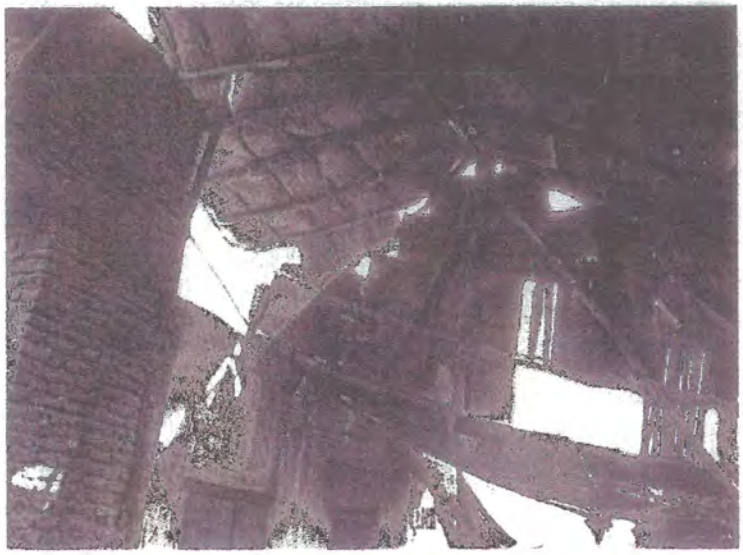
The changes in the local authority structure took away from traditional neighbourhood or village leaders the responsibility for keeping their limited spaces clean. On the other hand the required work became an excessive load for casual volunteering; and the changed values of the new social structure could not rely upon the outcast or lower class labour that once handled and processed domestic waste in towns. Scavengers had been eliminated; but it is obvious that they would not have been able to cope with the volume of garbage generated by the new society.

Domestic refuse disposal and collection is now a priority on the list of municipal responsibilities. Rubbish collection and disposal schemes have been proposed and are being implemented in towns of all sizes, but by 1990 they were still far from being completely effective. Central collection points are often overloaded and domestic garbage piles up at corners in the least accessible - and once most charming - neighbourhood streets.

The problems resulting from the generation, collection, disposal and treatment of urban waste and sewage stem not only from larger concentrations of people but also from new consummer habits and what has been called the "commodification of culture".[9] Yemen previously had no superfluous objects - or the space for them - and the notion of organised disposal was anyway mostly alien to North Yemen before 1962. The organic waste of traditional societies was easily disposed of or

[9]"Call for papers", Thirtd International IASTE Conference, Paris 1992.



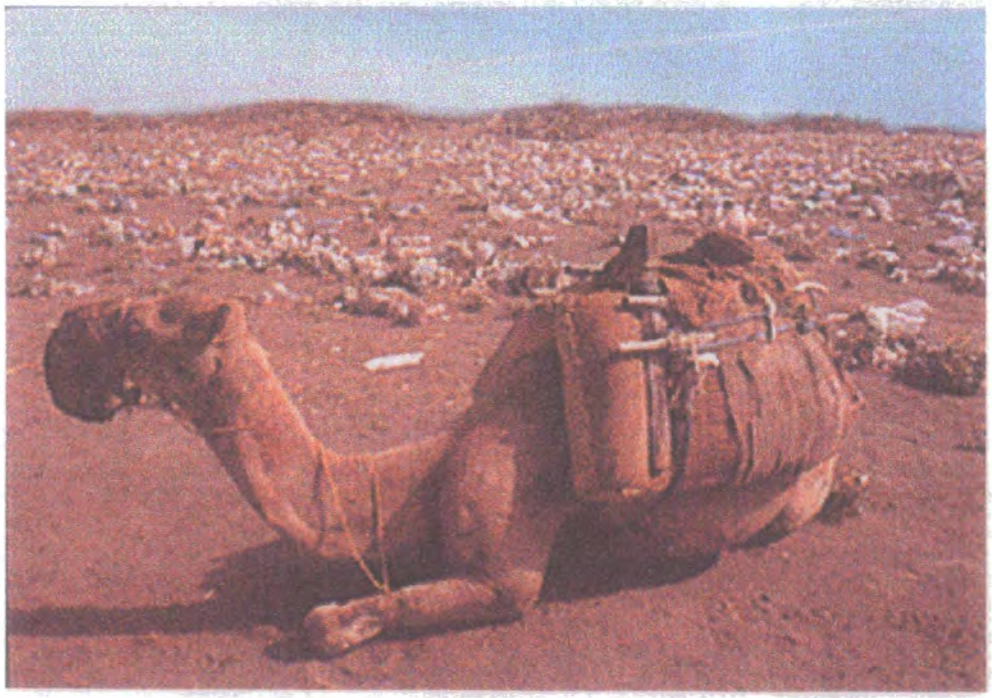


Top left - Pigeon house, Al Zuhra; *right* - Market street, Bayt al Faqih; *centre left and below*- Tyres in retaining wall, Dhawran, and fence, near Lahij; *right*- Lorry frames as the structure of a *barud*, Northern Tihama; *bottom* - Lorry tanks as part of motor pump irrigation systems, Huth; *opposite, left* - Hat as a street lamp; *right* - Sana'a, 1973 (photo Kai Bird).

recycled and apparently it was assumed that the inorganic material produced by the industrial system could be disposed of in the same way, regardless of its kind and quantity.

Recycling was part of pre-industrial North Yemen habits, being ultimately represented by the transformation of waste into fuel. Empiric recycling of discarded objects of the industrial culture, by people furthest removed from its source of production, was natural in the 'seventies and found in a variety of ways mostly in the countryside. Tin cans for water containers; plastic containers to make pigeon houses; flattened tin cans used to tile over the thoroughfares of a Tihama market; tyres used as fences or as retaining walls; lorry tanks as rural water supply reservoirs and many more examples, depending on how the individual imagination associated the item with utility.

The process had the interesting aspect that the absence of the act of purchasing reflected a creative attitude in the re-utilisation of the object. Discarded - and therefore free- objects were valued for their intrinsic material worth (the development of their potential for usefulness depending on the ingenuity of the user) regardless of the function for which they were originally created. When in 1973 the writer saw a plastic bag worn in lieu of a turban by a well-humoured young man, a plastic bag was still a rarity. Its use in this way showed that the young man had literally panache and at the same time applied the utilitarian approach of "if it can be worn, why not?". In itself this was no more strange than the use made by some foreigners of objects or clothing of the Yemeni tradition. Ten years later, however, every shopping item was delivered in plastic bags of all sizes and colours and soon there were so many that they would be thrown away. Carried by the wind they would float in cisterns and accumulate in street corners, they would cling to trees and thorn bushes and be scattered all the way to the horizon of the once clean plains.



Top left- Thula; *right* - Sa'da; *centre* - Northern Tihama; *bottom* - Hammam, Thula. Naphta and sometimes old tyres are now used as fuel

2.3- General Environment

Wood cutting, increased erosion, decreased soil productivity due to overexploitation, reduction of organic matter, neglect of terrace maintenance, excessive ground water extraction and consequent salinization, are among the reasons pointed by specialists for the "by now almost irreversible" desertification[10] of the country represented by the disappearing vegetation on forest and range land.

The process is being counteracted by such measures as promoting bottled gas as an alternative to wood for domestic fuel[11] and with government initiatives aimed at conserving and extending the green ground cover of the country by annual tree-planting programs, creation of nurseries, research and pilot projects. An example of these is the dune containment project at Marib and in Tihama, carried out in cooperation with local organizations[12] and F.A.O. Moreover the UNDP prepared a "National Plan for Action to Combat Desertification" for implementation by a High Committee, having, among other reponsibilities, the task of preparing a desertification map which would also be of value in the formation of government land use policies.

Potential environmental problems are industrial pollution, marine pollution and the disposal of hazardous wastes, which, in agriculture, are caused mainly by the use of pesticides.[13] The labour intensive cycle of fertilization of crops with "*animal manure and ashes from cooking fires fuelled partly by the roots and lower stalks of the previous crops*",[14] is being interrupted. The preparation of fuel from dung is being replaced by oil; and industrial fertilizers can be easily obtained. In any case "purchasing" rather than "re-cycling" has become part of the agricultural production process.

Various government agencies are concerned with particular aspects related to the control of environmental degradation. Among these the Environmental Planning Council, founded in 1987, has responsibility for co-ordinating, stimulating and evaluating the actions to be taken, but it has no authority for implementation. Recommendations for curbing the side effects of industrial production place emphasis on water recycling, proved to be economical, and the disposal of waste in treatment plants, land fills and selective incineration. Action on long term environmental improvement depends on education, training, institutional building, legislation, financing and implementation of projects.

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[10]Haskoning:89.

[11]A gas fuelled version of *tannur* has been developed locally and, at least in urban areas, has been well accepted.

[12]Confederation of Local Councils and Tihama Development Authority.

[13]A side effect of this is reflected in the consumption of qat. As with other crops, before chemicals were known, protection against pests consisted of spraying the leaves with very fine dust. This meant that once the leaves were shaken or rubbed clean they would be chewed. The use of pesticides has added a health risk because washing qat before chewing is considered to ruin its quality. Consequently, qat that has been treated with dust rather than pesticides is to be preferred and a higher price paid.

[14]Steffen:78.

"Egyptian Plan" of Sana'a

Section 3: Planning

3.1- First steps

Physical Planning associated with central co-ordination and design on the drawing board was initiated by the Ministry of Public Works and with the assistance of foreign- mostly Egyptian - advisors. The Ministry, fully organized by 1968, had responsibility for civil engineering work, and included in its constitution, at the deputy Minister level, a "Head of the Municipalities" (*Rays al Baladiya*), to whom the General Directors of the eight municipalities of the time reported.[15]

The first document known by the writer as in any way representative of a city plan proposal is the "Egyptian Plans" made for the three largest towns, and was still very much the basis used in Sana'a by Ministry surveyors when the writer arrived in 1973. In practice, this consisted of superimposing a grid of streets over the existing pattern in the periphery of the walled nucleus and adapting from then on. There was an elementary hierarchy of major to minor streets but they did not seem to follow a correspondingly organized conveyancing pattern. The design reveals the simplifications of the drawing board as a medium at the same time that it shows the preponderance of networks over sites.

3.2- The United Nations Town Planning Programme

In 1970 a physical planning division at the MPW became operational with the arrival of a United Nations Development Programme (UNDP) expert, Alain Bertaud. He found difficult conditions. There were no centrally planned land use, health or safety regulations; no land development controls and no organized cadastral records. The building permit procedure, established two years before, was still of little effectiveness in the control of land and building, given not only the variety of entities that could independently grant permits, but also the fact that municipalities, providing no infrastructural services at all, had little authority to make enforcements. Cartography for the country or the towns was scarce and inaccurate; for instance the base map of Sana'a then in use had been drawn in 1936 from an amateur air survey and had no defined scale.[16]

The first aerial surveys started at the end of 1970, at the same time as census and other statistical collections. An Italian firm[17] was initiating studies of Sana'a and Hodeida in order to prepare major utility plans.

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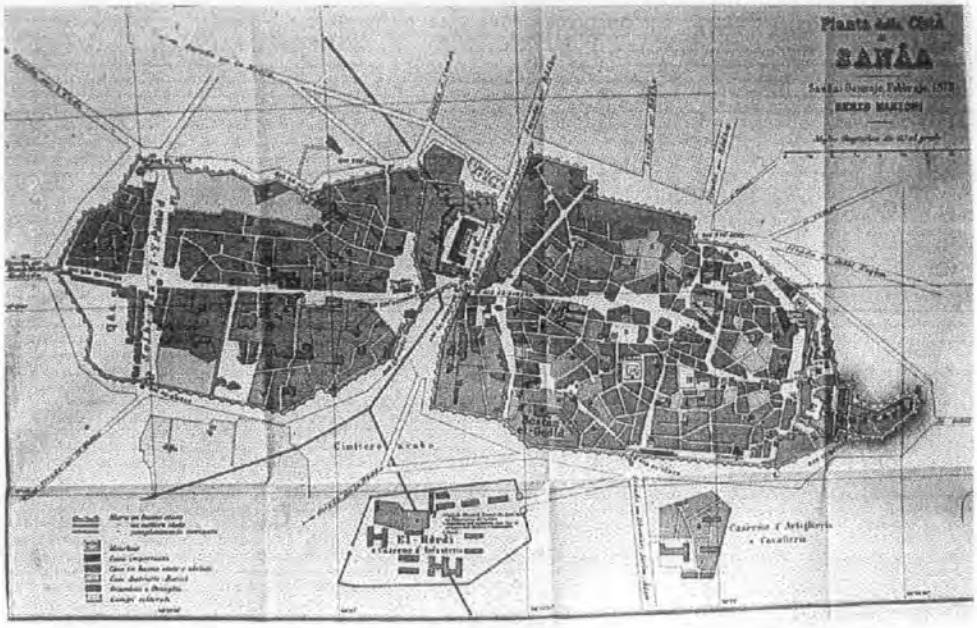
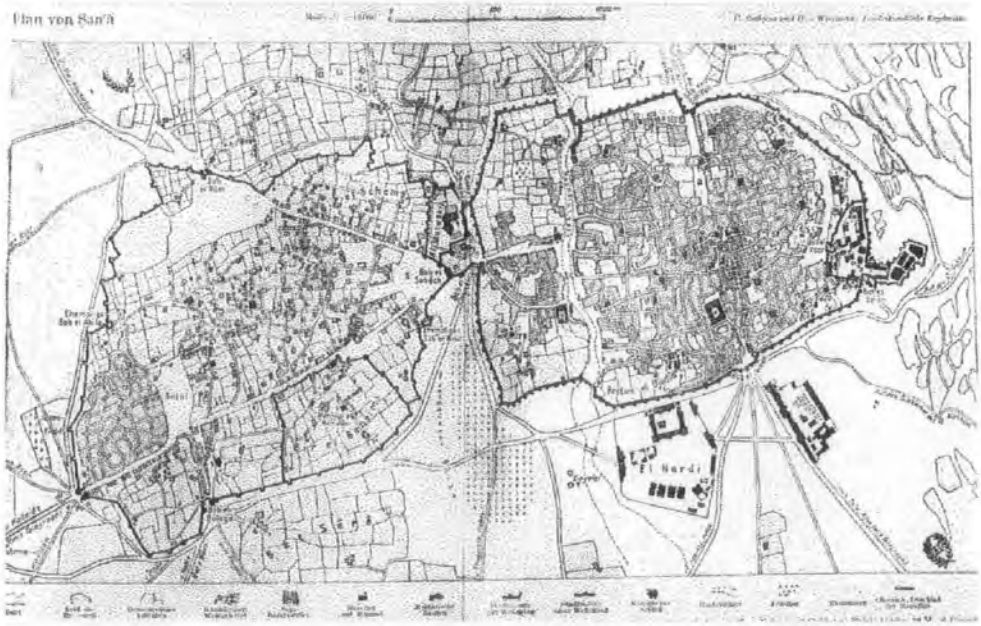
[15] San'a, Taiz, Hodeida, Ibb, Hajja, Sa'da, Rada' and Al Baydha.

[16] Bertaud:70

[17] Italconsult

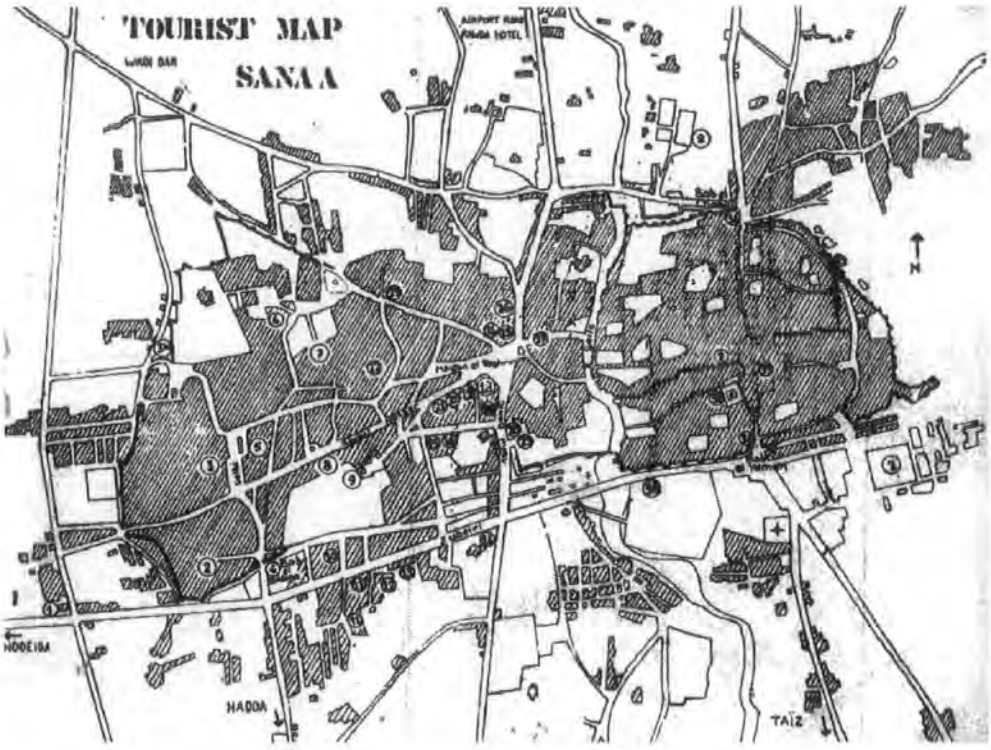
From top to bottom - Sana'a in 1879 (Manzoni map), 1929 (Rathjens and Wissmann map) and 1964; *opposite*- Sana'a in 1972 (Bertaud)





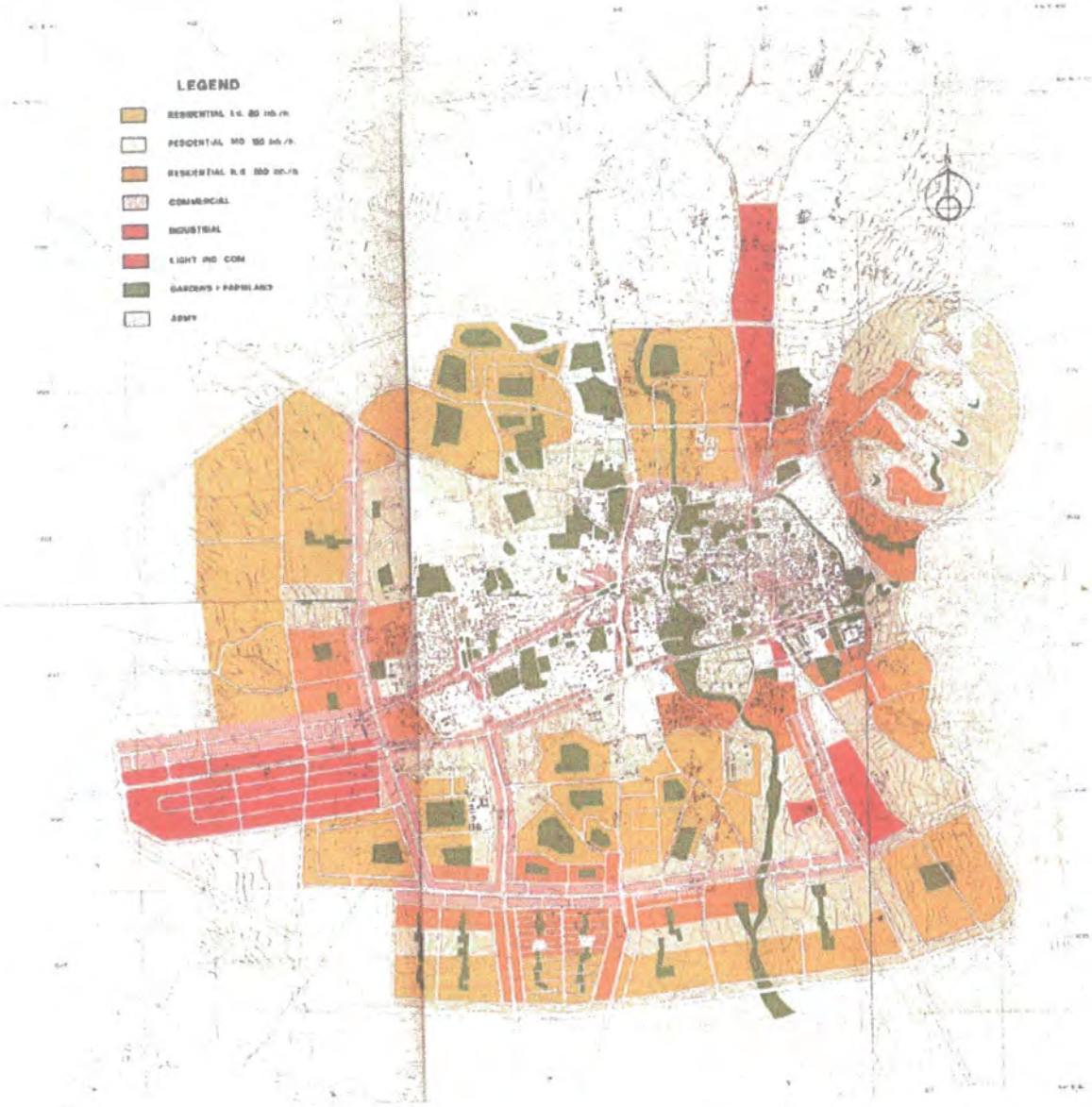
In 1970, Bertaud found in Sana'a a consolidated walled city, with two contiguous nuclei, the oldest and most dense having the best architecture and the worst sanitary street conditions. Around the walls, scattered low density development, with no utilities, already occupied three times as much land as the city had in 1962.

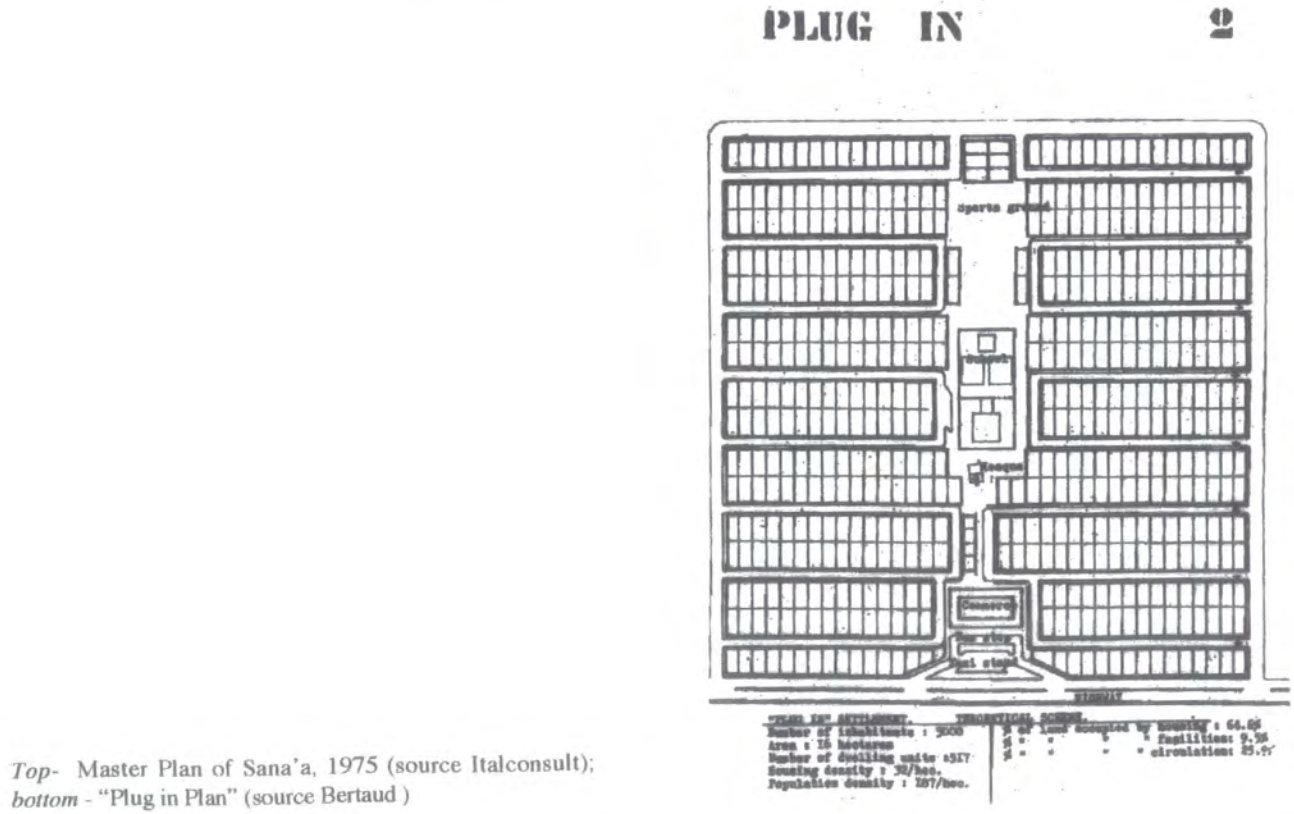
Bertaud's enthusiasm for the traditional methods of building was demonstrated in his campaign, described on chapter 5, where we saw that his efforts to promote earth construction failed, but partly succeded in having stone rather than concrete used for institutional buildings[18] and former imam's buildings restored and adapted to hotels such as the Dar al Hamd and the Al Rhawdha palaces. In first progress reports on the Master Plan for Sana'a at the end of 1971 the systematic use of traditional building materials is considered "*a prerequisite for the implementation of the Master Plan*" and capable of halving the yearly capital investment on the expected construction schedule for the following 15 years.[19]



[18]Such as the Government Guest House, the new heaquarters for the Ministries of Public Works and Municipalities and the Ministry of Foreign Affairs. The last was designed by Jerry Erbach, a UN Volunteer architect that joined in 1972.

[19]Bertaud:71. In a comparison between the costs of a school made in stone, in Rada', and a current "Kuwaiti school", made in concrete, the total cost of the former would remain in the community and was three times lower than that of the latter, in which only 25 % of the cost remained in the community. The cost of concrete construction in the countryside could be four or five times higher than that of stone. In Sana'a it was the triple.





Top- Master Plan of Sana'a, 1975 (source Italconsult);
bottom - "Plug in Plan" (source Bertaud)

MASTER PLAN OF SANA'A

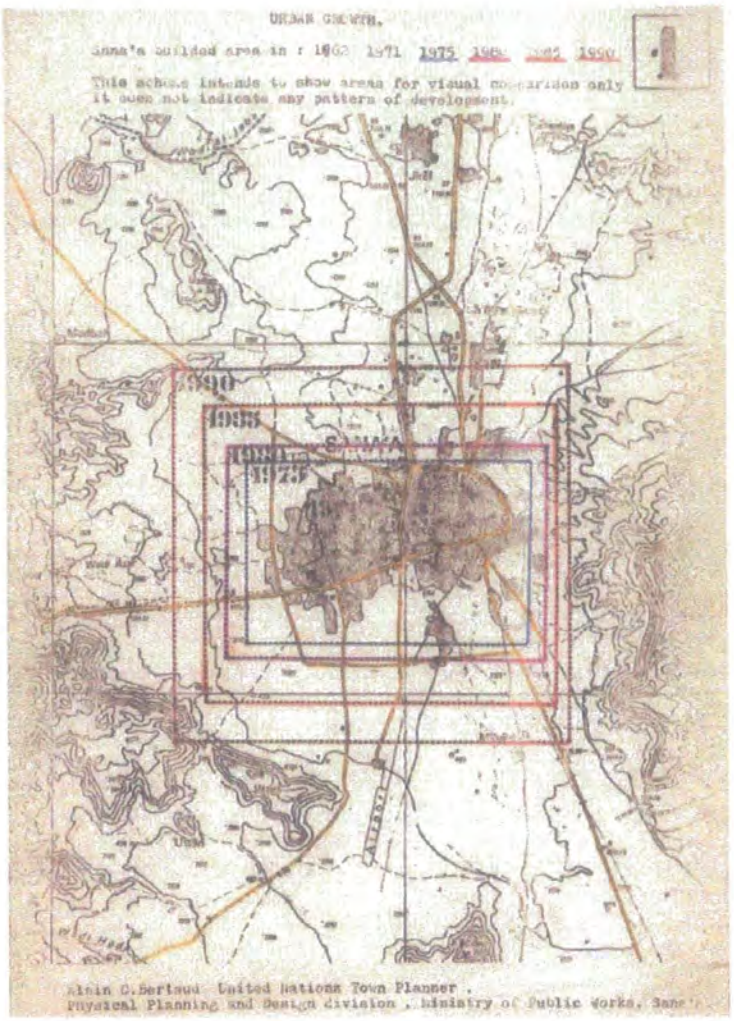
The Master Plan for Sana'a rested on five major objectives: 1) Basic housing for all households in which at least one member worked; 2) Basic utilities and facilities for every neighbourhood; 3) Control of city growth to allow the progressive provision of utilities, facilities and job providers at minimum cost and maximum efficiency; 4) Preservation of the city's cultural heritage and adoption of a modern construction programme adapting to Yemen's cultural features; 5) Systematic tapping of the manpower resources offered by traditional building craftsmen.

The measures proposed by Bertaud were characterized by an effort towards reasonably realistic achievement in face of the institutional means then available. Some of the standards are at a bare mimimum such as water supply of one fountain for 60 households and bi-weekly garbage removal.

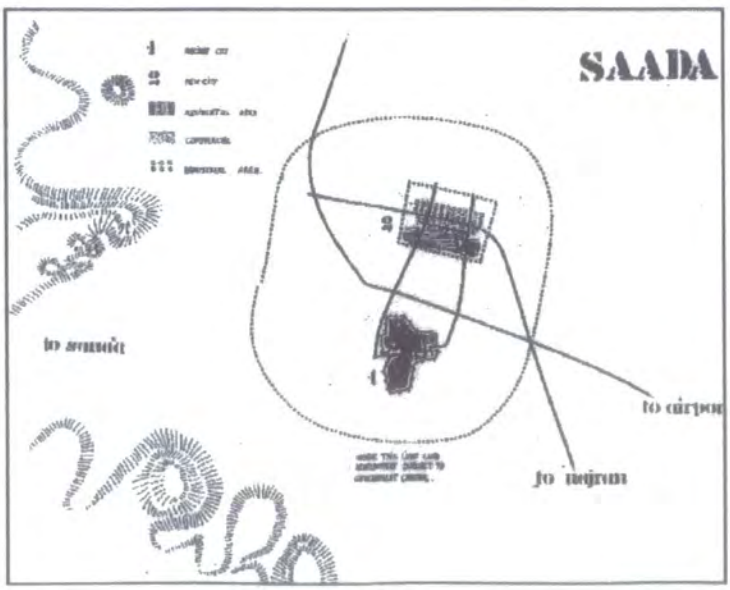
He proposed a zoning map which he cautiously designates as an indicative rather than an imperative document, and a street hierarchy network, dividing the site into a grid of arterial streets, tied by ring roads defining relative limits of radial expansion. The system was complemented by a network of collector and local streets designed to discourage through traffic in residential areas. Existing farmland was surrounded, rather than crossed, by streets in residential areas, in the hope that by enclosing farms by buildings and limiting access to the interior, thid would result in cost decrease and consequently an incentive to maintain the land use as agriculture. At the same time essential reserves of open space would be created in the developing areas, with streets laid out in relation to easily identifiable landmarks such as irrigation ditches which, at the same time, allowed an equal contribution to public rights of way from the owners on either side. In response to the pressures for rapid subvision he presented a neighbourhood unit prototype ("Plug in Plan"), adopting principles recognized in the various concepts of neighbourhood units at that time in the West.[20]

His plans were made in the assumption that the population of Sana'a would be 280,000 by 1988. In reality, the growth of the town was double that for approximately the same period.[21] However his forecast for land expansion in 1985, if no planning policy was enforced, did correspond with the perimeter actually developed, although the spaces expected to remain unbuilt were occupied by twice the population.

[20]Namely, a central pedestrian core with community services and local roads looping to an external system of collectors where local commerce was located, and which in turn hooked into the major arterial grid.
[21]See YARSYBs.



Top - Extracts of the Master Plan for Sana'a (source Bertaud:73); *bottom left* - First planning proposal for the expansion of Sa'da (source Bertaud); *right* - The expansion of Sa'da in 1990 (source: Ministry of Municipalities and Housing, Physical Planning Division)



Looking at this document one feels that, in an effort to contain development based on maximisation of results for the investment in infrastructure and acessibility, the city was seen as a progressively expanding central core with a desirable goal of growth based on the occupancy of the furthest segments but only after saturation of those nearest to the centre. No peripheral poles were proposed or encouraged that would present strong alternatives to the initial cluster.

The contrary happens in the plan for Sa'da, a town which, from relative isolation, was to be on the major paved road to Saudi Arabia. To maintain the integrity of the walled town, Bertaud proposed that a twin settlement be created separately and at a distance from it. By early 1973 a school was already there and sale of lots had begun.

Estimates were again conservative and expectations on the government control of pressures for development, optimistic. Development outside the walls swelled along the new roads with a population growing from less than 5,000 in the 40 hectares of the walled town in 1975, to more than 18,000 in 1990,[22] the new settlement now functioning as an alternative centre to the old.

In 1972 the Ministry of Public Works and the Head Office of the Municipalities were installed in two separate, adjoining, buildings. This coincided with the arrival of another UN expert - Derek Matthews - and it was decided that he should take over the institutional building sector of Public Works, while Bertaud devoted his full attention to organizing the Physical Planning and Housing Division of the Municipalities. Derek Matthews designed various major buildings of that period [23] where a local idiom was adapted.

Early in 1973 the writer arrived to join Bertaud's team. By then its UN Volunteers were terminating their commissions to be followed two months later by Bertaud himself. The office was left with a fair amount of material produced in the preceding three years - aerial photos, plans and reports - and a little by way of office supplies.

The Planning Division of the Minicipalities included then a recently appointed director and sub director,[24] a young clerk with negligible understanding of draughting, a tea boy and a few land surveyors who had

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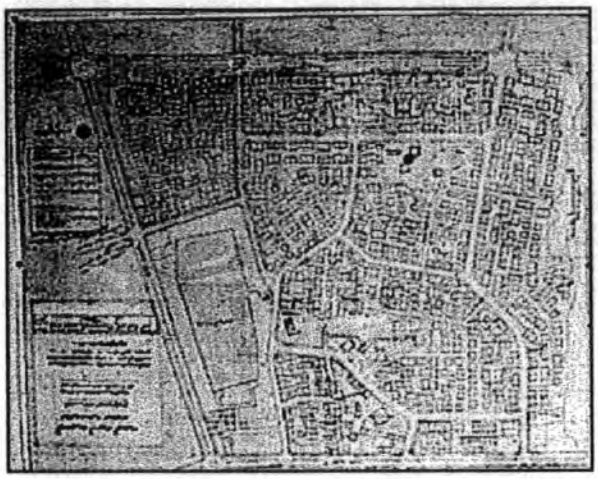
[22]Estimated figure. See Winzer: 82.

[23]National Institute of Public Administration, Health and Manpower Institute, Ministry of Justice.

[24]Addul Jelil al Hak, architect and Dhirar Abd al Daim military engineer.J20.

Subdivision plans for Sana'a (not strictly followed): Bayt Mayad, 1974 *(top)* and Al Hasaba, 1973 *(bottom)*



Al Hasaba I village project:site plan

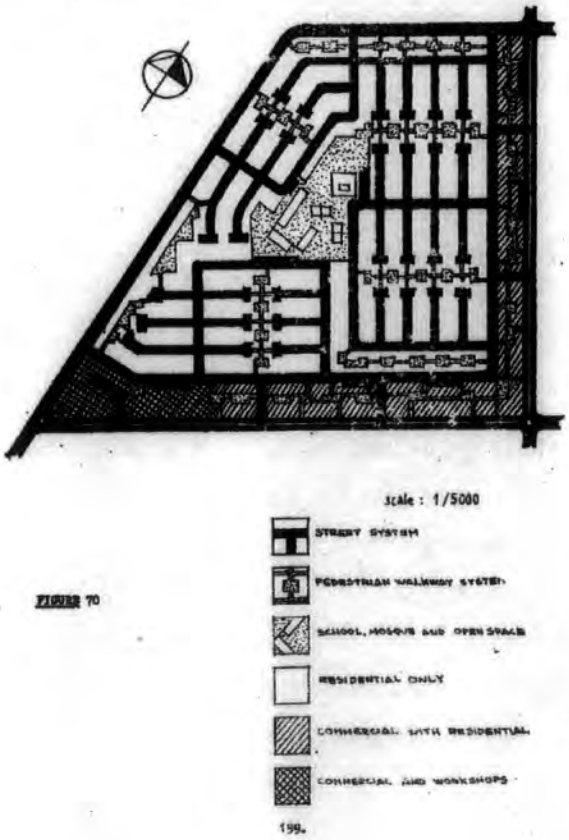
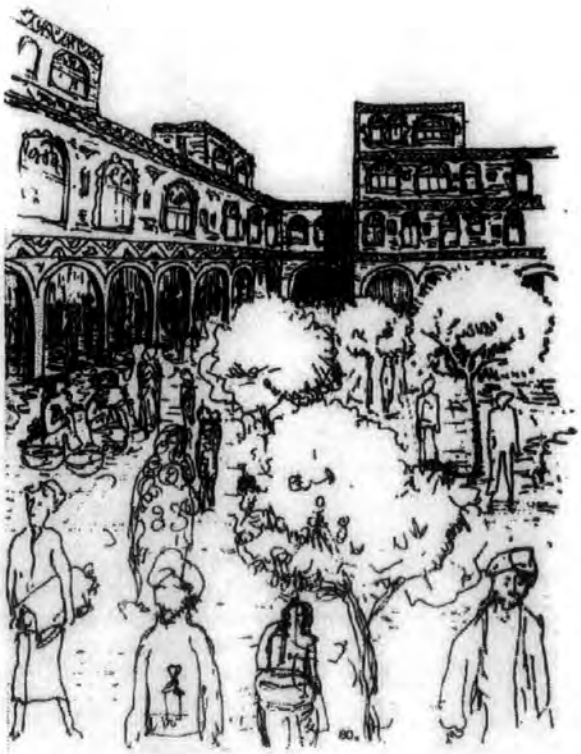


FIGURE 70

PERSPECTIVE OF SUGGESTED COMMERCIAL AREA



been brought up in the "Egyptian Plan" tradition.

The writer had no power to seek foreign aid and, in a way, this was good because he believed that initatives that depended exclusively on foreign help and expertise were liable to fail; and now there was no alternative but to rely solely on local means and to employ and train local staff. In this respect there can be no adequate recognition of the role played by the indefatigable sub director of the office as the mobiliser and mentor of the group of unprepared young men that one morning entered that empty basement to begin work.

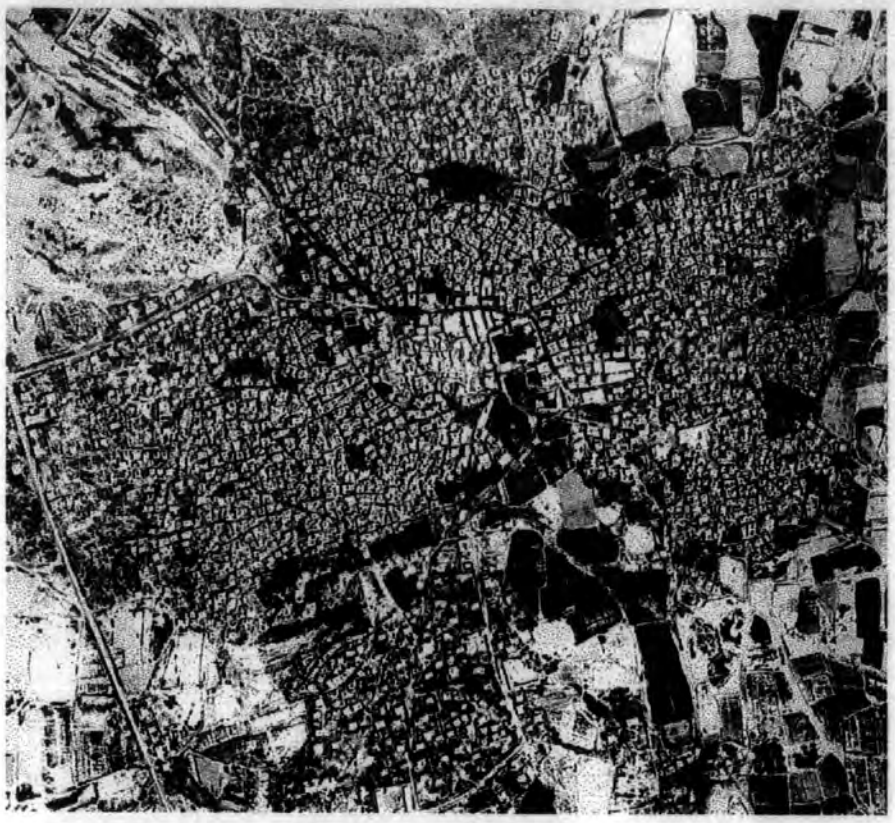
Circumstances were fortunate; at that time there were in Sana'a a few foreigners qualified in architecture, planning, civil engineering and English teaching, who voluntarily agreed to run courses in their spare time for the trainees. Thus, for one year, in the afternoon (qat chewing was allowed), a few eager young men learned the rudiments of their tasks as draughtsmen and land surveyors. Some earned scholarships to higher education abroad and returned to take responsible positions in the municipal structure at the local or central level.

Other pressures were added to the task of trying to implement the Master Plan for Sana'a, namely those of increasing the amounts of land to be developed both in Sana'a and in the provincial towns of Sa'da, Dhamar and Hajja.

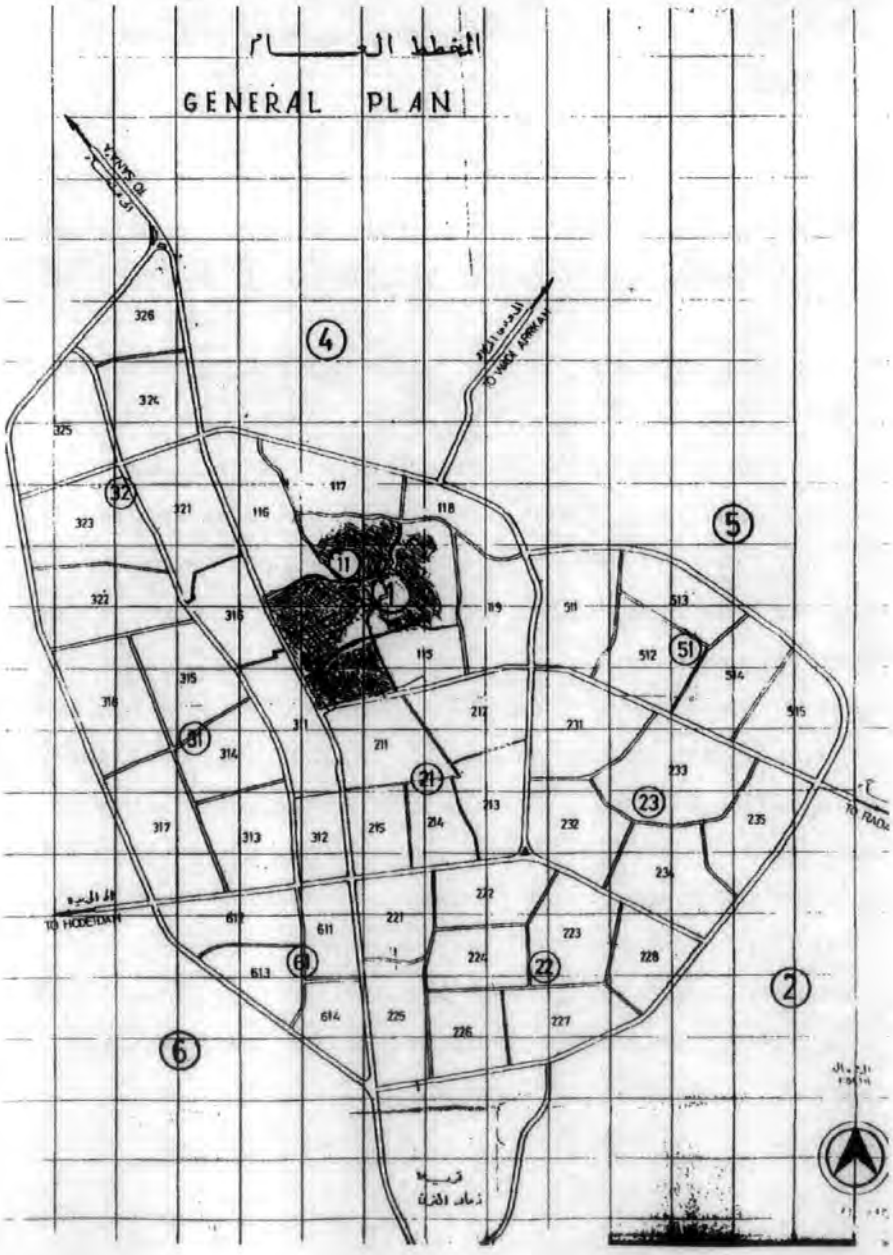
With the same drawbacks of earlier years, similar methods were adopted to those of the former expert. These were based on the priority for securing a "ring road system" and the creation of subdivision plans in the form of neighbourhood units. These were provided with basic services and an internal street network inter-related with the collector street system thereby ensuring basic rights of way and land reserves in areas of high demand for development.

The notion of "development planning " applied to the capital and the towns in the countryside thereby became identified with a general layout plan repeating, with variations, a basic neighbourhood unit module, and intended to reserve rights of way for the main street network and land requirements for public uses, such as mosque, hospital, school, market and, occasionally, administrative headquarters and parks. Recommendations were made for the protection of natural and built features and proposed land reserves but at that time there was no way that measures of this kind could be enforced.

Site considerations were, in most cases, not crucial, unless, of course, one considers that in general the land available for development was the

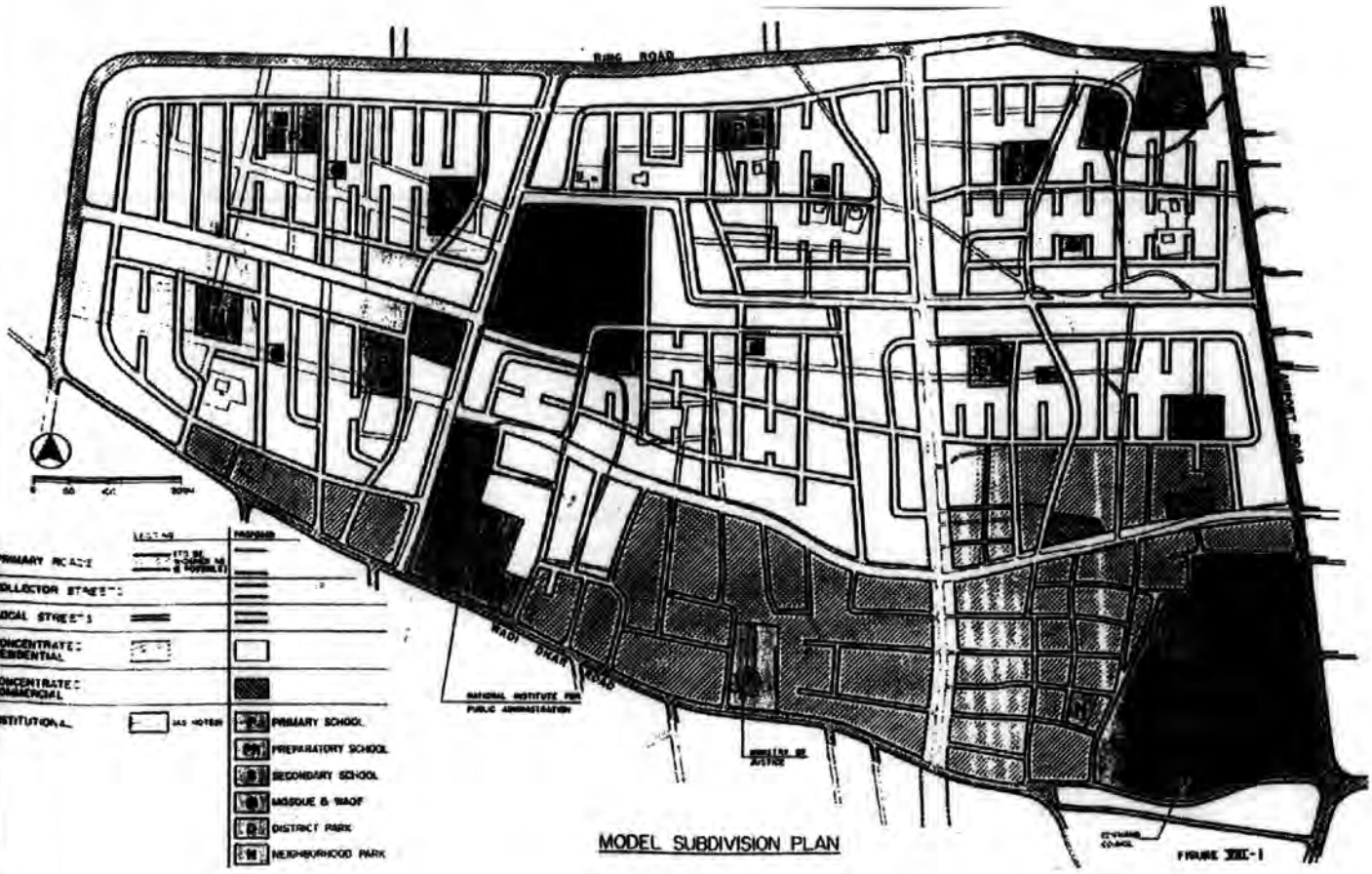


This page: Dhamar General Plan (source: Ministry of Municipalities and Housing, Physical Planning Division). The shaded area corresponds to the town as it is seen in the 1973 aerial photo *(top)*; *opposite* - Model subdivision plan for Sana'a (source Berger/Kamsax: 78)



flat land that had formerly been part of the settlement's agricultural provision. On hilly sites, the recommendation of following contour lines conformed to established tradition and there were few cases where extensive land forming was involved.

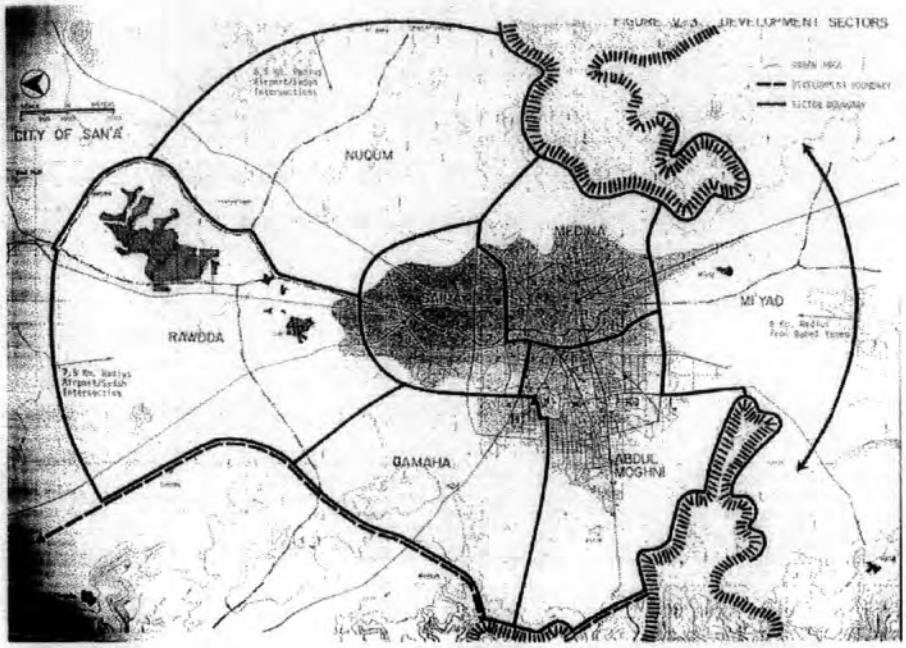
The absence of a cadastral survey, the looseness of building permit procedures, the pressures on a weak administration and the absence of proper equipment and qualified personnel caused significant departures from the plans then made. The writer had some difficulty in recognizing his layouts in the patterns he found built 10 years later and confirmed the refusal to adopt certain features, such as the use of cul-de-sacs or loops in local streets to secure an internal pedestrian right-of-way, which were already seen with reluctance in his time. Nevertheless this neighbourhood unit principle, however compromised, remained as a basis for land development and became institutionalised. The basic concept, with whatever modifications individual designers introduced, was still being applied in ministerial planning offices in 1990.

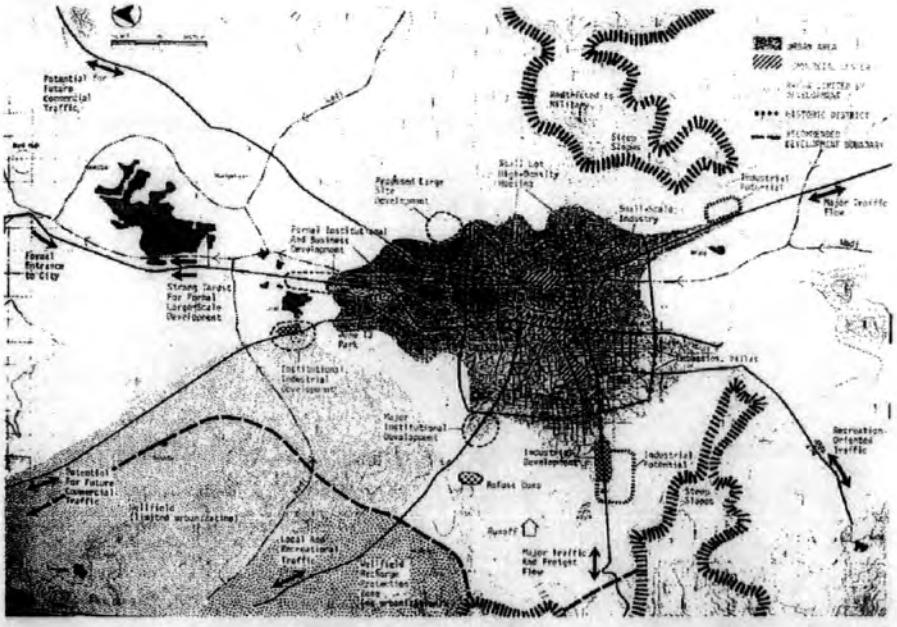


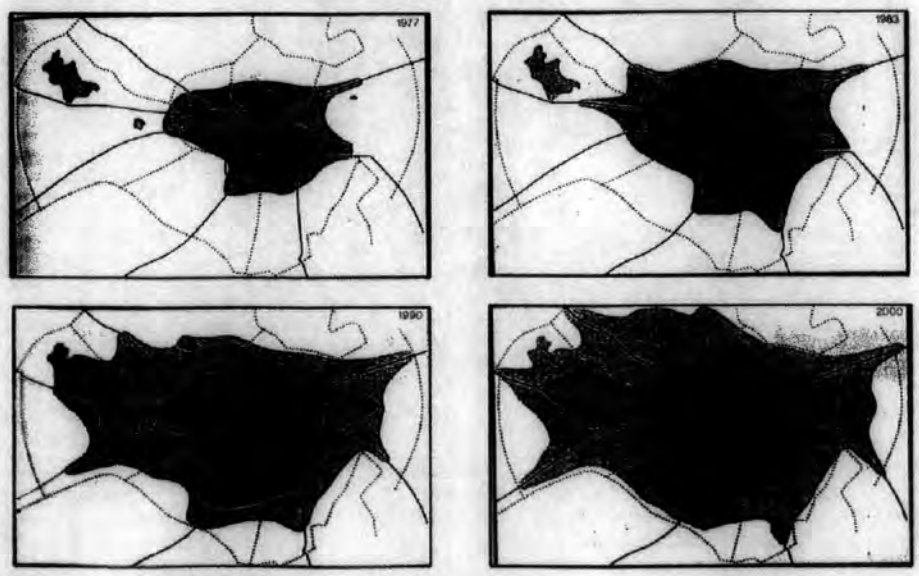
MODEL SUBDIVISION PLAN

FIGURE XIII-1

This page and opposite - Extracts of Berger/Kamsax Sana'a Master Plan, 1978





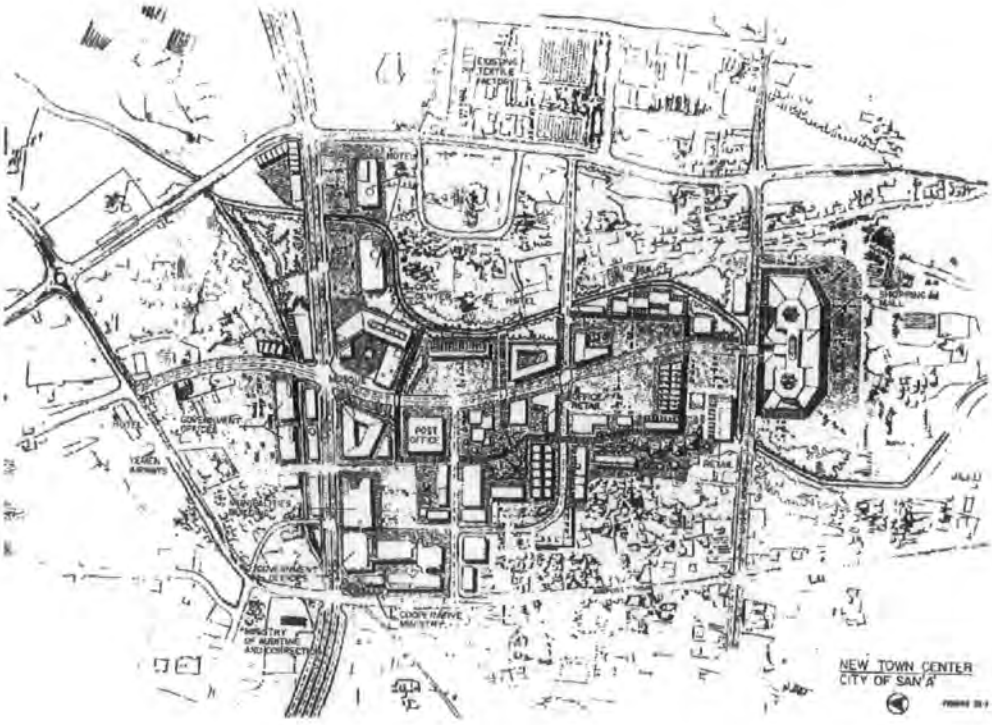


FORECAST EXPANSION OF SANA'A

3.3- The Berger/Kamsax Master Plans

After the writer's departure in 1975 an interim caretaking period with U.N. assistance appears to have followed until, in 1978 a foreign consulting firm (Louis Berger/Kampsax) was commissioned to produce Master Plans for the country's largest towns. These remained the basic guidance documents in 1990, although not without changes in some of the main proposals.

Berger/Kampsax's plans for Sana'a viewed the city as an already large entity and their forecasts for 1990 proved fairly accurate. They foresaw that by 1990/2000 growth would engulph the neighbourhing villages such as Al Rhawda within an average distance of 8 kms from the city centre. They also envisaged sectorial development extending from the densely built up residential core, each sector being equipped with central commercial zones and government offices in secondary centres and subcentres organized along a recognizable western stereotype of "shopping+service+hotel" malls. In the periphery of the denser zones, sites were designated for institutional use and industry, land for refuse disposal and land where development was to be restricted such as well fields and well field recharge protection areas. Traffic flows and trends were identified and proposed road networks were defined securing land reservations for major traffic routes.



Sana'a Planning Zones, 1990 (source: Ministry of Municipalities and Housing, Physical Planning Division)

Historical protection districts were established in the Old City and the Jewish quarter of Al Qa'a but, strangely, not for the walled garden suburbs in between, around Bir al 'Azab. Proposals were put forward for the creation of an administration for the historic preservation programme and a survey of areas in order to determine the sites that should be acquired by the government.

The predicted establishment of a satelite concentration of the main city cluster in the north, adjoining Al Rhawda, did not take place, if for no other reason due to the unforeseen location of the main sewage lagoon in this area. Instead, a quasi-symetrical development took place to the south although in a rather less controlled way.

The Plan contained a "Summary of first phase action projects" listing the more important interim actions in land reservation, subdivision and community planning guidelines, staffing of agencies concerned with housing and infrastructure strategies including a solid waste collection programme in which the Old City was a priority.

3.4- Implementation

By the end of the 'eighties, the implementation of the planning guidelines for the principal cities was the charge of the Main Cities Planning Department of the Ministry of Municipalities and Housing, following as possible the prescriptions of the master plans but reportedly subject to much political pressure.

In the field, this basically consisted of opening up, grading and paving streets; in the office, of designing neighbourhood units and supervising their development by the local municipal offices.[25] Each unit was about 50 ha, with, as usual, an elementary school, a mosque, park, local business area, and commercial activity in the fringes. A secondary school and a police station were allocated for every three or four units. Sana'a was divided into nine planning sectors, each sector having nine zones and each zone having nine neghbourhood units. This allowed for a three digit organization of areas (first digit for the sector, second for the zone and third for the neighbourhood) which is convenient for computer storage and for postal distribution in which , after the three digit group, two more two digit groups follow, one designating the street and the other the house.

Once a plan was approved, agreements were made and signed by the designers at the Department, its Director, the Minister and the Deputy Minister.

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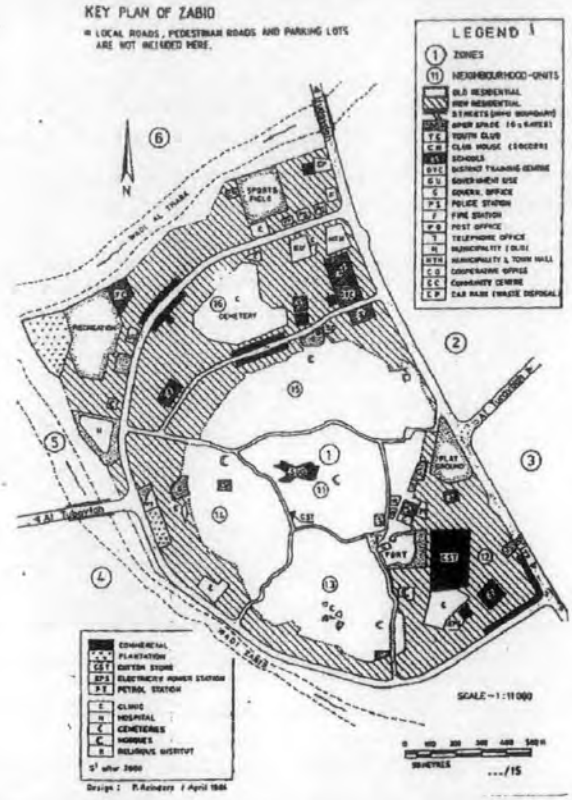
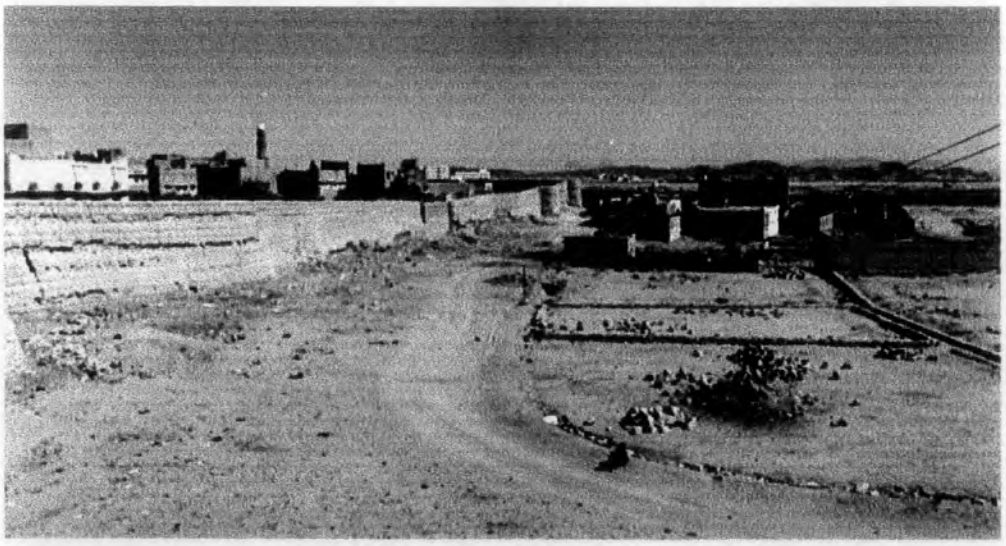
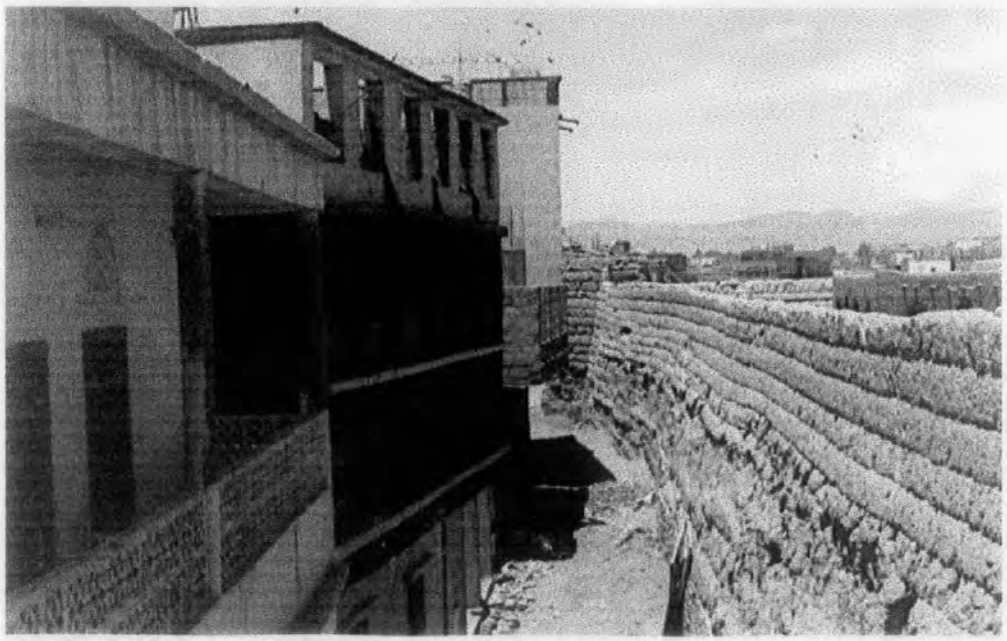
[25]In an attempt to control speculation, site plans for private development have also been prepared in the Department.

Top - Plan for Zabid (source Reindeers:86); *centre and bottom* - Building outside the Sa'da walls, 1990







3.5- Secondary Cities

"Secondary Cities" evolved as a planning concept during the 'eighties and justified a special planning team within the Ministry.

Although there are discrepancies in the estimates from different sources, the million and a half to two million people that made up the urban population of North Yemen in 1986 were equally distributed into three parts. One third was in the capital, another third in the cities of more than fifty thousand (Taiz, Hodeida, Dhamar and Ibb) and the remainder in seventy or so minor or secondary towns with populations of between 2,000 and 15,000 people.[26]

In 1980, the German Volunteer Service was officially assigned by the Ministry of Municipalities and Housing to town and country planning tasks. Since most of the Ministry's Planning Department was pre-occupied with the plans for the main cities, it was decided that the German assistance should be concentrated on the preparation of master plans for secondary cities. A "Secondary City Section" was therefore created in 1981 at the General Department of Physical Planning at the Ministry. It later became a department of the same standing as the main cities department, staffed by both German and Yemeni professionals.

The major goal of the Yemeni-German Project for the Secondary Cities was to call the attention of the Yemeni government to local development in the minor towns as a means for improving the quality of life. This would be done through the decentralization and training of local planning officers, and by providing local voluntary assistance coordinated by the Ministry. In the course of that decade land use plans were produced for aproximately a quarter of the secondary cities, begining with the most important namely Sa'da, Hajja, 'Amran, Thula and Zabid.

After the Unification the Ministry of Municipalities and Housing became the Ministry of Urban Planning and Housing with corresponding changes of structure. The possibility of merging both the secondary and the main cities departments into a single town planning department raised fears that, inspite of the artificial division into major/minor cities and obvious advantages in planning methodology, the largest settlements would deserve most if not all the attention of the new department, leaving the overall urban development of the country unbalanced. To counteract this, regional, governorate-based, working units were proposed.

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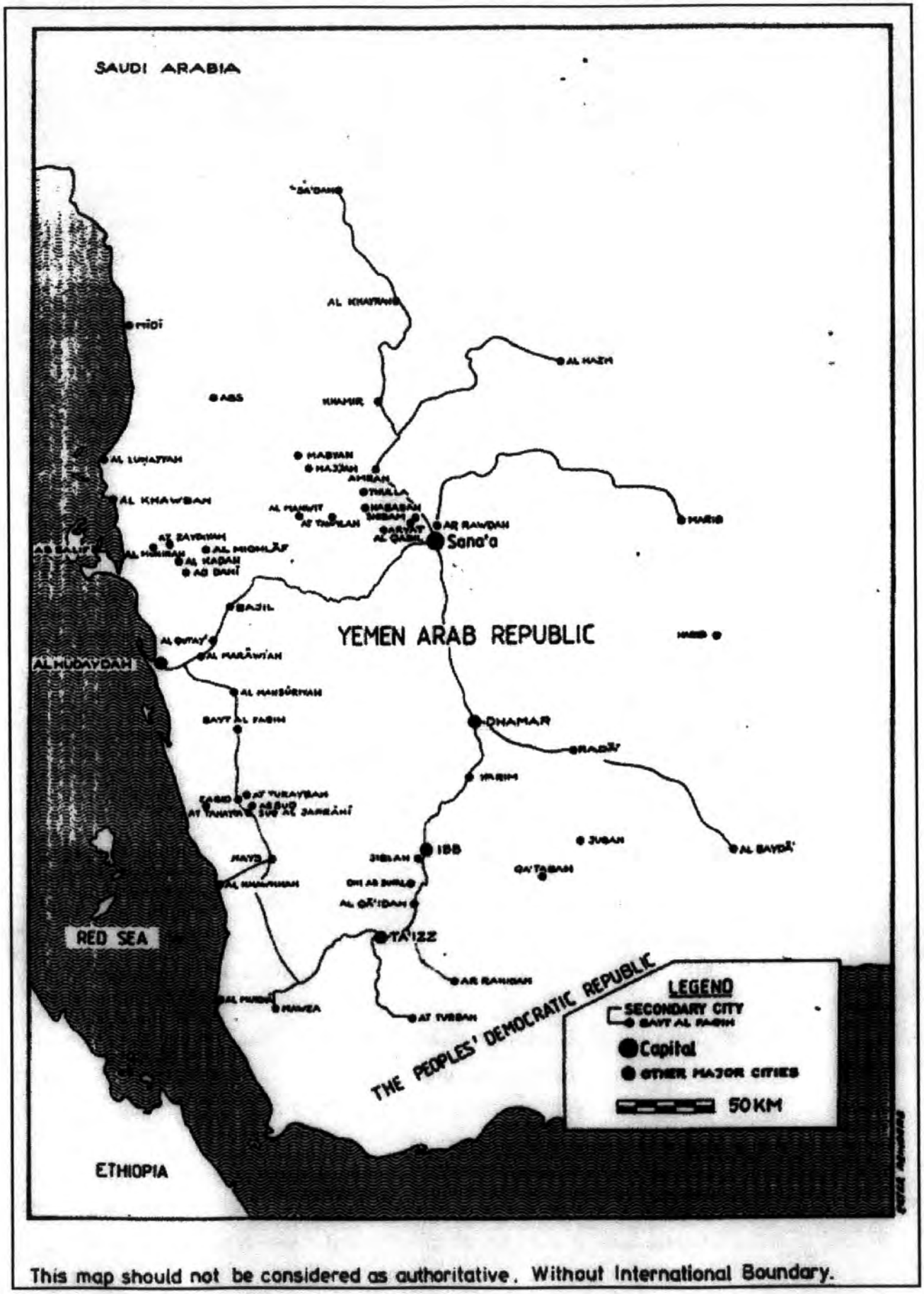
[26]See Saqqaf:89.



This map should not be considered as authoritative. Without International Boundary.

Secondary Cities in the Yemen Arab Republic, 1986 (source Reindeers:86)

3.6- Bureaucratic framework and municipal participation

The transitions at ministerial level illustrate the evolution of the role of central administration in the organization, funding and control of local municipal administration.[27] After unification it was expected that the network of relationships between central, provincial and local administration would be largely reorganized.

Until that time the responsibility of the Ministry had been to provide general guidance to the municipalities on land use and networks. This was enforced at the municipal level by the "Local Offices", with an appointed director who administered common local aspects, including building and shop permits, street and cesspool cleaning,[28] control of public health and waste disposal. The "Local Offices" acted throughout the towns and countryside of their designated areas. Sana'a, however, had a more complex municipal organization, having one office for the city alone and directly connected to the Ministry, together with a second office for the province, reporting to the governor.

In the early 'seventies land needs for public use were determined by the Head Office of the Municipalities and compensation to the owners was offered in cash or by an exchange with land elsewhere. In cases of conflict there was no defined legal procedure: a compromise would have to be reached but ultimately, it was the the government that had the upper hand.

The municipal structure has visibly developed since the 'seventies. Machinery and manpower became available, coupled with experience gained in organizing building permit and land registration procedures. Meanwhile, the Survey Authority has developed a centralised air survey based cartography and a data bank for the whole country, which has made planning tasks easier.

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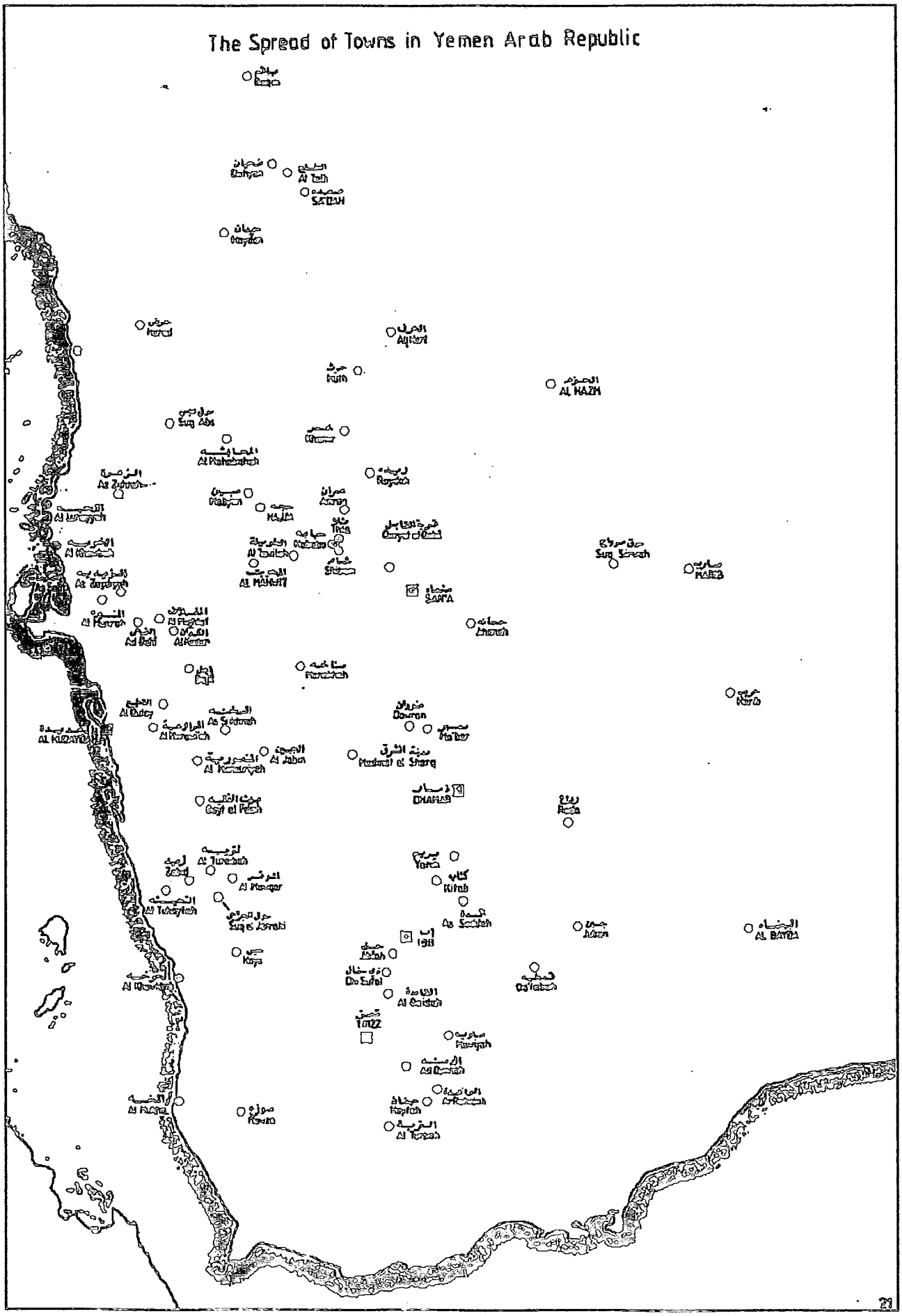
[27] Before the Unification the government bodies involved with urban development were: 1) The Central Planning Organization (CPO) coordinating national policies and regional planning, formulation of the National Five Year Plans and negotiations with foreign donors; 2) The Ministry of Public Works, in charge of land registration, construction of public buildings, rural water supply and control of the road and port authorities; 3) The Ministry of Municipalities and Housing (which became Ministry of Planning and Housing, in 1990, at the Unification) responsible for planning and administration of land development and overseeing the minicipal offices of the country's eleven provinces; 4) Other central entities: Ministry of Health (health centres, hospitals), Education (schools), National Water and Sewage Authority (water supply and sewage disposal), Yemen General Electricity Corporation (electricity), Highway Authority (construction of national roads), Yemen Transport Company (public transportation), etc. At the regional level, each province has its own Planning and Inspection Directorate; and at the local level, responsibilities fall on the municipalities (building permits, coordinated by their ministry, street construction, maintenance, drainage, lighting, waste disposal, environmental health, etc.). Local Councils for Cooperative Development, derived in 1985 from the Local Development Associations and are self- help organizations, at the *nahyia* (district) level, financed through the *zakat*, working often in close association with municipal initiatives and connected to the Central Government through the central confederation and provincial governorates. See Reindeers:86, pg12.

[28] In Sana'a this is done against payment of a fee and arranged by appointment.



The spread of towns in the Yemen Arab Republic (source Saqqaf: 89)

In time, it became possible for the principal planning guidelines to be enforced without the earlier strong reactions when owners of farmland bodily opposed the opening of streets and the bulldozing of major thoroughfares needed an armed escort.

BUILDING PERMITS

At the end of the Civil War, when the first planning office was set up, all that was needed to have one's house built was the possession of land and the fulfillment of a few rules, concerned more with local sociability than with centralised control. Property titles and the identification of the land by its area[29] and surrounding neighbours, ensured the right to the land. When the property was sold, witnesses of the act of transfer written on the title received 5 to 10 % of the transaction value, to be equally divided among them. The property title was then registered with the neighbourhood *qadi* and bureaucratic procedures stopped there. With the consolidation of the Republic, the land transfer had to be approved and stamped by the government registration office at the Municipalities who received another 2%. Finally registration had also to be made at the Ministry of Justice.

The first step towards land control was the institution of the building permit procedure. This began in 1968 and was for any kind of building within urban areas.

The granting of building permits was concentrated at the Planning Division of the Head Office (later Ministry) of the Municipalities. The applicant would be given a "form" free of charge[30] and then proceeded to the site of his land with a land surveyor (*muhandis al mantaqa*), who would make a sketch location plan on the form, indicating area, major roads and North point, certified with his signature. Back at the office, land surveyors would make a more precise layout of the lots surveyed and calculate how much was to be paid for the permit. They were also supposed to register the parcels pertaining to the granted permits on a city or area map at the office, but they seldom did so. The approval of the planning division followed, in the form of the director's signature on the same document. Once the land registration office confirmed the property title, the fee for the permit would be paid and a booking clerk would write the permit document proper, with the signatures of the land surveyor, the

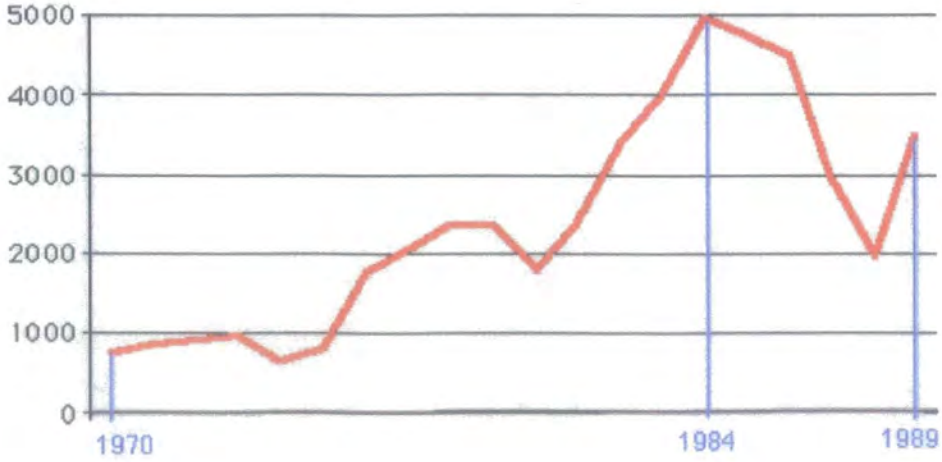
[29]Land was, and still is, usually measured in *libna*, a *libna* being equivalent to 44 m2. Common urban parcel sizes are 5, 8 or 10 *libna*; 2 *libna* lots are about the absolute minimum and lots of 12 or more *libna* are above average and characteristic of the wealthier neighbourhoods.

[30]At a time it was a sheet of blue-ruled paper with a ball-pen written heading and/or a stamp.

Top - Cover of the booklet issued by the Ministry of the Municipalities and Housing for the Sana'a Municipality, with the rules and procedures for the granting of building permits *bottom* - Yearly building permits issued in Sana'a (source Sana'a Municipality)

BUILDING PERMITS IN SANA'A

1970 - 800
1971 - 900
1972 - 950
1973 - 1000
1974 - 700
1975 - 850
1976 - 1800
1977 - 2100
1978 - 2400
1979 - 2400
1980 - 1800
1981 - 2400
1982 - 3400
1983 - 4000
1984 - 5000 (peak)
1985 - 4800
1986 - 4500
1987 - 3000
1988 - 2000
1989 - 3500
Total, 1970's: 12,900
1980's: 34,400.



director of the planning division, the minister and the ministry's stamp. The approval of the land title by the Ministry of Justice was, and still is, required to obtain the permit. The whole procedure would normally take a week.

No building plans were required for the permit, and no special rules or regulations existed concerning the design of the building. Setbacks were not regulated but tradition prescribed that no windows could be opened at less than 1.5 metres from the plot boundaries.

The builder could provide the design, which did not normally include water plumbing or drainage systems, but in the early days the Ministry of Public Works provided design drawings for the insignificant fee of 3 *buqsha* (less than half a penny) per square metre of construction. In later years this practice could not be maintained due to the increased work load in priority planning tasks and the limited staff available for it.

A former land surveyor commented that in those days building permits were easy to obtain but the enforcement was difficult. The situation has somewhat changed and, at least in the major towns, the public now seems to have accepted the idea that it is safer to wait for an area to be planned and build only afterwards. The consequence of not doing so is to have one's tract of land made useless by the portion allocated to public rights of way, or run the risk of having one's house demolished if caught before it is half completed - past this point the area land surveyor is held to be responsible, and the owner may argue his way to a *de facto* approval.

An illustration of this situation is given by the increase of building permits in Sana'a. Between 1970 and 1975 4350 permits were issued; between 1975 and 1980, 9550; from 1980 to 1985, 16,600; and from 1985 to 1990, 17800.

Building permits are no longer obtainable through the Ministry but only at the municipal offices. The procedure has become more rigorous: an application form and two neighbourhood maps (one for the files) are purchased and submitted. The application is preliminarily checked at the office with a map of the zone, and only then does the owner go, first thing in the morning, with the land surveyor to see his parcel. The land surveyor must now verify the specifications contained on the form for the type of use (residential or commercial), total area, position in the subdivision

- Plot Coverage: The coverage as described in Art. 21 of this regulation
- Plot Ratio: The ratio as described in Art. 22 of this regulation
- Height of Building: The height as described in Art. 23 of this regulation
- Set Back: as described in Art. 25 of this regulation
- Building Line: The line as described in Art. 27 of this regulation
- Street line: The boundary line of a road or street on both sides
- Limit of specific use: Border line between different land uses

Art. 3 (Scope)

The Land Use Regulation is applicable to areas covered or to be covered by a Master Plan or a Detailed/Parcellation Plan (as defined by Art. 12 to 16 by the Planning Law) and in limited cases to areas without master plans or detailed plans (as defined by Art. 27 and 28 of the Planning Law). It is binding all public and private legal bodies and private individuals as well as government and local authorities.

Section 2: Contents of Master Plans and Detailed Plans

Art. 4 (Master Plan)

(1) The master plan must mention the main goals and objectives of planning and of the further development of the specific city.

(2) Within its boundaries (or in limited cases outside) the master plan may show all or some of the following:
1 Location and directions of the arterial roads and main roads as well as bus and taxi terminals
2 Areas for preservation and of touristic interest such as archaeological and historical sites, old towns and places of architectural value
3 Built-up area and the area to be built-up according to its kind of use such as residential, commercial and industrial
4 [illegible] for public services such as health facilities (hospitals), educational facilities (secondary schools, universities, main training centers), cultural facilities religious facilities (mosques, cemeteries)
5 [illegible] for administrative and governmental use
6 [illegible] space
7 [illegible] market area
8 [illegible] for agriculture

9 Area reserved for the protection and development of landscape and nature
10 Areas for special purpose
11 Areas of restriction for reasons of civil or military aviation (close to airports)
12 Area and main lines for utility services such as electricity, water supply, sewerage and solid waste disposal (dump site) and communication facilities
13 Area with land use or building restrictions

(3) The master plan must show areas for which detailed concepts have to be elaborated for preservation reasons.

(4) Within its boundaries, the master plan shall define the neighborhood boundaries.

(5) The master plan shall show a phasing concept which determines the stages of the development of the area covered by the master plan.

(6) If necessary, the master plan may explain the details of land use and dimensions in a written form.

(7) The master plan shall contain the name of the city, its location, a legend based on the stipulations of Art. 6 (2) of this regulation, the scale, the cardinal north point, the names of the technical staff who elaborated the plan, the final signatures of approval (by the Minister, the Deputy Minister and the General Director), the date of approval and the number of the decision.

Art. 5 (Detailed Plan)

(1) The detailed or the parcellation plan must mention the main goals and objectives of planning and of the further development of the specific area.

(2) The boundary line of the detailed plan is to be specified by the master plan. If a road is considered as the boundary of a detailed plan, the road shall be included in the detailed plan on its whole width if it is not already included in a different detailed plan.

(3) Within its boundaries the detailed or the parcellation plan may show all or some of the following according to the stipulations of section 3:
1 Directions and width of all kinds of traffic areas
2 The detailed kind of use of the area for preservation and touristic interest such as archaeological and historical sites, old towns and places of architectural value
3 The detailed kind of the built-up area and of the area to be built-up such as residential, commercial, industrial use
4 The detailed kind of use of area for public services such as health, educational and cultural facilities

5 The detailed kind of use of area for administrative and governmental use
6 The detailed kind of use of area for religious facilities
7 The detailed kind of land use of the areas and the lines for utility services
8 The detailed kind of land use of open space
9 Area for agriculture
10 The detailed use of the area reserved for the protection and development of landscape and nature
11 The detailed use of the areas for special [illegible]
12 The areas with land use or building restrictions as specified in Art. 18 and their detailed kind of land use as well as their detailed restrictions

(4) Within its boundaries the detailed or the parcellation plan shall show the dimensions according to the stipulations of section 6 of this regulation.

(5) If necessary, the detailed or the parcellation plan may explain the details of land use and dimensions in a written form.

(6) The detailed or the parcellation plan shall contain the name of the city, the number of the plan, the number and location of the area, a legend based on the stipulations of Art. 5 (3) and Art. 5 (4) of this regulation; the scale, the cardinal north point, the names of the technical staff who elaborated the plan, the final signatures of approval (by the Minister, the Deputy Minister and the General Director), the date of approval and the number of the decision.

Section 3: Kinds of Land Use

Art. 6 (Traffic Area)

(1) Arterial road:
Arterial roads comprise access streets of a city, ring road and streets which connect different zones of the city with each other.

(2) Main road:
Main streets comprise streets which connect neighborhoods with each other, and streets which delimit neighborhoods.

(3) Secondary street:
Secondary streets comprise streets within the neighborhood units branching from the main streets.

(4) Local street:
Local streets are streets in the neighborhood units branching from secondary streets.

(5) Pedestrian walkway:
Pedestrian walkways are the ways which are restricted to pedestrian traffic only.

(6) Parking area:
Parking area is restricted to parking of vehicles.

(7) Bus or taxi terminal:
Bus or taxi terminals are restricted to the indicated use only. Small commercial activities and offices related to the indicated use are permitted.

Art. 7 (Residential Area)

(1) Pure residential area:
Pure residential area serves residential purposes of different kinds only.

(2) General residential area:
General residential area serves predominantly residential purposes and has the objective to secure the (existing) specific nature of uses for residential purposes and those commercial and service uses which are related to the residential use. In addition to the residential use those uses may be permitted which serve the daily/short-term and the weekly/medium-term supply and which do not considerably relent. This includes services and shops for medium-term demands, office buildings, hotels, non-polluting workshops. Not permitted are car repair shops and all kinds of industries.

Art. 8 (Commercial Area)

(1) Central commercial area:
Central commercial area serves predominantly commercial uses with high centrality. The essential characteristic feature of the central commercial area is a concentration of several different uses of high centrality which serve long-term needs and which always permit housing. Small wholesale trade, retail trade, offices, private services, hotels, banks and residential use are permitted. Not permitted are car repair shops, workshops which considerably relent and all types of industry.

(2) Local commercial area:
Local commercial area serves predominantly commercial uses for weekly / medium-term needs. Retail trade, private services, offices, hotels, banks and residential use are permitted. Not permitted are car repair shops, workshops which considerably relent and all types of industry.

Fac simile of pages 2 to 5 of Planning Regulation proposal (page 1 is Reference and Definitions)

(corner or centre lot) and the construction material to be used. The surveyor's role is then complete. The office director checks this information and if it is approved the permit fee is paid. The fee currently varies with the frontage and position of the lot as well as with the width and surfacing of the adjoining thoroughfare, being, for example, higher for wide, asphalted streets and for corner lots. A permit can later be amended to allow additional floors provided that 20% of the site is left unbuilt upon.

Once the fee is paid, the procedure is similar to that previously described. A booking clerk issues the actual permit as a document with all the signatures (surveyor, director of the Ministry's planning division and director of the local municipal office) and the contemporary rules are written on the back.

As a rule, a building project[31] is now mandatory, at least in streets 16 m or more wide. It may be dispensed with for smaller buildings in the minor streets but the trend is to generalise the requirement for a project especially after the earthquakes of 1983. In the major towns projects may be made by private designers in "engineering offices"[32] registered at the municipal office or, if it exists, by the office design section, which is less expensive.

Small municipalities usually do not have a design capacity and do not rigorously enforce the requirement for a project to have a permit granted. So far, in most cases the traditional construction procedures are still active in which master mason and designer mean the same.

CONTROLS & REGULATIONS

The notion that planning controls are essential for the orderly development of the country's urban structure has been advanced to the authorities from at least the time the planning division of the Municipalities was founded. Various proposals for control procedures have been made, together with the major planning documents presented by foreign advisors or consultants. As late as the 'eighties, most of these had not been brought into effect perhaps because, as an internal report suggested, they were not apropriate to the Yemeni situation,[33] Nevertheless by the early 'nineties a Planning Law and a Building code had been completed and submitted to the Cabinet, and urban policy codes

[31]The project consists of a location plan, floor plans, elevations and sections, utilities plan (water, sewers and electricity) and, when the building involves reinforced concrete structures, the structural engineering design and calculations.
[32]There were more than 50 in Sana'a, in the late 'eighties.
[33]Reindeeers:86.

(3) Collective commercial area:
Collective commercial area serves predominantly commercial purposes. Permitted are uses for wholesale and space demanding trade (shopping centers) and central commercial facilities and related services. Hotels are permitted. The following uses are permitted: Car repair shops, workshops, small scale industry. Residential use may also be permitted (predominantly for traders). Not permitted are all kinds of industries such as mentioned in Art. 9 (2).

Art. 9 (Industrial Area)

(1) Light industrial area:
Light industrial area serves small-scale non-polluting production. Relocating workshops are permitted. Housing is permitted for workshop owners only. Hotels and restaurants are permitted. Block factories and stone-cutting factories are not permitted. Not permitted are also all kinds of industries which store or use dangerous materials in their production process.

(2) General industrial area:
General industrial area serves predominantly those industries which are not permitted in other areas. This includes space demanding, heavy traffic generating / traffic attracting or polluting industries or services or the related facilities only. Housing and accomodation of employees is not permitted.

Art. 10 (Area and lines for utility services)

Area and lines for utility services comprise installations and uses for electricity (power stations, distributing lines, transformers), water supply (treatment stations, pumping stations, tanks, wells, cisterns, water pipes), sewage disposal (treatment plant, pumping stations, sewage lines), solid waste disposal (collecting points, dump sites), communication facilities (telex, telegrams, telephone facilities). No other than the indicated use is permitted with the exception of traffic area. The lines shall follow the street network pattern.

Art. 11 (Area for public services)

Area for public services comprises area used for educational facilities (Kindergarten, primary, preparatory and secondary schools, universities, training centers), health facilities (hospitals, clinics, health centers), cultural facilities (libraries, museums, theaters, cinemas, cultural and neighborhood centers). No other than the specified use is permitted. Residential use and small shops or service facilities related to the specified facilities may be permitted.

Art. 12 (Area for administrative and governmental use)

The area for administrative and governmental use comprises mainly office blocks and government buildings (e.g. ministries or their branch offices, courts, police stations, post offices, fire stations). Small social and commercial facilities as well as housing are permitted. No other use is permitted.

Art. 13 (Area for religious facilities)

Area used for religious facilities comprises mosques, cemeteries, religious schools. Small shops libraries and guest houses related to the specified use may be permitted. No other than the indicated use is permitted.

Art. 14 (Open space)

Open space comprises
1 forest areas and pastural land
2 parks and public gardens
3 public playgrounds
4 sportsgrounds, stadiums
5 public squares
6 open markets.
No other than the indicated use is permitted.

Art. 15 (Area with land use or building restrictions)

(1) Area with land use or building restrictions for environmental reasons, because of danger of hazards or because of difficult underground:
Area with land use or building restrictions for environmental reasons, because of danger of hazards or because of difficult underground comprise areas such as water reservoirs, ground water collection areas, and areas for protection against inundations, sloped areas, sandy areas etc.. Other land uses may be restricted according to the specific situation. The land use or building restrictions must be indicated.

(2) Area with land use or building restrictions for the protection of waterways, wadis, sailat, stormwater channels:
Area for the protection of waterways, wadis, sailat, and stormwater channels are to allow unrestricted water flow. Therefore, no other use and no building activity is permitted.

Art. 16 (Area for agriculture)

Area for agriculture is restricted to agricultural use only. Buildings related to the agricultural use such as barns and watch houses or watch towers may be permitted.

Art. 17 (Area for the protection and development of landscape and nature)

(1) Area for the protection and development of landscape:
Agricultural use is permitted. Streets and paths are permitted if they serve the agricultural use and they may be permitted if they serve the access to the area. Small shops, restaurants and small hotels may be permitted. No other building activity is permitted.

(2) Area for the protection and development of nature:
Agricultural use may be permitted. No other uses are permitted. Any building activity is restricted.

Art. 18 (Area for preservation and of touristic interest such as archaeological and historical sites, old towns and places of architectural value)

(1) Area for protection of archaeological sites:
Within an area for the protection of archaeological sites no other use and no building activity is permitted unless the responsible specialised authority (General Authority for Antiquities and Libraries) agrees.

(2) Area for protection of historical sites, old towns and places of architectural value:
Within an area for the protection of historical sites, old towns and places of architectural value no uses or construction or conversion of buildings are permitted which disturb or change the character of the area.

Art. 19 (Area for special purpose)

Area for special purposes serves the indicated use only. It comprises military areas, airports, harbor areas, areas for extraction of mineral resources, large tourists areas and expedition grounds. The areas of restrictions related to the landing strips of airports are to be indicated and the restrictions are to be followed although these areas are not to be respected as [illegible] for special purposes.

Section 4: Dimensions (for plots and buildings)

Art. 20 (Permitted minimum and maximum dimensions for plots and buildings)

The permitted minimum and maximum dimensions for plots and buildings are to be defined in the detailed plan. The

dimensions are to be indicated according to the existing situation and according to the objectives for development and planning for each individual specified and limited area within the boundary of the detailed plan.

Art. 21 (Plot Coverage)

(1) The plot coverage is defined by the ratio of built-up area to the plot size. It represents the percentage of the plot (or area) on which building is permitted.

(2) In detailed plans, it must be indicated for all areas which are built up or which are permitted to be built up. In master plans the maximum plot coverage may be indicated if necessary.

Art. 22 (Plot ratio)

The plot ratio is defined by the ratio of the total floor space of a plot to the plot size. The upper limit permitted must always be indicated on the detailed plan.

Art. 23 (Building Height)

(1) The building height has to be indicated in a detailed plan by the permitted number of floors. This may be done as the maximum number of floors.

(2) The building height may also be indicated in a detailed plan measured in meters. This may be done as the maximum measure in meters.

(3) The building height may - if necessary - be indicated as the obligatory number of floors or as the obligatory measure in meters.

Art. 24 (Form of Building)

(1) The form of building may be indicated as attached or detached in the detailed plan for all uses of area to be built up.

(2) Attached buildings mean that every building must be attached to the neighboring one so that a number of buildings form a continuous uninterrupted facade.

(3) Detached buildings apply for villas, blocks and all buildings which are [illegible] free standing. [illegible] have to be left between neighboring buildings and may not be less than 25 % of the permitted building height.

Fac simile of pages 6 to 9 of Planning Regulation proposal (pages 10 and 11 have articles on setbacks and building lines and final considerations dealing with planned or unplanned areas)

were at the draft proposal stage.

The draft planning regulations prepared in 1989 by the planning department of the Ministry of Municipalities and Housing contained, among others, a land use regulation applying to master and detailed plans and listing their contents.[34]

The regulation defines a hierarchy of thoroughfares from arterial roads to pedestrian walkways together with parking and the characteristics of the various land uses enumerated. Special uses such as "military installations, airports and harbours, and large tourist areas and exhibition grounds" were also included. Finally it prescribed maximum and minimum dimensions of plots and buildings, floor-site area ratios and building height, form and type with alignments and setbacks. Unplanned areas or interim plans had to conform to the principles issued in the regulation.

The proposal was open ended in so far that, according to the Planning Law, it left to the Minister's ultimate discretion the decisions concerning the modification or enforcement of various aspects of the regulations.

Other measures were also being prepared at the time of the Unification. A Department for Urban Strategy was proposed, undertaking socio-economic studies, aimed at analysing trends in urban development in order to establish a strategy the lack of which had been felt ever since the Ministry's foundation. Another department was to control land prices whose highly inflated values were partly blamed on the development of real estate agencies and land speculation. After Unification, national urban policies and master plans were to be undertaken jointly by the new Ministry of Urban Planning and Housing and the Central Planning Organization.

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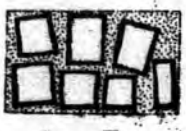
[34]Location of streets and of built up areas for residential, commercial, industrial and public use (adminstration, health, education, cultural and religious facilities); open space; open markets and agriculture areas; preservation of historic sites or archaeological remnants; natural protection; restricted uses; and utility areas and networks (electricity and communications, water supply, sewage and waste disposal sites).

- The traditional plan has to be changed in order to restore the traditional Yemeni cultural values of light and privacy inside the house.

(Fig.6) Shows the existing building pattern with its narrow space between houses. Those spaces do not provide adequate light nor circulation to the buildings.

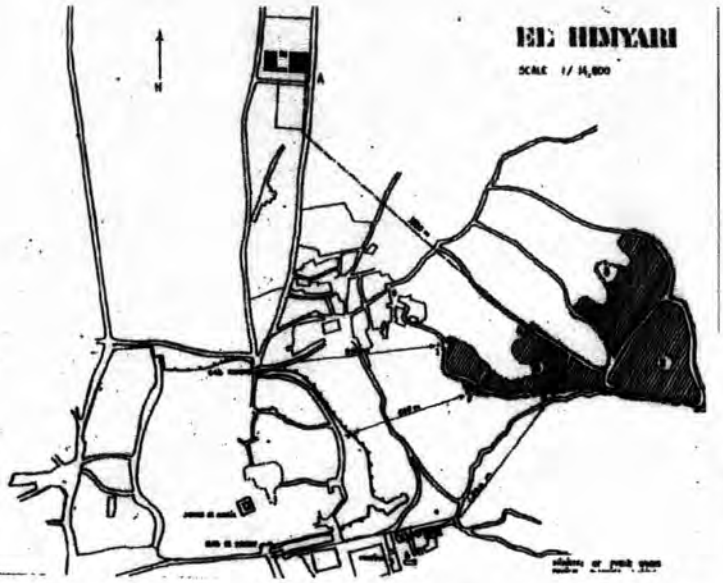


(fig.6)

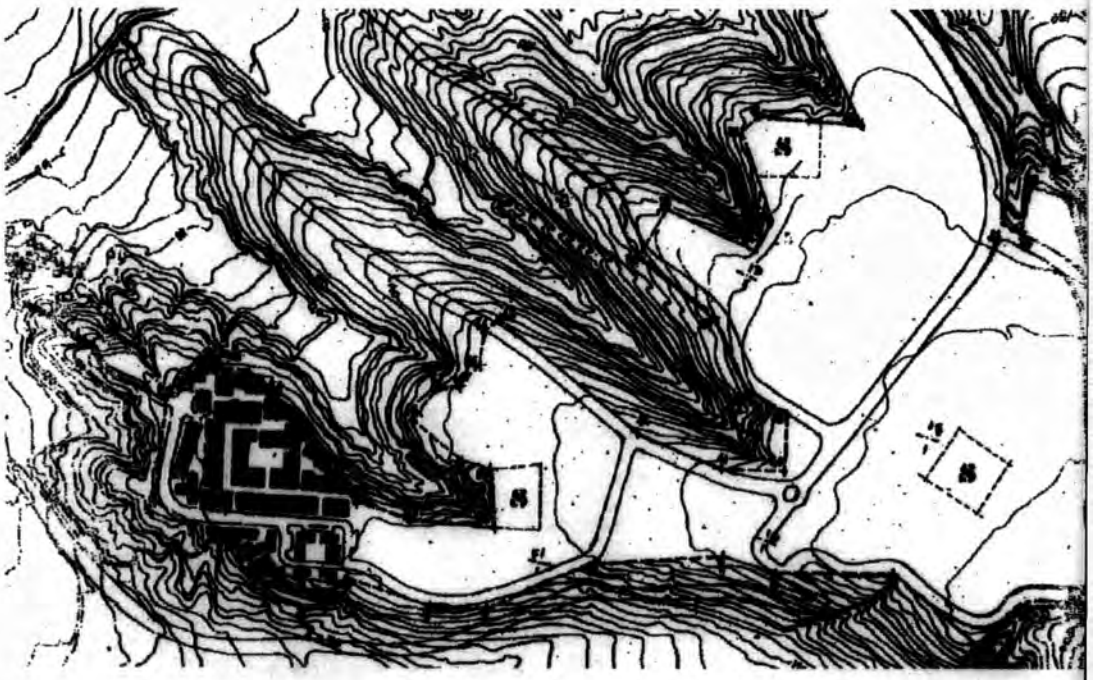
(Fig.7) Shows the proposed solution by using the same lot size but with a different plan. It is perfectly possible to have the same builded area while having adequate light and ventilation space.

(fig.7)

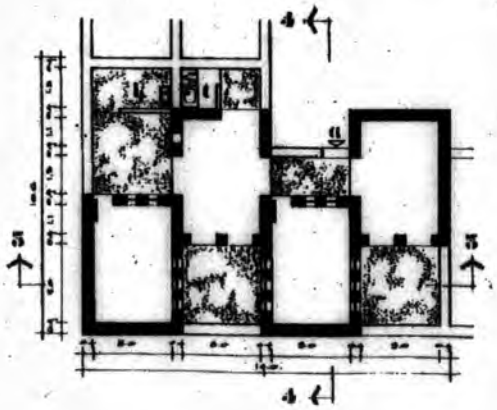
- The above we wanted to prove by building an experimental house in a neighborhood in full development, and on a minimum sized lot : 8.00 x 11.50m.

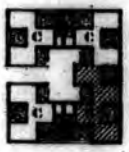


Top left - Rationale for a new type of low cost dwelling (source Bertaud:71); *right and centre* - El Hymiari Co-operative Housing Settlement (source Bertaud); *bottom and opposite* - Medinat al Jedid, Hodeida (source Bertaud:72)



HODEIDAH — MEDINAT AL JEDID





grouping c+d

house type d

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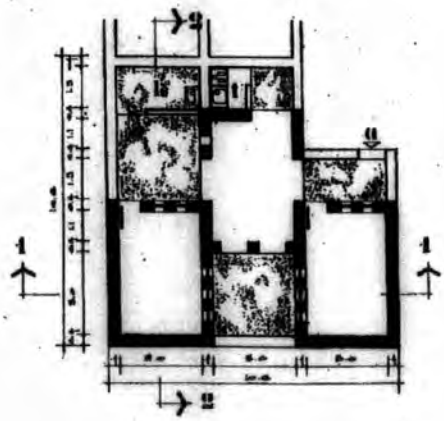

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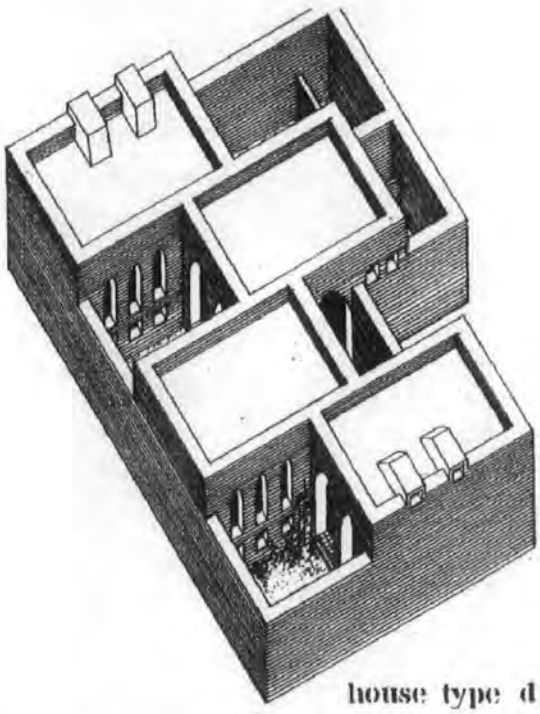
Section 4: Mass actions

4.1- Standardised Housing

The first concerted efforts at public housing programmes were attempted in the early 'seventies with plans prepared by the UN expert at the Ministry of Public Works. They included schemes at Hodeida for 7500 units to be built over a period of five years (*Madinat al Jedid)* and in Sana'a where, besides the 1500 unit *Al Hymiari* Cooperative project for the workers of the Textile Factory, a "United Nations Village" was planned with 50 units for local and foreign staff. In each of these proposals the intention was to create housing built with local materials and increase the open space of each unit by introducing new contiguous court house types rather than detached dwellings with a surrounding narrow yard.

The Hodeida project was built but with such departures from the design and materials originally proposed[35] that the UN expert declined responsibility for it. The other projects were never built.

The forerunners of some form of standardised housing, thus, may have been the few small compounds, appearing during the 'eighties, that were reserved for nationals of foreign governments or agencies which provided the design and paid for them being built. Government initiative to date has been very limited and housing of Sana'a as elsewhere is largely done by private enterprise.[36]



house type d

[35] The most radical being that concrete was used instead of the baked brick proposed both for its performance and for the possibility it offered of reviving a local industry.

[36] According to an informant at the Housing section of the MMH, in 1990 government promoted housing was about 5% of the total of housing in Sana'a.

This page - Madina Sakaniya, Sana'a; *opposite* - Addition of floors to former standard single-storey type, Madina Sakanyia, Sana'a

SCHEMATIC PLAN OF HOUSE IN MADINA SAKANYIA

The first major standardised housing project built by governmental decision and in collaboration with the national bank was the *Madina Sakanyia* (lit. residential town), at the southwestern outskirts of Sana'a, for local and foreign government employees.

The project, consisting of 650, four room, two bath units, was designed by a local Chinese consultant during the late 'seventies and the houses were occupied in the early 'eighties. The units, built in pre-cast concrete, with minor atavistic concessions such as *takhrim* , and set in a regular grid of local streets, comprise one-storey detached houses, set within a small high walled yard so that on two sides the yard is as wide as 4 metres and on the other two as narrow as 1,5 metre. Major community services were at one end of the development with peripheral commercial development lining the main roads.

The opinion gained from residents was that the houses were not uncomfortable, being well divided (except for the kitchen), tolerable in terms of thermal comfort and, inspite of its size, the yard was serviceable and pleasant. The dullness of the street layout and the monotonous repetion of a single house type were however considered as major drawbacks, together with the lack of green areas, remoteness from the urban activity and exposure to thieves.

Six or seven years after their first occupation the houses were being expanded in two ways: either by filling the yard space with outbuildings and extensions, or by additional storeys. Examples were appearing in 1990 of one and two storeys added in baked earth brick or cement blocks.

REVISED LAYOUT PLAN OF
SAWAD SAWAN

Top - Sawat Sawan site plan, Sana'a; *centre, bottom and opposite* - Sana'a University housing at the new campus

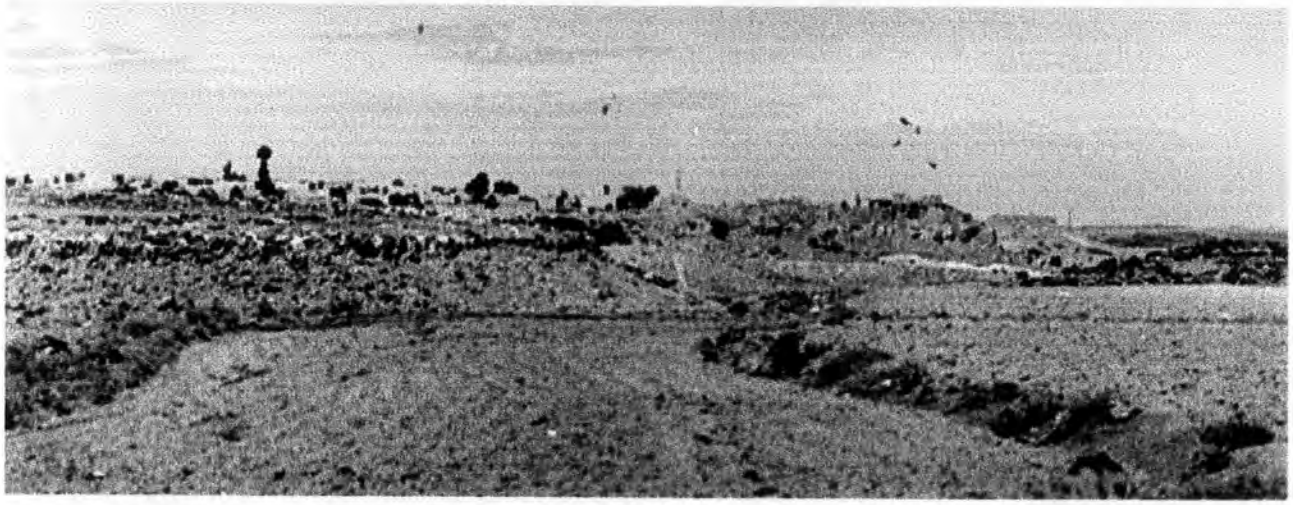
Other major schemes were built in the mid 'eighties in the Nuqum/ Musaik area of east Sana'a. There, 500 units were promoted by the Yemen Bank for Reconstruction and Development and nearly 400 units by the military authorities. The projects were drawn up by an Indian consultant and constructed by an European firm.

After the consolidation of the Housing section of the Ministry in 1984, the main thrust was directed at the upgrading of sites and services, as for example in the Musaik in Sana'a, and the construction of large low-cost schemes in Sana'a, Hodeida and Taiz, such as at Sawat Sawan, also on the eastern boundary of Sana'a, where a scheme undertaken with the help of the World Bank consisted of a 1700 plot subdivision and the provision of the necessary services. Occupants had salaries in the 1500 - 3500 YR range (low-middle income) and anybody could apply for accommodation although government servants had priority.

By 1990 126 houses had been built as demonstration projects on 25 ha. The remaining plots were allocated for people to build on their own initiative, with services and house plans being provided by the Ministry. The experience was to be repeated later in the remaining 30 ha.

The site plan obeys the conventions seen in the adaptations of a neighbourhood unit concept, adopting a transformed grid system, where the centre is occupied by community services and major green areas, with smaller patches of green space distributed within the residential blocks. Major throughfares encircle the whole. The house designs are of detached units with surrounding yards.

An important example of housing produced by other sources is that at the Sana'a University campus where, early in the 'eighties, various attempts were tried at interpreting traditional forms for mass housing.



Top - Village at Ysla, destroyed by the 1982 earthquakes; *centre* - Al Risaba was totally destroyed; *bottom* - Village and new "Earthquake housing"at Dhawran.

4.2- Earthquake reconstruction

The most important mass housing programme of North Yemen, however, was in consequence of the December 1982 earthquake[37] In the Dhamar province the earthquake totally destroyed more than 25,000 buildings (mostly houses but also many mosques and schools), leaving, according to official figures, 1,600 dead and 11,400 injured.[38]

The extent of the material loss - estimated at US$ 2 billion - justified the intervention of various sources of foreign aid and the creation of a Supreme Council for Earthquake Affected Areas with responsibility for coordinating funds and a reconstruction programme policies. The main points of the programme were: 1) the repair of 17,000 seriously damaged houses; 2) reconstruction, by contractors, of 236 settlements on new sites,[39] totalling 15,000 dwellings, for those villages where 75% of the houses were destroyed and 3) reconstruction by self help of another 10,000 dwellings.[40]

The substantial part of the financial share in this effort came from donors supporting the building, by contractors, of the 15,000 units of point 2) above. They opted for repetitive application of a most elementary design, using cement blocks and the simplest types of windows and doors. These units, with three rooms, bath and kitchen, were of 36 m2 or 48 m2 floor area and sited on flat ground often quite distant from the original settlement.

On the other hand the notions of self help and use of improved techniques for local materials, were part of the approach of such agencies as the United Nations Development Programme and the association of OXFAM (U.K.) with CONCERN (Ireland) and the Norwegian SAVE THE CHILDREN FUND.

The UNDP agreed to provide technical assistance by supervising projects executed by the contractors, by training of national staff at the Executive Office for Reconstruction and by integrating skilled labour at the Building Advice Centre created in Dhawran - which was the worst affected area.[41]

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[37]Of magnitude 6 in the Richter scale. Although its epicentre was in the area of Dhamar, the shock was felt all the way to Sana'a where a few houses in the Old City collapsed.

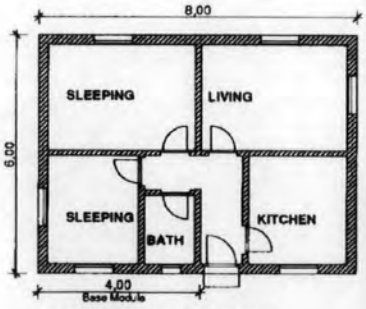
[38]UNDP:85

[39]A United Nations report says that "surveys show that the damage is mostly due to poor construction systems which do not secure structural cohesiveness, and poor location of houses, often on steep slopes" (UNCHS Mission , Feb. 1983).

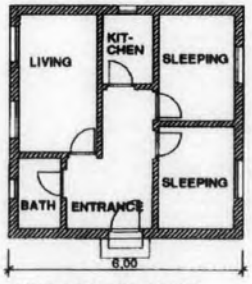
[40]UNDP:85

[41]7000 houses and 250 community facilities destroyed, 4500 cracked versus 3900, 120 and 2800, respectively, for the average of the other districts.

Top and centre - Dhawran; *bottom* - Al Hada



U.N. EARTHQUAKE HOUSING FOR DHAWRAN



EARTHQUAKE HOUSING IN AL HADA

It was here, at the end of 1984, that a self help housing scheme of 280 units in 27 villages was started.

The original intention was the construction, using the same floor plan, of various alternatives in stone, combination of stone with concrete blocks and concrete blocks alone. The stone was to be re-used from the destroyed sites. In the event, this proved too difficult because stones apparently had to be re-cut into small blocks and therefore only concrete blocks were used.

A uniform 48 m2 floor plan was adopted, similar to that mass produced by the contractors, for a living room, two bedrooms, kitchen and bath, and without any storage space. The UNDP prototype attempted a concession to the traditional idiom by introducing colour glass fanlights in the main windows. Yet, looking at the design proposal, deposited in the Sana'a office, one is struck, among other things, by the alien nature of the designers' world in relation to the population life style as illustrated by the standard stencilled representation of furniture on the plan. Easy chairs and coffee tables in the villages of Dhawran?!

By 1990 the project, which had involved a UN team of one expert and 13 Volunteers based in Dhawran, was virtually complete. Its self-help component consisted of the occupants' provision of unskilled labour for removing the rubble, clearing the site and digging foundations. Materials - water, sand, gravel and rubble stone for foundations - were also locally provided and, whenever available, skilled masons were trained in earthquake resistant construction.

The actual cost of the units was reduced to two-thirds of the initial estimate (63,560 as opposed to 90,000 Y.R.). It was envisaged that the balance could be invested in the building of 300 more units and community facilities including 3 schools, 4 health centres, water supply for 64 villages and 50 kms of improved roads. However, by the middle of 1990, the UNDP in Sana'a was unable to provide any further information on progress.

The training of local skills in earthquake-resistant construction was the intention of the Building Education Programme undertaken by the association of three non-governmental European agencies,[42] in collaboration with the relevant Yemeni ministries, the Confederation of Yemeni Development Associations and the Dhamar Local Development Agency.

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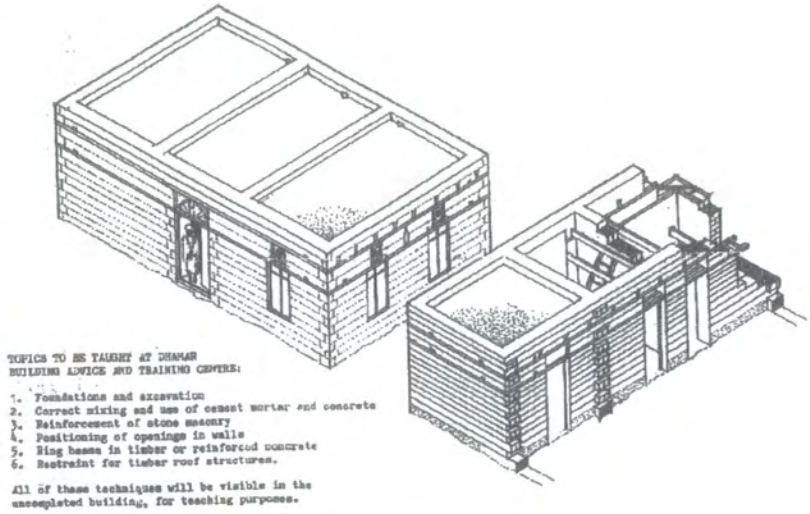
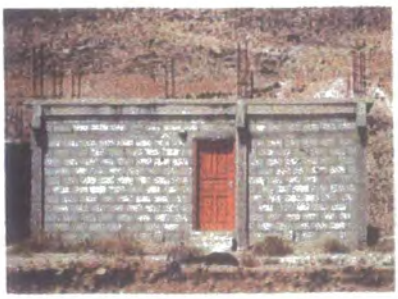
[42]OXFAM, CONCERN and SAVE THE CHILDREN FUND

Top - Illustration of leaflet describing OXFAM's campaign (source OXFAM); *centre, above* - Mithal, Al Hada; *below, left* - South of Dhamar; *right* - Al Wasta, Ma'bar; *bottom* - Way to Bainun, Al Hada.





In 1983 a "Building Advice and Training Centre" was constructed on the outskirts of Dhamar to demonstrate reinforcement techniques suitable for domestic reconstruction. The buildings of the Centre itself were a demonstration of the way in which simple and readily available reinforcements could be incorporated in stone construction. Reinforced construction using other materials including earth and cement blocks were to be demonstrated in further prototypes since one of the aims of the project was the creation of demonstration centres throughout the region affected by the earthquake.

The technical supervision and running costs of the operation were provided by OXFAM, which by 1987 had completed its commitment for the training of masons throughout most of the Dhamar area. A leaflet issued in 1983, explaining its objectives, concluded "*it is very much hoped that the technical modifications can, in the long term, lead to more secure housing which however retains the traditional architectural genius of the country*".

The fact is that, but for the professional improvement and the repair of 27,000 damaged structures, the achievements of the earthquake reconstruction effort as represented by those 15,000 new units are, to say the least, disappointing. An internal UN communication reported that "*the major constraints on the project, both past and present, are organizational, human and political, rather than financial or technical*".[43] Another evaluation report on the UN project could also be applied to other contractors' schemes: "*the houses are not integrated, in the existing fabric and styles*". [44] The buildings are also substandard, in terms of space and materials, the choice of sites is senseless and the site layouts are dull to the point of inanity. Small or large groups of houses are regularly set in the same grid pattern as if they were patches cut out of a single large, repetitive fabric.

The population reacted as might have been expected, by refusing to live in them and voicing scandalised objections to the cost of the contractor-built units - which would build them "a good stone house" just as quickly.

The figures reported for the occupancy of the UN houses were more favourable: 20 % were not occupied, 59 % were occupied by people, 16% by storage, 5% by animals.

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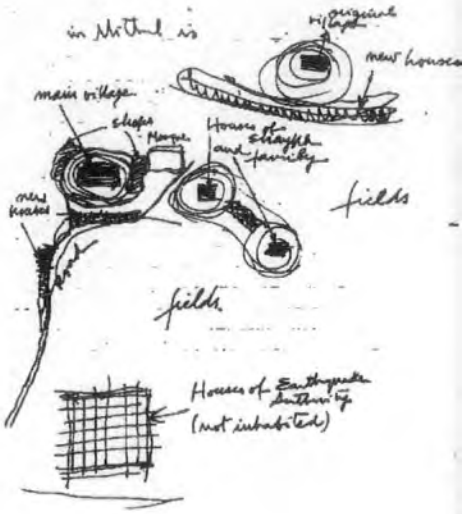
[43]Mamun Chebib, Sana'a, to Dean Everts, New York.
[44]UNDP:85



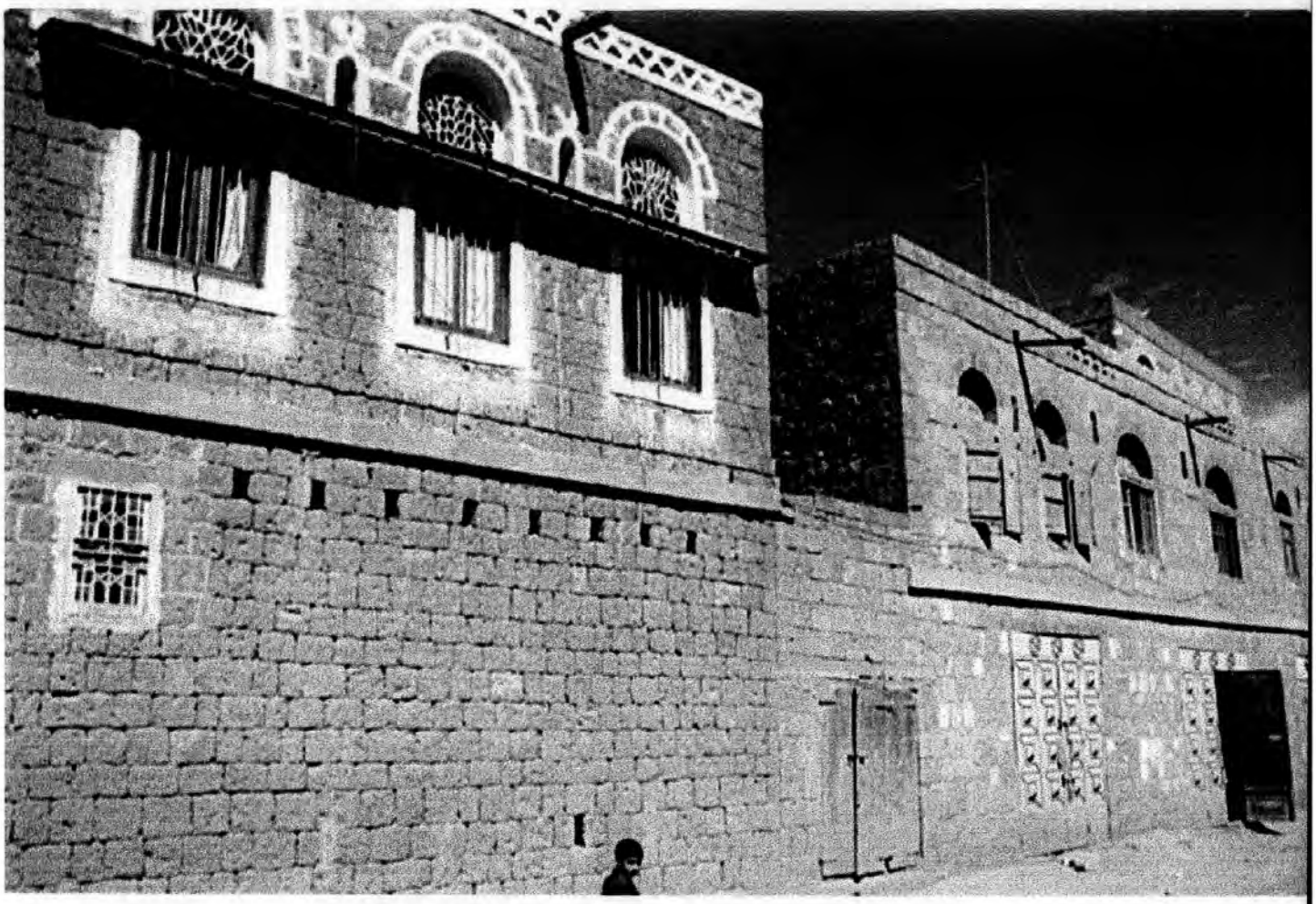
Top left and centre - Dhawran; *top right* - Scheme of new housing distribution, Mithal (writer's notebook); *bottom* - Stone houses built by private initiative next to government housing, Dhawran; *opposite* - Dhu Awlayin

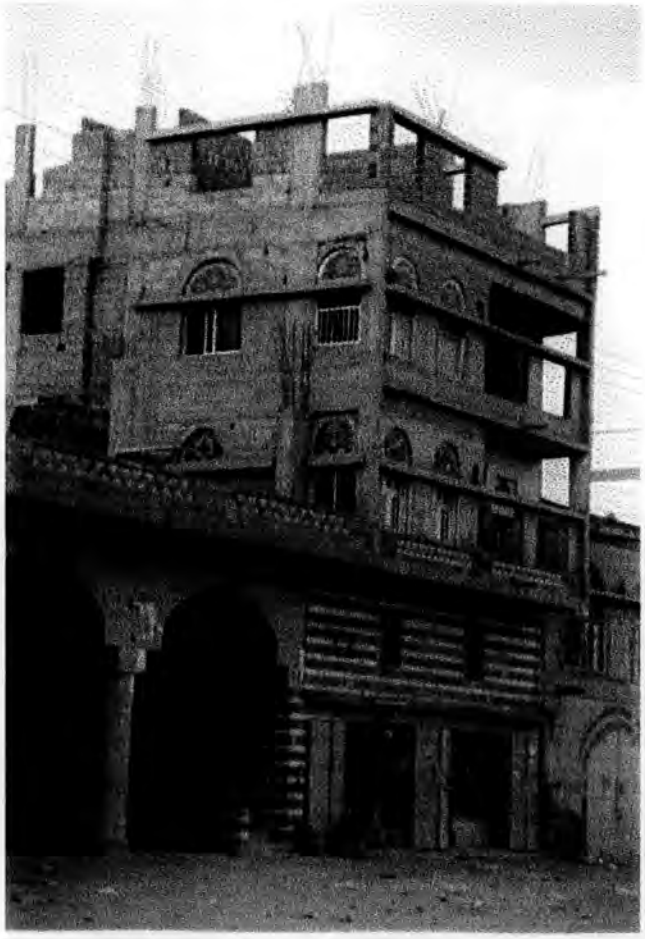
The writer is able to confirm that in the Dhawran area occupancy was higher than anywhere else he visited, but in some areas, as at Al Hada, complete settlements were never occupied. In one case he saw buildings connected by walls accross public rights of way and converted into a school. The rest of the houses remained empty and the population that was supposed to dwell there was building their own houses usually of cut stone on sites nearby. In the proximity of larger centres, such as Dhamar and Dhawran, modifications have been made which basically involve enclosing several units within a wall or infilling the road reservation with ancillary buildings.

Often, as at Dhu Awlayn, an original settlement, sited on a rock outcrop and largely destroyed was abandoned, while the government-built houses, on flat land some distance away, were practically uninhabitted. In between, spontaneous development by villagers supported by their shaykh had taken place on the gentle slopes just below the former settlement.

A UN report says that people don't use the bath and the kitchen because they are accustomed to cooking outside but, from his knowledge of the traditional standards of space in the region, the writer is of the opinion that the occupants of the houses offered as an alternative do not have much choice but to cook outside. Limited space, low quality materials, bad insulation and a bleak environment have been offered to a population that, lacking any another choice, may adapt what became available rather than adopt the spaces as they were offered.

The architecture of the region incorporates ancient earthquake protection devices including the *basut*, described in Chapter 4. The omission or random use of such techniques may be explained by the number of generations that lived without serious earthquakes. A necessary structural feature became a mere formal element whose justification might have been forgotten. In this way training of local masons in techniques that were, basically, those of their forefathers required that those masons, in turn, faithfully transmit their knowledge and that whoever works as a mason has acquired his experience from a reliable source. This however did not always appear to be the case in the private initiative building seen in the area six or seven years after the earthquake.





Top - Reinforced concrete lintels introduced in stone houses after the earthquakes, Dhamar; *bottom* - Construction in Dhamar, 1990

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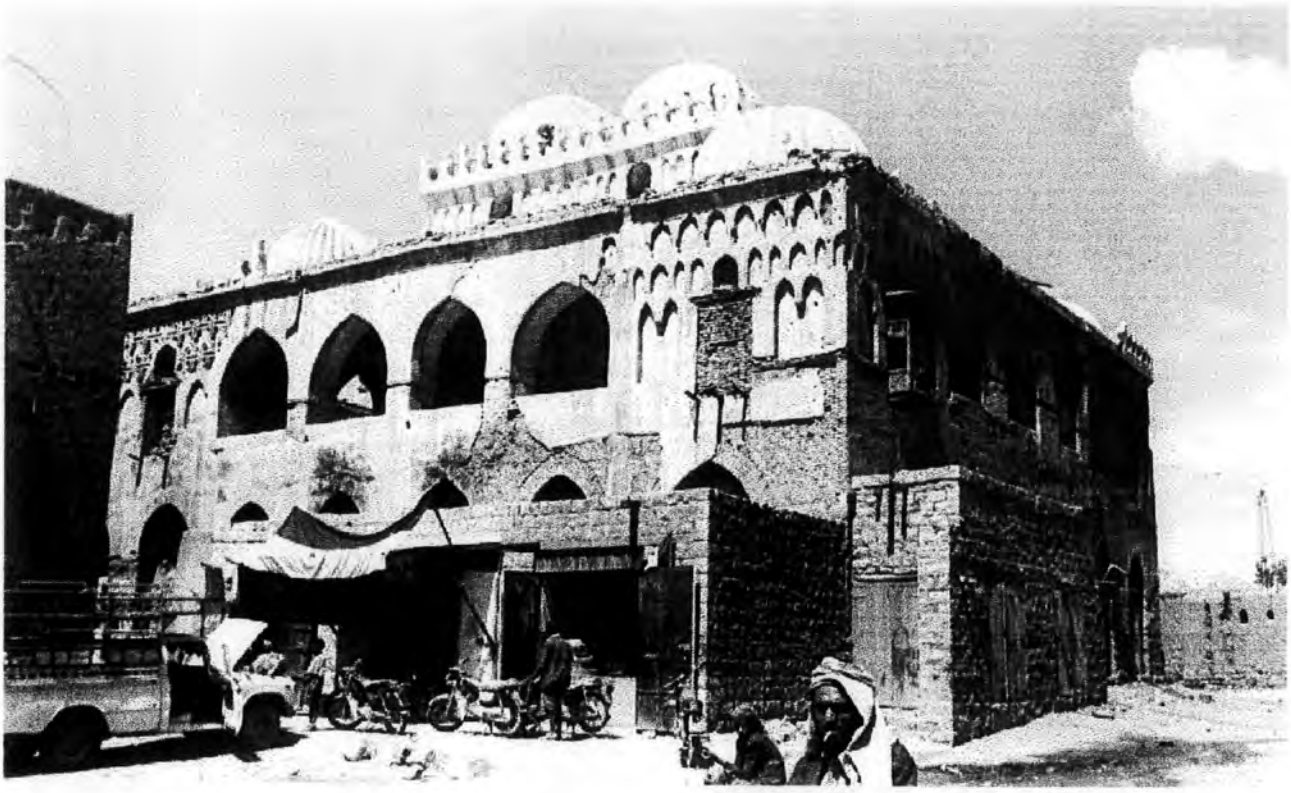
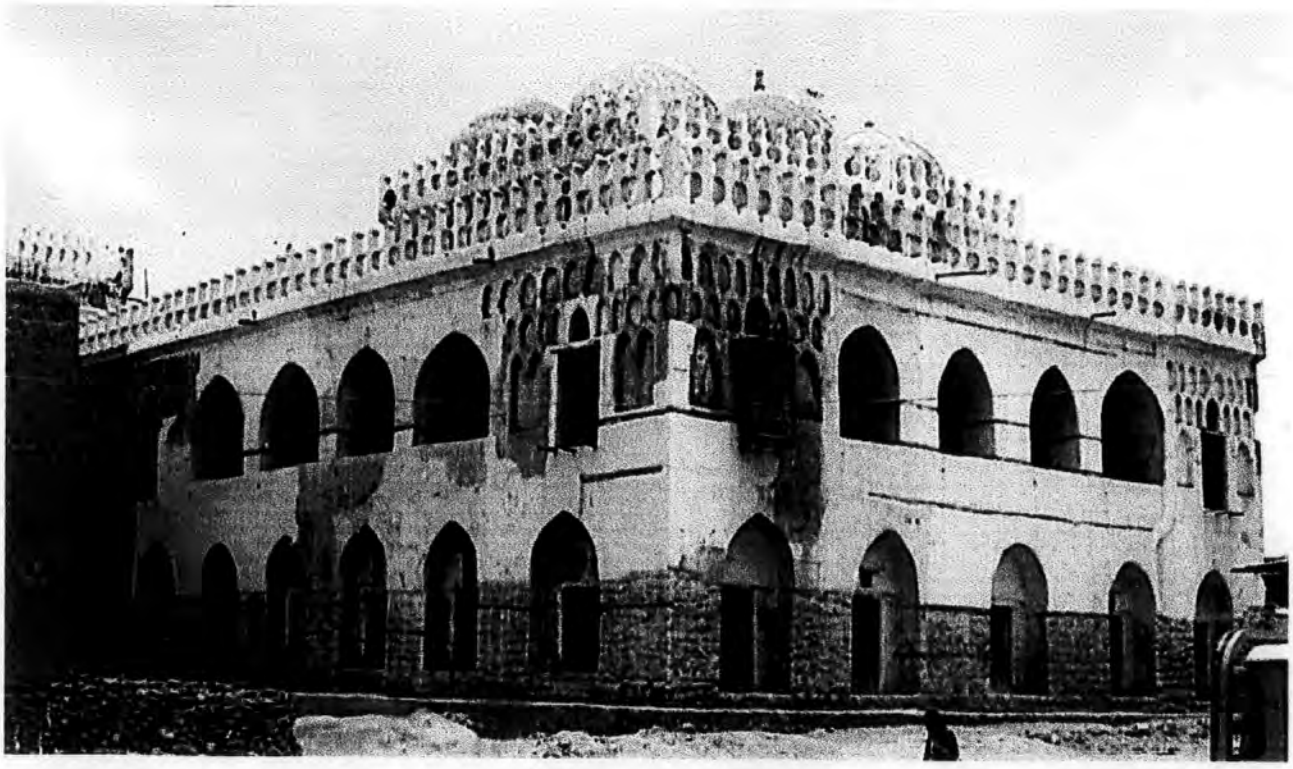




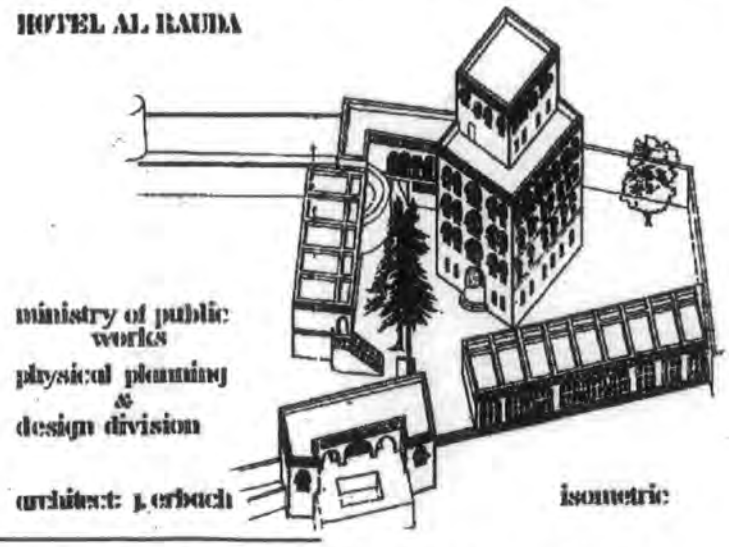
The 'Amiriya *madrasa* before (*top*) and after restoration; *opposite* - Front page of the rehabilitation project for a former Imam's palace in Al Rhawdha

CHAPTER 7: CONSERVATION

1- Early efforts

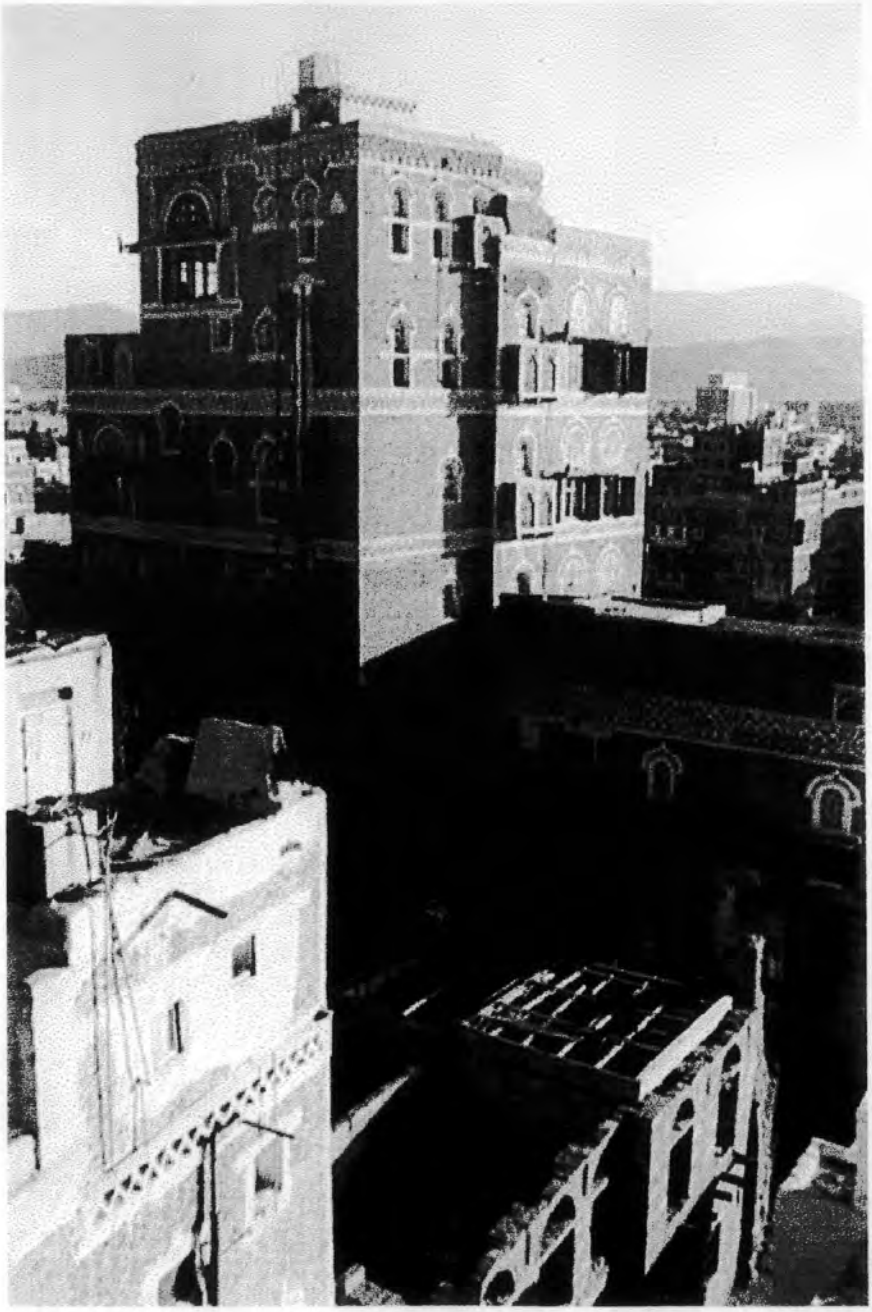
Concern for the country's cultural heritage was officially acknowledged by the passing, in 1972, of the Law of Antiquities and Heritage and with it the creation of a government department to oversee the custody of the country's cultural heritage, including archaeological digs, museums, the restoration of monuments, action against the traffic of antiquities and similar matters. Restoration of major monuments such as the Great Mosque of Sana'a in 1973, the 'Amiriya *madrasa* in Rada' and the Ashrafiya mosque in Ta'iz, ten years later, was accompanied by the appointment of foreign advisors and curators to the National Museum.[1] Other large buldings for public use including museums and hotels were restored by adapting buildings formerly belonging to the Imam. Control was impossible, however, when donors imposed their own restoration philosophy and methodology.[2]

In 1970 the preservation of the architectural patrimony appeared very low in the priorities of the planners advising the government or donating projects. Both the Egyptian and the Saudi planning proposals for Sana'a of that time brought sharp criticism from the UN expert at the Ministry of Public Works for what they reflected of attitudes that saw the Old City as all but a slum. He, on the contrary, advised that it should be preserved and protected against the negative impacts of the surrounding development, and undertook the first attempt at improving the public space of the Old City with the stone paving of Al Abhar square in 1972.

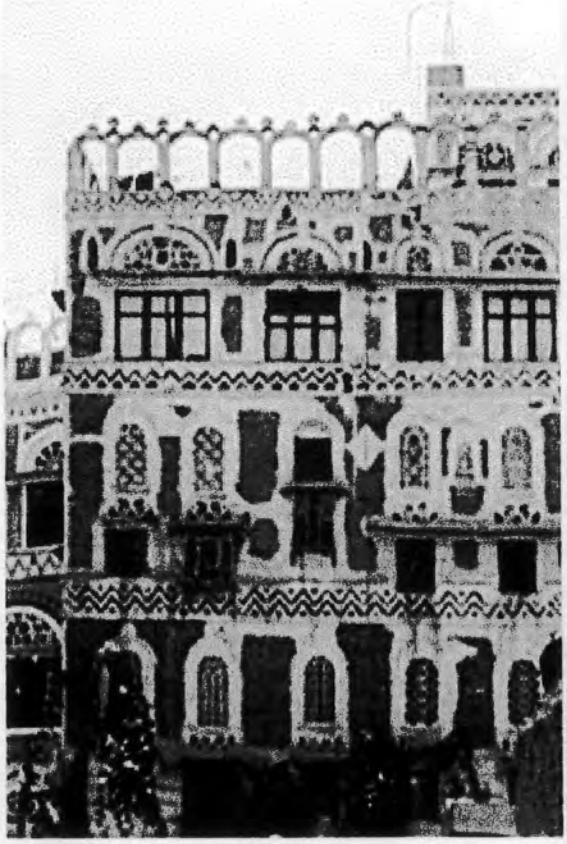


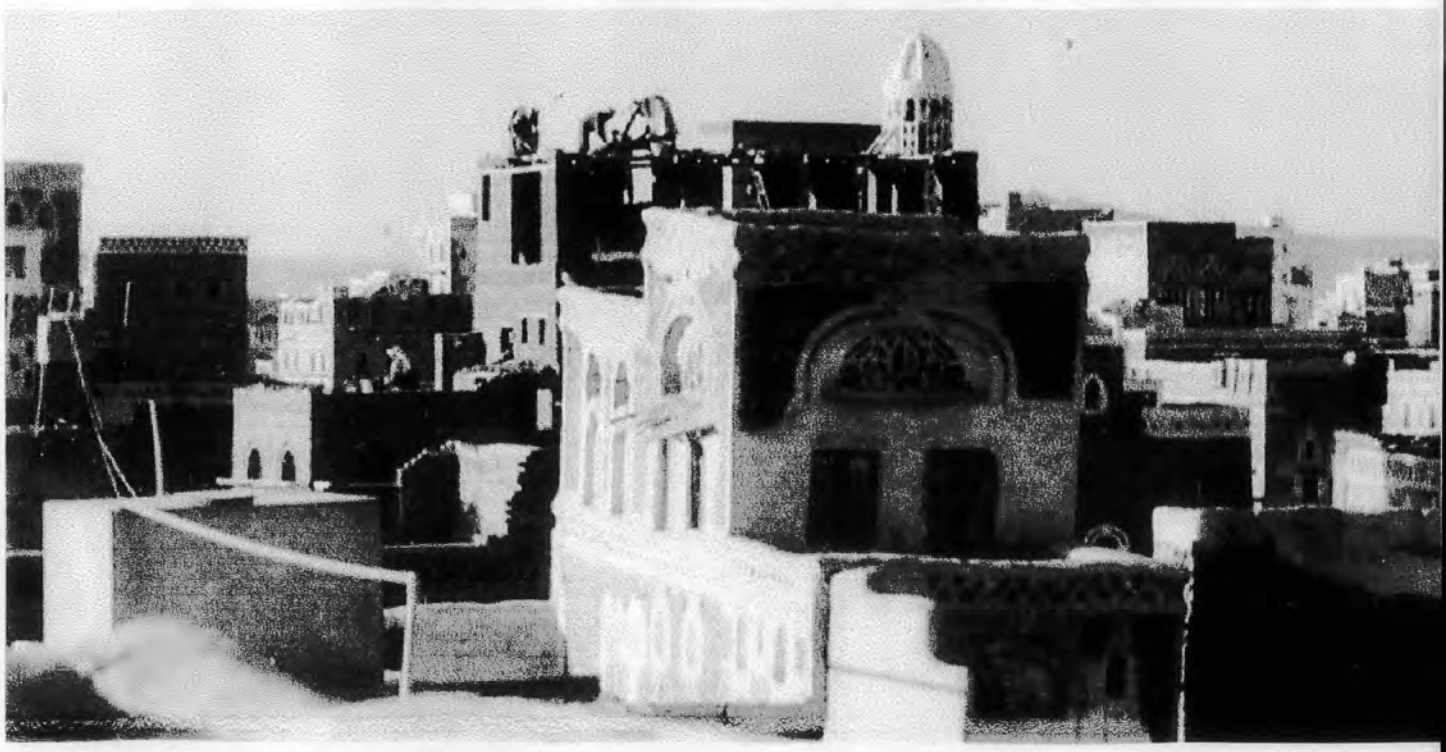
[1]By 1990, however, the director of the National Museum was already a Yemeni..

[2]For example, the mosque of Al Janad was "rebuilt" rather than restored, by the Saudis in 1974.



The Old City of Sana'a in 1990. Notice roof water tanks and construction in course





2- The conservation of the Old City of Sana'a

The conservation of Sana'a then became the concern of other groups of Western scholars. In 1976 a milestone was created when Sana'a appeared as the main feature of the World of Islam Festival exhibition in London. A year later the city was visited by a UNESCO mission.[3] This initiated the first concerted effort in Yemen for the conservation of a complete settlement rather than isolated monuments.

Some of the pessimistic forecasts made in the early 'seventies proved to be accurate in the late 'eighties: the sanitary conditions were worsening, water and sewage seepage were accelerating structural decay which the collapse of several houses in the 1982 earthquake succeeded in dramatising. Population outmigration, however, was not as great as at first feared.

In 1980 UNESCO and the Yemeni government endorsed a plan for the preservation of the old city of Sana'a, followed, four years later, by an International Campaign leading to the inclusion of the city on the list of the World Heritage Convention sites.

The objectives of the Campaign were stated as aiming at a strategy for strengthening the capabilities of local representation, co-ordinating external assistance and raising public interest and support. The emphasis lay on public relations, image promotion and information for education of the population, all of which was translated into a number of mission visits, films, videos and support of international seminars and exhibitions.[4]

In Yemen, a Board of Trustees for the Preservation of The Old City Of Sana'a, composed of top government officials and chaired by the Prime Minister, was created to head the national and international campaigns (1984). Next, the Executive Office for the Preservation of the Old City of Sana'a - known as EOPOCS by Unesco report writers and locally as the Old City Office - began to function officially with a director having ministerial rank and responsibilities including the co-ordination, supervision and implementation of programmes and the disbursement of funds.[5] Effective action only started in 1986, the same year in which a

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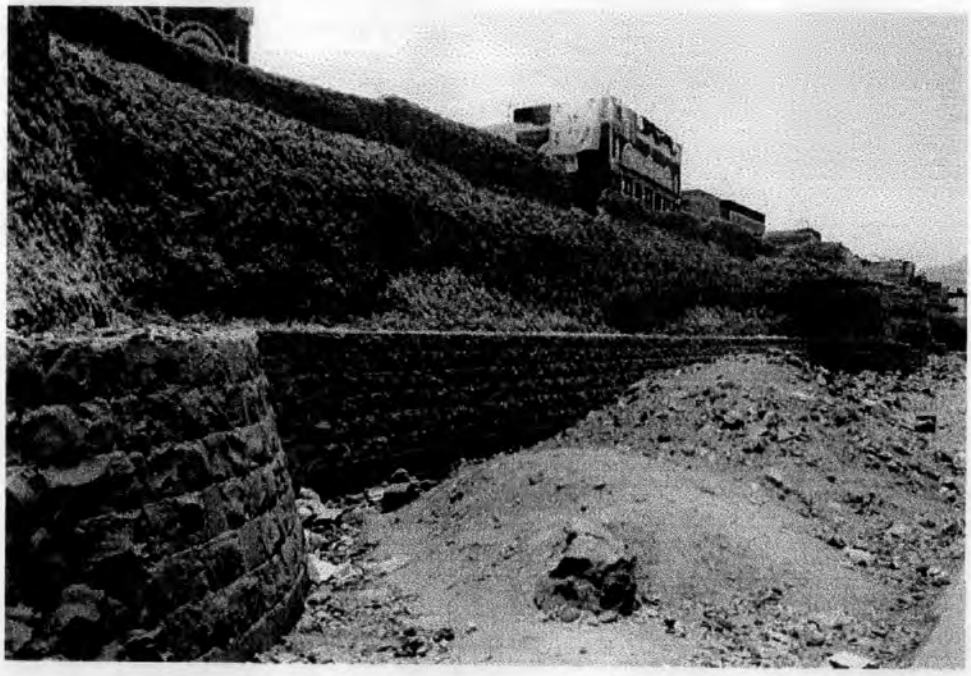
[3]Led by Prof. Ronald Lewcock who has been prominent in the promotion of the Old City conservation process.

[4]Vacher, Jacqueline-Hélène, "The International Campaign to Safeguard the Old City of Sana'a". Report for UNESCO, Division of Cultural Heritage, UNESCO Mission to Sana'a, Nov./Dec. 1988.

[5]Vacher:88.

Restoration of the City wall, Sana'a
1990



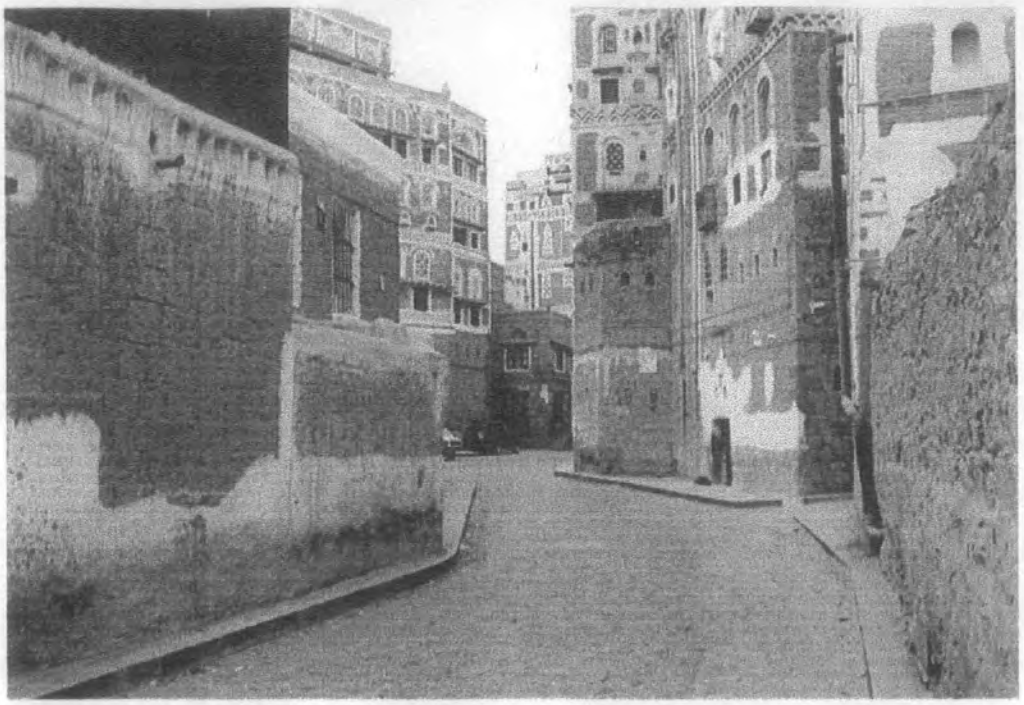
fund raising committee was created by the Board of Trustees, and a working group formed by the director of the office and two UNESCO experts, appointed to advise the government on the conduct of the Campaign.

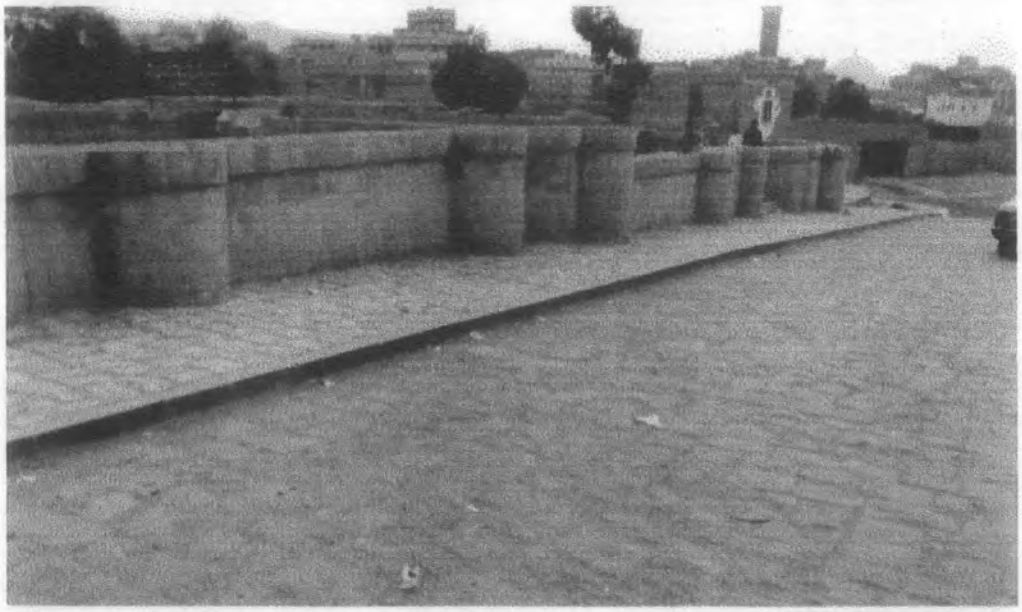
In 1985, when the writer first visited the Old City Office, the working group he met was small and informal enough for this meeting to take place in a *mafraj* of the splendid building that was the Office headquarters. By 1990 it had multiplied tenfold to some forty people staffing the main office and its other workstations.

The results of international aid were now apparent by way of technical assistance in a variety of restoration projects for buildings and public spaces as well as the creation of community facilities. Since 1982 the Italians have carried out studies and worked on the rehabilitation of a neighbourhood near the Great Mosque including street paving, the restoration of a few of houses and the establishment of a cultural and training centre. The French have been responsible for the restoration of an important section of the town wall including design work, staff for technical supervision and mechanical equipment. The German contribution covered the restoration of Samsara Al Mansuriya besides the paving of streets and the construction of a school and a health centre. The Netherlands sponsored street paving and the restoration of Samsara al Jimruk. Switzerland participated in the restoration of a large house to be used as a training centre for women producing domestic handicrafts. Support from Norway successfully achieved the restoration of Samsara Al Nahas where a craft training centre started functioning with the help of UNDP. North Koreans supplied a design team of ten people who were integrated in the Office staff; and South Korea provided modern office equipment. By 1990 Japanese and American projects, including the treatment of the *Sa'ilah* bed and the restoration of another samsara, were being discussed.

The foreign teams had resident experts detailing the documentation of the work to be done jointly with the Old City Office which in turn prepared the tender invitations. UNESCO, through the periodic visits of its experts, assisted the office in general organization and in the formulation of strategies and project proposals by sponsoring countries.

The largest share of the operation cost went on street paving, which included laying utilities, consolidating foundations, street furniture and





Sana'a: pavement of street *(top)* and square by the Sayla *(centre and bottom)*

landscaping.[6] Half of the costs of paving were supported by the government and the rest by bi-lateral aid.

Most of the work was done by hand, with the occasional help of small machines. Large flagstones were used, on a similar principle to that of the experimental paving of Al Abhar square in 1972, which had in turn adopted the traditional image seen in remaining pavements at mountain towns elsewhere in the country. It was judged, in the Office, as slow and expensive, but paving with smaller, easier to carry and easier to place pieces, had apparently never been considered.

The most pessimistic scenario projected during the early 'seventies was the deterioration of infrastructural conditions to the point where all but the poorest people would leave. Fortunately, this did not take place. The Old City has been provided with utilities and there has been no dramatic population movement. A number of the middle-higher income group left, although some have returned and many have remained apparently satisfied with the good quality of their ancestral homes and their proximity to the main suq. Nevertheless, it has been noticed that the wealthiest families are using their former abodes for hotels and tourist oriented facilities or else they leave their houses empty to deteriorate.

Between 1984 and 1986 there was an actual increase in population from 38,000 to 42,000[7] but most of the new arrivals were from the villages and with limited financial resources which has occasionally lead to overcrowding.[8]

Also, the value of property is lower than in the new residential areas where vehicular door-to-door access counts as an asset. The occupation by poorer people of rented houses with no direct interest in or capacity for the buildings restoration is a major problem for the Old Town Office. All operations ultimately depend on family income and the willingness to do repairs, and that has visibly been reduced .

Tastes and lifestyles changed. For example the ground floors of houses were being given over to shops;[9] the "village life" of the old town was seen to have its days numbered and Westerners were finally allowed to live in certain areas of the Old City.

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[6]78 Million YR spent until 1990 versus 29 Million YR spent in restoration of buildings.

[7]YARSYB.

[8]More than three persons to a room.

[9]"Suqification" was the word, first heard by the writer in 1992, describing the conversion of the ground floor warehouses and animal quarters into shops, which was being blamed for the "destruction of the quality of life"in the Old City.

Top - Advertisements for conservation projects in the Old City, Sana'a; *bottom* - The re-designed and paved *intra muros* square at Bab al Yemen, Sana'a

For the Office's responsible staff, the major problems were seen to be the raising of confidence among the local people, institutional co-ordination with other government departments that were involved and the quality control of private construction arising from local initiatives.[10]

In the first case progress was made through positive contacts with the neighbourhood authorities but it was believed that if an improved social support component were to be introduced a better response would be obtained.

Co-ordination with concerned government agencies was considered essential for proper achievement. It involved, first of all, co-ordination of paving, which was the Office's responsibility, and laying utilities, which depended on the Electricity, Water and Sewerage Authorities. Other aspects were regular street cleaning once paving was done and the time taken to approve contractors after the tenders had been prepared and submitted by the Office. Invariably this took so long that costs had meanwhile increased.

The Office campaigned to prevent the use of industrial materials[11] in repairs or new construction in the private sector. It was however a task based only on persuasion, there being, at the time, no other enforcement mechanism. This was made particularly difficult since unlicensed work was done during the afternoon while the Office was closed and inoperable.[12]

Cost comparison does not now favour the use of local materials and techniques. Stone construction is almost six times more expensive than cement block[13] and a master mason is paid three times more if he works on traditional rather than concrete construction. Former low cost materials such as sun dried block or even baked brick have literally disappeared from around the city and the raw material is now found only at a distance that makes its transportation impractical in economic terms. The small quantities of the traditional baked brick which remain in the vicinity of Sana'a may be sufficient for restoration work but not for large scale construction. The same was said about water proofing in lime (*qadad*) which was considered extinct, the attempts at restoring it

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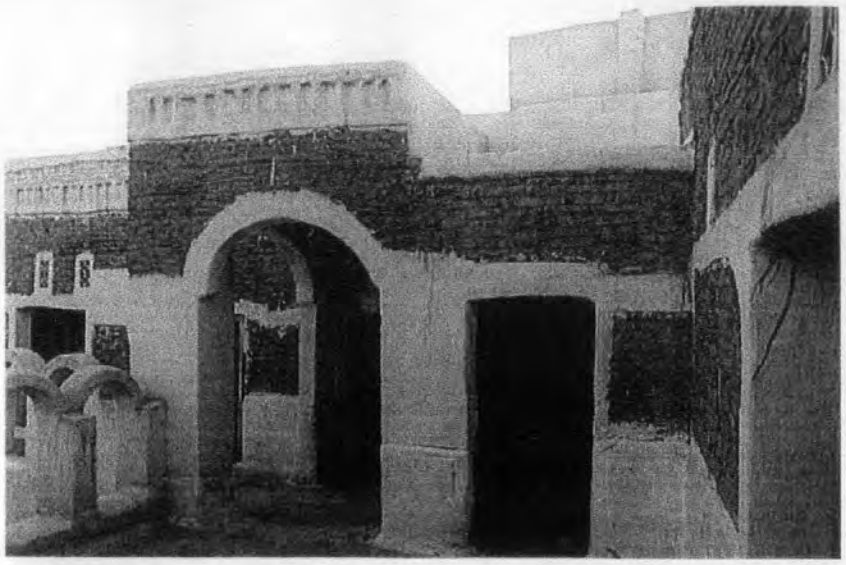
[10]A case in point was the replacement of wood by aluminium window frames.

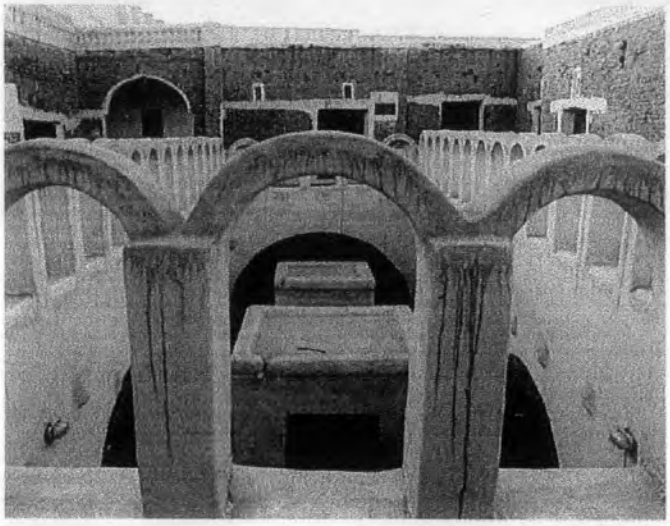
[11]e.g. concrete structures, cement mortar and blocks, metal doors and aluminium frames.

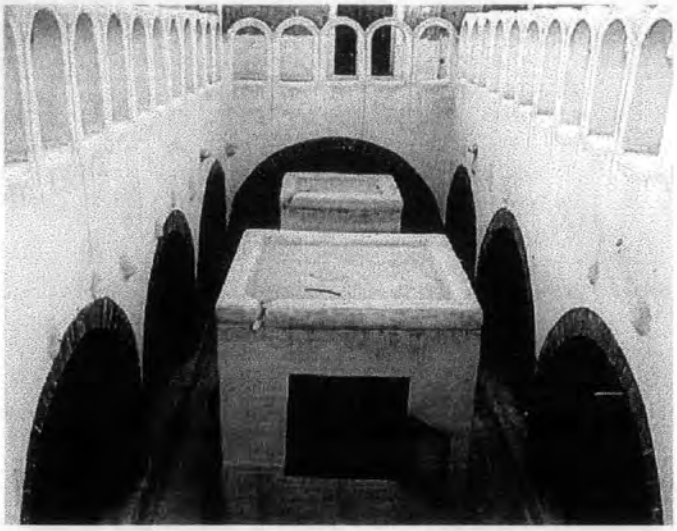
[12]In North Yemen, office hours were from 8 am to 2 pm.

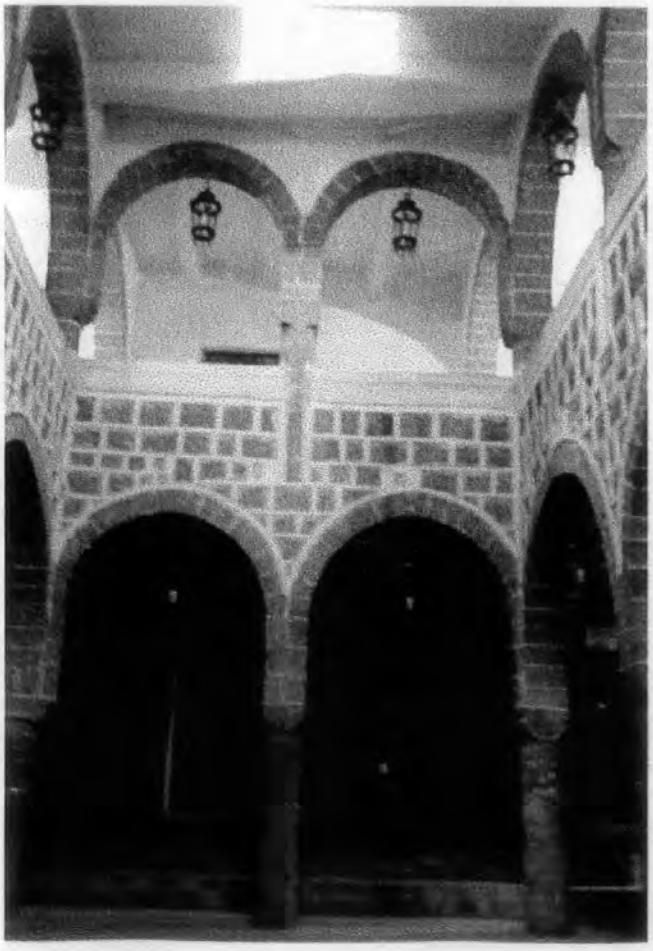
[13]1400 YR/m2 as opposed to 260 YR/m2 in 1990.

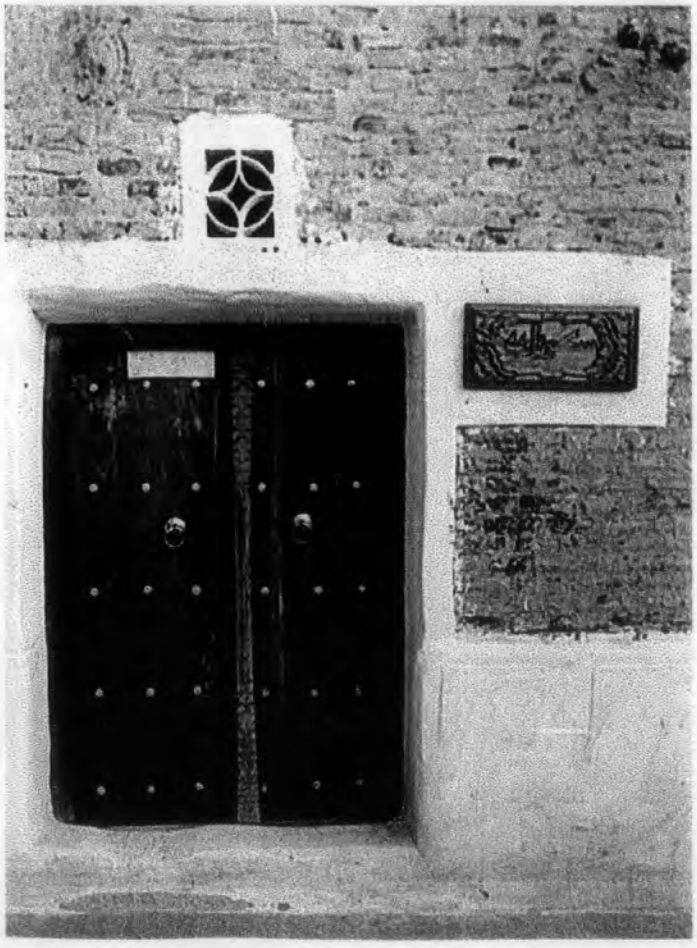


Top - Samsara Al Nahas in 1990, Sana'a









resulting generally in poor quality for the effort involved.[14] The Germans were consequently investigating an alternative waterproofing material composed of lime and volcanic ash.

Restorations carried out under the Office's supervision used only local techniques and materials. Simple solutions to construction problems were needed; some solutions proposed by aid agencies, apart from their specific merits and performance, appeared just too costly to be considered[15]. There was also the risk that new technological solutions, seen from the standpoint of cost and ease of application, might even eventually recommend themselves to the responsible staff of the Old City Office[16].

A frequent opinion was that the movement of traditional master masons to industrial construction and their consequent integration in a new social and economic order would make of their children not masons but "doctors and economists". The Office gave priority to the project of creating a training centre for building crafts, in which the students would receive a salary, as an incentive. This centre was covered by the assistance provided by the Italian aid team.

It was considered important that the government itself act to protect traditional masons and their employment not only with propaganda campaigns but by actually reducing the import of steel, aluminium and other industrialized materials.

Contacts with the university were seen as highly desirable. Groups of students had visited the Office since 1987 and there were discussions on a form of collaboration in which students would work on designs related to the Old City and other conservation projects. The Unification was expected to play an important role in this proposal.

With Unification, the Old City Office was transformed into the General Committee for Old Cities, enlarging its scope to cover all historical towns,

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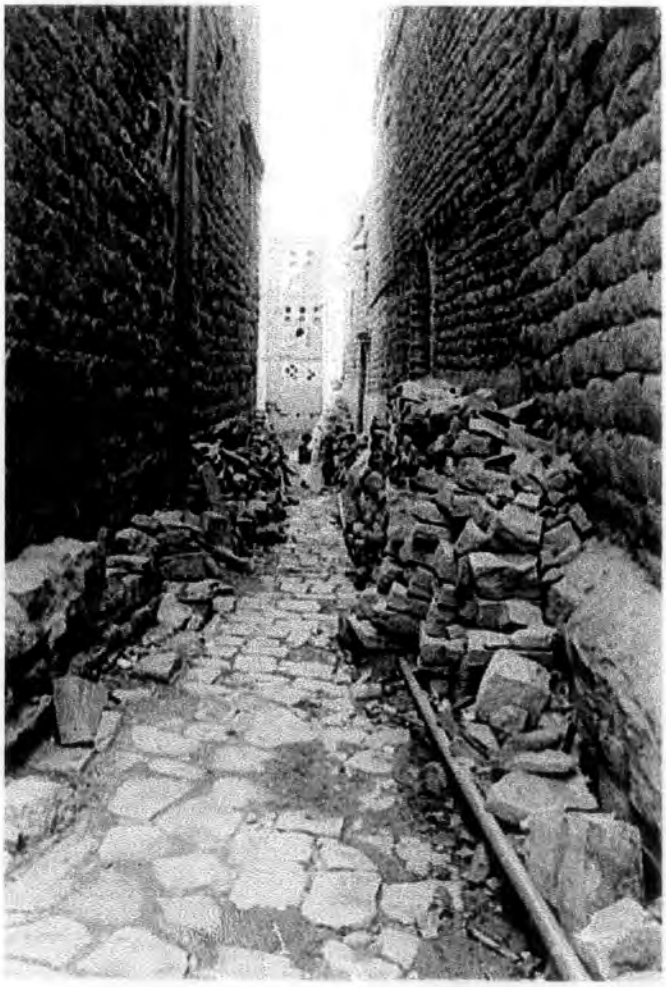
[14]This is in apparent contradiction with Al Radi's article quoted in chapter 4 , where the material "*has been used on the roofs, courtyards, and bathrooms of the large samsaras and a few of the large houses*". See also Lane, M.B, *San'a'. Pilot Restoration Projects for the International Campaign to Safeguard the Old City of San'a'.*, UNDP-UNESCO YEM/88/006.

[15]In the words of the Office's sub-director in 1990, the means proposed to consolidate and insulate the foundations of the houses would make them more costly than palaces...

[16]The writer heard one of the top officials in the institution extolling the merits of cement blocks for interior partitions and of pre-stressed beam and block floors, which he wished to propose for rehabilitation work, based not only on cost but also on aesthetic merits - ceilings would be nice and flat - although he admitted that some people liked the effect of the traditional timber ceilings.

Thula, 1990



of both North and South,[17] and bringing additional financial support to projects that had already been started in certain selected settlements. Included, among others, was the laying of utilities and street paving in Thula, Shibam and Kawkaban; the inclusion of the Jewish neighbourhood and the "garden suburbs" in the Sana'a conservation project; and a small project in Sa'da. However no mention was ever made to the writer of efforts toward the rehabilitation of the "Red Sea House" architecture of the Tihama.

3- Conservation and tourism

Yemen "as it is" (or rather as "it was") is now a recognised source of revenues from tourists both for the government itself and indirectly for private enterprises of various kinds. Tourism has been recognized as capable of making an important contribution to the nation's economy and hard currency reserves[18] and advertising campaigns through national outlets - the airline company and national tourist offices - emphasise the charm of brown and white skylines of towns and minarets, green terraced slopes fading into blue mist, and pale silver jewellery.

Traditional crafts have been revived; visitors can now take with them something of the country - a basket, carpet, dagger, dress, necklace or pot. One can now find in Sana'a items that only a few years ago required travel over many kilometres of hard tracks to be seen.

The tourist industry began in 1973 when small French chartered flights of "organized adventurers" discovered Yemen. The French and Yemeni governments later entered into agreements for expanding the development of tourism in the country.

The multiplication of exhibitions and conferences in large European towns, together with television documentaries distributed by various countries, contributed to the stimulation of those who sought to travel in

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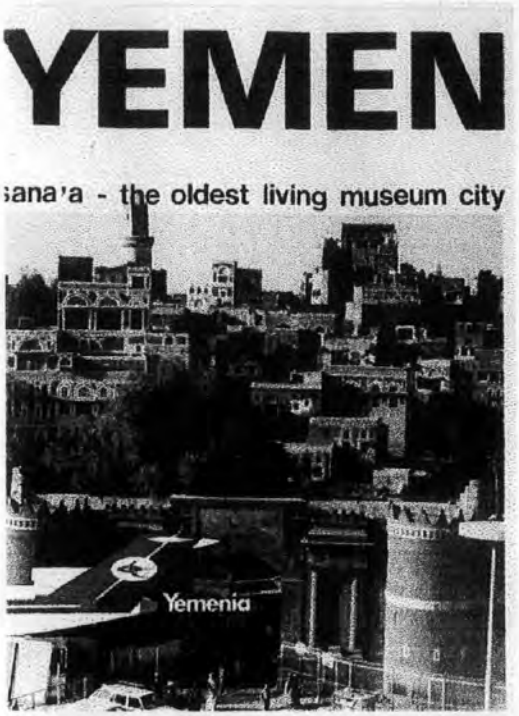
[17] In 1991 the North American Commitee for the Support of UNESCO Projects in Yemen (NACSUPPY) was founded, with Ronald Lewcock as Executive Director. In its press release it stated that ."*A natural outgrowth* (of UNESCO's campaigns in San'a and Shibam) *is the formation of a public relations network to promote and gather support for the preservation campaigns in Yemen. It is with this in mind that the North American Committee in Support of UNESCO Preservation Projects in Yemen was conceived. It is a goal of this Committee to promote the cultural heritage contained in the built environment of Yemen especially as defined by the UNESCO campaigns in San'a and Shibam.*" See Yemen Update:91, 92 and 93.

[18] Middle East Times. Yemen Edition, Vol III, n° 29 {EE} 18-24 July 1990. Revenues were estimated at US$ 22 Million in 1988, i.e. 26 % more than in 1986, an increase expected to double in 1990.



Top- Airline advertisement; *centre* - Tourist caravan on beach near Khawkha; *bottom* - Making palm leaf sandals for tourists in the same location

remote and exotic locations. Most of the tourists recorded until 1990 were European (64% of the total of 55,000 in 1989) followed by nearly 20% of Yemenis with Saudi passports and various other Arabs, the remainder being made up by other nationals.

Excursions are now organized that visit the once closed settlements on their mountain peaks or the temples on the desert fringes; they go in caravans of four-wheel drive vehicles, to see the bridge at Shahara or to bathe in the small secluded beaches of Al Khawkha, firmly believing that it is necessary to bargain in Yemen because of some experience they or their friends may have had with a carpet in Tangiers or or in Bombay.[19]

The government is keen to create opportunities for investors. Several tourist projects for holiday beach villages and hotels had been proposed before the Unification. In 1991 plans were disclosed involving the restoration of the Sira castle in the Aden bay, as part of a large recreation project, and the development of a large housing complex in Abyan, on the southern coast, with 1000 flats, 200 villas and corresponding community facilities.[20] Contradictory approaches may eventually conflict between conservation of the country as a major factor of attraction and the environmental destruction brought about by the impact of large masses of people and the buildings required to service them.

A UNESCO report trusts that communicating the principles of the campaign for the preservation of Sana'a "*will help in the developing of specialized cultural and urban tourists*" and "*contribute to the restriction of some non-desired consequences that can proceed from large tourism activities* ".[21]

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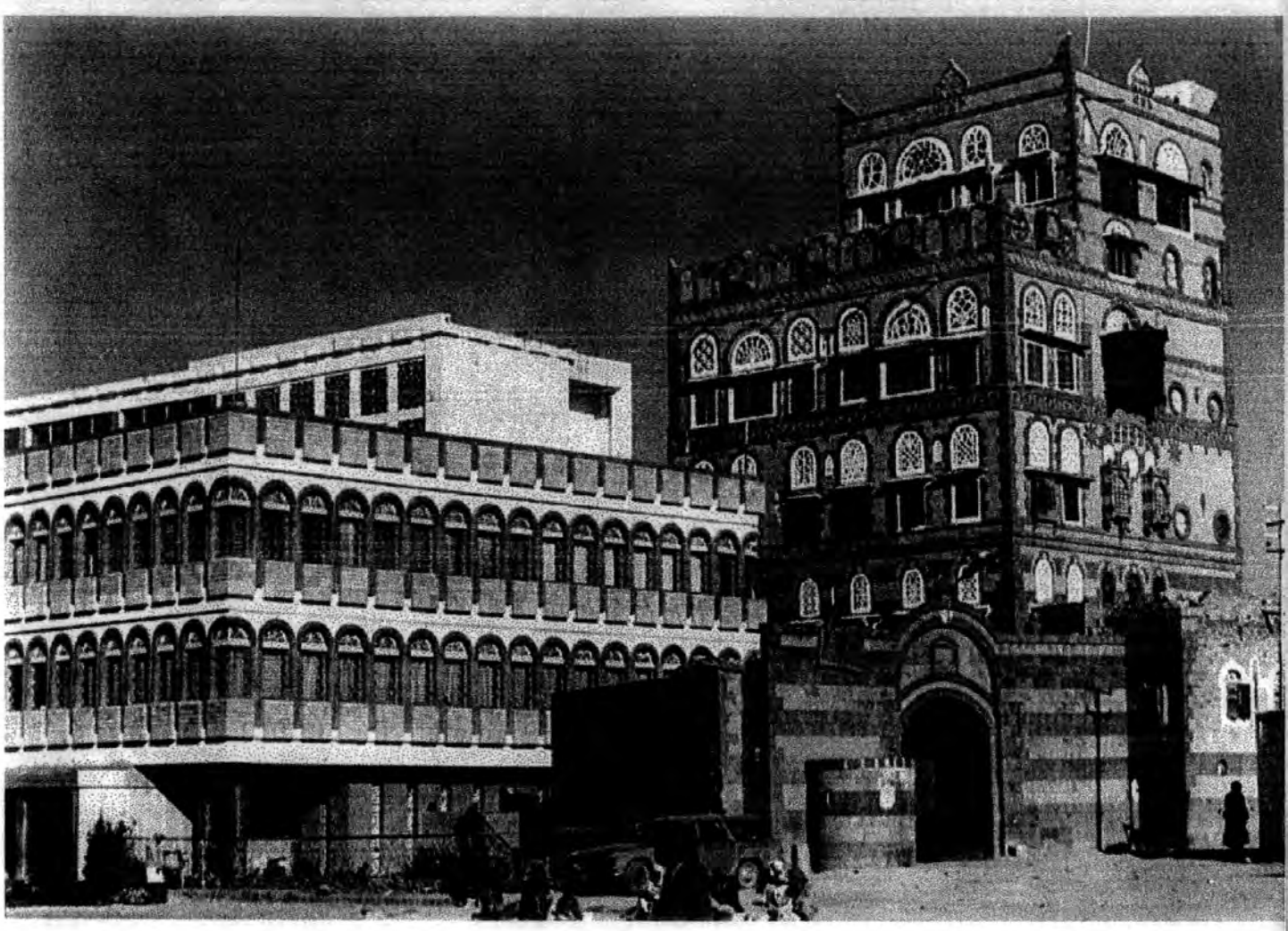
[19]In the writer's experience, Yemeni merchants were not bargainers; they might make a discount or offer a small present if the transaction proved particularly satisfactory but there was no asking for a "thousand" to sell for "ten" as occurs elsewhere. Lately, however, this might not be so true and one cannot help but suspect that the habit of bargaining is being introduced by tourists.

[20]Middle East Times, Sept. 1991, Oct. 1991 See also Yemen Times, June 5 and 12, 1991.

[21]Vacher:88, p 18.

CONCLUSION



Sana'a, National Museum (right of the photo) and the headquarters of the Yemen Bank for Reconstruction and Development. At its opening, in 1973, the later building was cited as a paragon of the new ways to be followed by Yemeni architecture

CONCLUSION

After some sixty thousand words of analysis, it might be hoped that points had been made so that conclusions were obvious. However, different perspectives can offer a variety of equally valid interpretations. For example, this writer produced a book that was the result of his fascination with the built environment in Yemen as he saw it in the 'seventies. He offered a copy to a friend who lectured on earthquake resistant structures and who later commented: "Your book has been very useful; I am using it in my courses to show how houses should not be built". Unfortunately those were prophetic words;[1] but, until then, the writer had limited his appreciation to the combination of form and function which he identified with the excellence of Yemen's built environment. The factor of risk that could be seen by one individual to symbolise the audacity of a culture was understood by another as the impudence of the nescient. Likewise, the writer is aware that his own conclusions reflect a professional background in other countries - namely Portugal and Bahrain - where, in spite of all the obvious differences, he found parallelisms with the situations experienced in Yemen.

Throughout this study various dichotomies have been presented which can function as either landmarks or tendential reference points in charting an evolutionary process. Among these the "rural/urban" dichotomy is paramount .

The last third of the 20th century has seen urbanisation in Yemen expressed in terms of demographic explosion and systematic building production. The process appears quite explicitly as a distancing from "mother earth" observed in the progression from earth dependency towards structural self-support solutions. This may be symbolised by

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[1] Soon afterwards, in December of 1982, the earthquakes of Dhamar had the catastrophic consequences already described. Yet the character of Yemen's buildings in themselves and in relation to their environment cannot be contested. Earthquake resistance, a yardstick as good as any by which to measure the structural quality of buildings, seems once to have been understood in Yemen, and building without some form of earthquake protection only to occur in areas of lesser risk.

such extremes as cave and skyscraper but it is also evident in building tone and texture; and ultimately reflected in the attitudes of the inhabitants regarding their participation in the construction process. Thus, the trends identified in Yemen have been associated with the transposition of building from being a farmers' art to becoming a merchants' industry. The Republican Revolution marked the turning point with the introduction of alien technologies and a different social order.

Until the Revolution the physical distinction between rural and urban settlements was a matter of overall textural refinement, rather than building density or size and structure of the individual buildings. Towns were the seat of specialised craftsmanship and the natural field within which it was applied. The differences in values were illustrated by the usual anecdotes contrasting the customs of villagers and townsfolk.[2]

As society is urbanised, its production is steered towards trade rather than local self-sufficiency. The individual's time is purchased to be spent in the production of whatever goods and services are in demand, so that payment can be made for someone else to provide for essential needs and acquired habits. Urbanisation, here, means the introduction of money as the systematic intermediary between what is needed and what is obtained. There is a large degree of contrast between this and the tribal situation where wealth is measured in terms of land ownership rather than money and in which a landless man has the certainty that his fellow tribesmen will provide the continuity of his support system.

The urban dweller ceases to have direct contact with the earthiest aspects and may even be repelled by them. Dealing with excrement may be abhorrent to present day town dwellers but it has been a natural quota of the hardship of living and building in the rural context. Dirt and dust are part of the farmer's life and spatial experience and only a humourist or a poet would talk of dusty *zabur* towers. Dust, however, is the plague of the papers, computers, machines, glazed surfaces, and parlour room knick-knacks required for the new urban spaces.

Thus, dichotomies, such as rough/polished, dull/glossy, monochrome/polychrome, illustrate the polar textural options that appeared to characterise the process of urbanisation, associated to others applying to means of production, such as hand-crafted/machine-made, and acessibility, as in walking/driving.

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[2] For example, a villager once told the writer that the speech of his village was more pure than San'ani; the sounds were clearer and people would not use them to lie.

Other dichotomies relate to ways of living and spatial organization. In this way, for example, the dominant vertical in the organization of the mountain house and settlement reflects their environment as much as the horizontal component does in the flat terrain of the Tihama. As opposed to this, the new development of towns occurs horizontally as "urban sprawl" and urban high-rise buildings result from the stacking up of horizontally organized individual dwellings.[3]

A variety of new attitudes concerning the house and originating in the urban context has been described. At one extreme, the house appears endowed with increasing individuality, distinguishing marks being made more possible by the access to new products and technologies. At the other, the tendency to uniformity is represented by governmental or private efforts in which the inhabitants tend to be grouped into categories expressed in terms of project cost and tenant income. Urbanisation, in this way, equates with the control of site allocation and building quality, secured by an agency beyond the builder's reach.

It also means that construction is increasingly entrusted to intermediaries. The number of intermediaries multiplies as building becomes part of a process in which to build and occupy a house is no longer a question of dealing directly with materials and people but with the paper-work of a complex bureaucracy which, at times, appears as the largest "industry" generated by the contact of developing societies with modernity.

Yet, in the writer's experience, quality at the level of Yemen's present advancement cannot be guaranteed by regulation alone. There are "inner" regulations which grow within the culture of a country, based on successive levels of contact and understanding. An experienced mason has many more rules instilled within himself than has an apprentice but may nonetheless be oblivious of the formal regulatory process that conditions the matter he is dealing with; yet, if both the regulation and the mason are sound they will probably be in concert. The opposite may also be true: finding ways of going around or meeting the rules on their own terms appears to be the key to success for many entrepreneurs, rather then the quality of their wormanship.

How can one formally regulate the skill of a mason erecting eight-storey mud or stone buildings? With the new materials, the stability of the

[3]See Varanda, Fernando."Horizontality and Verticality: Architecture and the Environment in Yemen". *Traditional Dwellings: Case Studies in Different Cultures,*Center for Environmental Design Research, University of California, Vol. 13. Berkeley, 1989, 33-43.

structure is safeguarded by previous submission of schemes and calculations, with wide safety factors intelligible to the bureaucrats who approve them within the limitations of their accustomed technologies. Yemeni urban buildings after the 'seventies tend to be the same concrete structures seen anywhere else, with stone applied as the epiderm or cosmetic.

As far as "traditional" building is concerned, once the traditional craft organizations lose control of the process of admission, professional education and promotion of builders, the tendency experienced elsewhere by the writer has been to reduce risk by limiting various parameters including height. Eventually this contributes to the erosion of those techniques and skills that allowed them to soar.

The writer felt the need of adding to conventional nomenclatures, such as "Yemeni", invented ones, such as "Yemenist", to describe an attitude involving the appreciation of the results of Yemen's cultural past and a more or less declared dependence on the formal models thereby created. In this way, "Yemeni" is to mimesis, understood as being the assimilation to the environment for structural and existential reasons, as "Yemenist" is to imitation, namely in the assimilation of former characteristics by copy or interpretation resulting from an intellectual process.

The process of change in the built environment of North Yemen is seen as having a sequential component from mimesis through rupture to imitation. Whether this will prove to be part of a cyclic process, only the future and other more specialised disciplines will confirm. It is also up to them to measure the entropy growth of a process whose magnitude is indicated symbolically by aspects such as the increase of waste and the decline of recycling.[4]

"Mimesis", "rupture", "imitation" could easily be interpreted in terms of contemporary architectural terminology as "pre-modernism", "modernism"

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[4]The question of "creative recycling" offers too wide a field to be explored in the context of this study. Yet a few references are necessary if for no other reason because of the frequency with which they appeared to the writer when he was looking at Yemen. On one hand, this was seen as part of an attitude of cultural innocence, increasingly lost with accessibility to objects for all functions thus taking away from the users the need to fabricate them and the "eye" to discover the potential re-use of discarded materials. Abundance breeds indifference and wastefulness. On the other hand, references come easily to mind from the western art world which has, at least since Marcel Duchamp, given a use to rubbish as part of a purely aesthetic process. If the first "ready-mades" could be seen as a somewhat ironical form of showing that beauty is in the eye of the beholder and that a change of context may be enough to create an aesthetic object, contemporary artistic tendencies, from Beuys to Tapies or Tinguely, have made it part of a highly expressionistic language. Other western attitudes are of a more terrain and utilitarian nature such as that illustrated by hippy comunes in the 'sixties where the rejection of the production system, the "establishment", resulted in original solutions for individual dwellings. These might integrate discarded materials at the same time that ways were being explored of working with natural materials and without sophisticated technology to maximize comfort and reduce energy consumption.

and "post-modernism". To this extent the conventions of modernism have conditioned the formal grammar of industrialised construction introduced by the Egyptians after the Civil War and ultimately represented by the steel and glass "Yemenia building" in Sana'a. Yemen has however passed from pre-modern (traditional, "yemeni") to post modern ("yemenist") without experiencing definitive modernism, as recognised in the West and expressed in "International Architecture". As such, modernism in Yemen can be seen as but a sign of rupture.

In 1990 "yemenism" seemed to be as much a temptation for foreigners attracted to the country as it was for the Yemenis themselves with their pride in an architectural heritage. The notion of building "Yemeni" was subjacent to the conscious efforts to create a new aesthetic language or simply to use the most acceptable model. This appears to be a natural process, characterised by a radical change in the choice of structure and attempts to define texture.

Some of these buildings are versions of industrial building typologies, such as flats or office buildings, which carried the familiar affectations of neighbouring Arab countries. Their assimilation by local builders consists, principally, of exchanging the cement rendering of concrete construction for interpretations of traditional finishes. A local idiom appears to be emerging which emphasises stereotypes such as arches, facing stone, inlays and plaster screens, inherited from traditional techniques and conventions, but which at the same time invents new applications as, for example, in the production of metal doors and aluminium tracery.

The major towns now present a composite image resulting from building quickly and in a wide variety of materials to accommodate new functions and social strata. At Ibb, for example, it is difficult to believe that the culture which created the proportions and finishes of the pre 'sixties town, is the same one that is building the chaotic, albeit colourful settlement that has mushroomed around it.

The countryside shows another face. If one has money one builds in solid stone. Otherwise cheaper materials, such as concrete block, have to suffice and embellishment is a question of fancy rather than convention.
In the work done by architects there may be attempts at a deeper interpretation of the traditional vocabulary, not only because of their natural impulse to create an original language, but also because they recognise the need for new forms and typologies in the immediate present and the near future. Among the new generation of Yemeni architects the recognition of the excesses of speculative building and concern for

national models appears associated with an idealistic search for a purified style bearing comparison with the past. Their attitude may be somewhat nostalgic as when they talk of new concepts adapted from the form and arrangement of the Old City houses of Sana'a.[5]

Examples by foreign architects oscillate between perfunctory folklorism created on the drawing boards of offices in their own country and the more serious attempts at an understanding of local materials and forms, capable of being translated into a language consistent with the times.

"Yemenism" is also concerned with economic investment in the expanding tourist industry. The country's built space is mainly responsible for the attraction felt by western tourists and the international cultural scene. Conservation and adaptative re-use of earlier structures are part of the effort to retain their inspirational value. This may therefore contribute to maintain outward appearance as long as it is believed that it guarantees the cash-flow from visitors.

Associated as it may be with connotations of pastiche and superficial imitation, "yemenism" has nevertheless already produced some sound examples. Ideally, what is now happening might represent a transitional period allowing time to re-establish and reformulate the basis of the continuity of architectural expression in Yemen.

Formal languages are being explored. Will there be an architecture resulting from the past two decades as wonderful to the visitor as that of the previous two centuries? Will the spontaneous manifestations of the countryside ever seed a new decorative grammar and figurative representation ever become part of Yemen's refined vocabulary? The answer to these and other questions is, at the present time, a matter for speculation.

Traditional structural solutions, in spite of their virtues, cannot compete economically with the increase in industrialised methods. Does this mean that traditional materials will be exclusive to the rich urban or to the remote rural populations? Does it mean that there will be aristocratic, middle class and popular levels of architecture in Yemen? The

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[5]In 1990 "traditional techniques" were not part of the curriculum of the potential engineers and architects being educated at the Sana'a University. The wish to have courses in Yemeni architecture was emphatically conveyed to the writer by the small group of young Yemeni assistants of Egyptian and Syrian teachers, for whom the study of architecture could not stop at Le Corbusier and Hasan Fathy.

twenty years spanned by this study appear to illustrate the tendency to go from an architecture that betrayed no class distinction to a demonstration of status through architecture.

In this way the art of building may no longer remain the homogeneous representation of the country's culture as it was before the Revolution. Until then, academic distinctions such as "vernacular" and "erudite" could not easily be applied. For some, the architecture of Yemen was completely "vernacular";[6] for others it would fall into the definition of primitive architecture cited by Guidoni.[7] Yet again for others, it is just "Yemeni architecture" since, seen from within, notions such as "vernacular" or "erudite" are distinguishable[8] but a homogeneous image is conveyed by the country as a whole.

The signs are now apparent of a possible fragmentation of this image. The different types of building initiatives - entrepreneurial, architect-designed and "popular" - are developing identities of their own. It is only now that there may be reason to speak of the emergence of a "vernacular" architecture, expressed in the spontaneous manifestations marginal to mainstream building production.

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[6] The *Encyclopaedia of Vernacular Architecture of the World,* soon to be published by Blackwell and Sons, includes Yemen globally in this category. In the guidelines for contributors "vernacular architecture" is accepted as a term that "*has gained wide acceptance and embraces the various kinds of buildings often termed 'traditional', 'primitive', 'indigenous', 'folk' or 'peasant'. These are self-built or community- constructed building types that relate to the environment, resources, technologies, economies and cultures of the regions in which they are found. They include both sacred and secular buildings in rural and urban contexts.*"

[7] Guidoni (*L'Architecture Primitve,* Berger Levreault, Paris, 32-36) defines primitive architecture as "*the expression of the space activities of a pre-state society, which occupies a determined territory and conserves a high grade of political and economic independence relatively to other neighbouring societies.*" Vernacular architecture, on the other hand, represents the "*expression of space activities of a group that occupies a territory in a plane of economic and political subordination ... which carries the loss (or the permanence in latent state) of the primitve characteristics that are specific to them ... The time of vernacular architecture is linear and refered to the process of industrial societies whereas that of primitive architecture is cyclic.*"

[8] Erudite architecture, in this context, is expressed especially by the vocabulary or provenance of the principal religious buildings .

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GLOSSARY OF TECHNICAL TERMS

Glossary of technical terms

'Aqd, arch, fanlight
Abyadh, white, white lava stone
Ajur, baked clay brick

Ballat, floor tiler; formerly a specialist in lime plaster waterproofing
Barrada, see *shubaq*
Barud, Open sided covered area for sitting outdoors, in the Tihama
Basu t, tie-beam
Bayt al ma, bathroom/toilet in a house
Bayt al myia, compartment where water is stored in containers; see also *shubaq*
Bayt al shurba, see *shubaq*
Bayt, house; small settlement usually named after the original settlers
Bint al 'usada, small cushion used as head rest when sitting; see *mukhadda*

Darwa, covered area on the roof terrace of "Red Sea Houses" in the Tihama
Dayma, guard house in the fields; kitchen
Dihliz, Entrance lobby of multi-storey houses
Diwan, Reception room
Dubr, quoin

Fa's, one of the hammer types used for hewn stone
Farsh, mattress or rug for sitting

Ghayl, water source; spring; canal
Ghurfa al istiqbal, sitting room
Ghurfa al majmu'a, sitting and gathering room
Guss, gypsum, gypsum plaster; also pronounced *juss*

Habash, black lava stone
Hakuma, government; government building
Hammam, bathroom/toilet, public bath-house
Handasa, the drawing of engineering and architectural plans.
Har, stable
Hara, neighbourhood
Haram, protected, neutral grounds
Harim, women's quarters; protecting easement for a water source
Hatab, storeroom
Hawsh, yard, courtyard
Hawyia, the same as *hawsh*, in the Tihama
Hijra, protected settlements; hallway or upper courtyard of a house
Himi, communal foraging grounds

Jabbana, open air prayer enclosures for particularly large congregations on special occasions.
Jami', Friday mosque
Juss, see *guss*

Kanun, coal stove
Kharja, roof terrace, in the Tihama
Kirs, chicken or sheep pen at the entrance hall of houses
Kunna, narrow canopy above windows, usually made of wood
Kursi, chair

Libn, sun-dried earth blocks
Libna, unit of area, approximately 44 m2
Liwan, reception/sitting room opening onto a yard, in the Tihama

Ma'jil, open air cistern
Mada'a, water pipe
Madfan, underground grain storage
Madina, city
Madka, arm rest
Madrasa, school
Mafraj, sitting room, usually on the top floors and with good views, in the Mountains
Mafrasha, an ensemble of rugs, mattresses and cushions furnishing a room

Mahall, hamlet

Majlis, sitting room, especially in the Tihama

Malaj, rendering plaster made of mud and cow dung

Mandhar, small isolated top reception room, in the Mountains; also known as *mafraj*

Mardam, sill stone

Masfa, ablution area or room

Mashrabyia, see *shubaq*

Matbakh, kitchen

Mathana. grinding mills; see *tahun*

Matraqa, hammer

Mattal, see *shubaq*

Mawfan, outdoor mud stove, in the Tihama

Milk, privately owned land

Minbar, pulpit

Mihrab, prayer niche

Miri, state owned land

Mu'allim, master; master craftsman

Mugharaf, niches

Muhandis, designation applied to engineers, architects and land surveyors as well as technical trades (mechanics, plumbers, electricians)

Muhandis al kahraba, electrical engineer; electrician

Muhandis al mantaqa, land surveyor

Muhandis ma'mari, architect

Mukhadda, pillow, head rest

Muqassis, plasterer; plaster carver; stucco tracery maker

Muqawil, contractor

Muwaqqis, mason in charge of stone cutting

Nashara, sawdust, wood shavings

Nawba, watch tower

Nura, lime, lime plaster

Qa'h, open field, square

Qabili, tribesman

Qadad, lime plaster

Qalfa, rubble stone for the inner, plastered, face of the wall

Qamaria, alabaster fanlight; also fanlight of other materials

Qanat, water ducts (Persian)

Qaryia, village

Qat, shrub whose leaves are chewed as a stimulant *(catha edulis)*
Qibla, an indication of the direction of Mecca usually appearing as a convex shape on the outer face of the wall and corresponding to the location of the *mihrab* inside.
Qishr, infusion made of coffee husks and aromatic spices
Qutb, newel

Rassas, common mason
Rawshan, bay window usually made of carved and latticed wood, characteristic of "Red Sea Houses"

Sa'la, central hall of a house where meals are usually taken.
Sabil, ablution pool in a mosque; covered drinking fountain or well
Safif, plaster shelves
Sahil, washing trough
Samsara, large storage room; warehouse; caravanserai
Saqif, roof; temporary shelter for shepherds and wayfarers in the Mountains
Saqifah. room with wide shutterless openings providing a cool shaded area in the Tihama "Brick Houses"; also known as *sfaf*. See *barud*
Sayla, flood; the dry bed of seasonal flood waters
Sfaf, plaster shelf; in the Tihama, the same as *saqifah*
Shahada, raised corner of roof line in mosques and houses
Shamsia, light well
Shaqi, unskilled day labour
Shaqus, ventilation slit
Shubaq, in classical Arabic, window; commonly, a perforated machicolation found in staircases, hallways and roof parapets, allowing one to see outwards without been seen and functioning as part of the ventilation system of the house as well as a cooling box for food and water
Shuqada, see *shubaq*
Suq, market, market place

Ta'la, variety of acacia
Tabaqat al-habb, grain and dried fruit storage room
Tabaqa, storage room
Tahun, grinding mill
Takhrim, plaster carving; fanlight made of coloured glass set in a stucco tracery
Tannur, traditional open top clay oven

Taqa, window

Taqa turki, designation given in Sana'a to the *rhawshan*

Thana, stone mason specialised in building the interior face of the walls

Thny, to double

Tibn, straw

Tikha, disks of animal dung used as combustible

Tilmidh, apprentice, young mason

Tunub, hard wood, a variety of acacia, preferred for the carpentry of doors and windows

Turab, dust

'Usada, cushion, back rest

'Ushash, thatch

'Usta, master mason

'Ujra, wage

Wadi, seasonal stream; its bed; the fields it irrigates

Wajh, face, facing stone

Waqf, land deeded to the religious establishment

Waqis, hewn stones

Zabur, sun-dried coursed clay construction

Zaqra, type of hammer used in stone cutting

Zawiya, try square

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