The Yemen Arab Republic: Economic Development and Architectural Change

The Aga Khan Program for Islamic Architecture Harvard University and the Massachusetts Institute of Technology

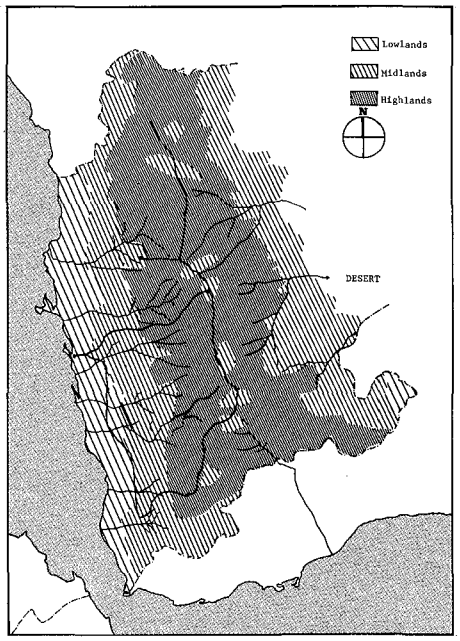
This background paper was prepared for The Aga Khan Award for Architecture by the Office of Special Programs, Aga Khan Program for Islamic Architecture, Mona Serageldin, Coordinator. The research team consisted of James Deemer (history), Joy Hecht (planning), Akhtar Badshah (architecture), Arjun Nagarkatti (architecture) and Ritz Sampat (architecture).

Introduction

The Yemen Arab Republic (North Yemen), a country of about 195,000 square kilometres, is situated at the south-west corner of the Arabian Peninsula: it is bordered to the west by the Red Sea, to the north and east by Saudi Arabia, and to the east and south by the People's Democratic Republic of Yemen (South Yemen). Following the establishment of the republican government in 1962, it has evolved rapidly, and communication with the outside world has increased in importance. Moreover, particularly during the past decade, Yemeni workers have migrated in increasing numbers to Saudi Arabia and other oil-producing countries in the Gulf area seeking lucrative temporary employment, mostly in the construction and service sectors. The combined impact of the sudden opening of the country to the economic and cultural influence of the outside world and the temporary migration of large numbers of workers to Saudi Arabia has been crucial in the development of contemporary Yemen.

Geography

Yemen is dominated by mountain ranges which run from north to south parallel to the Red Sea and rise sharply from sea level to an elevation of 3,700 metres. Several major wadis run down the mountains towards the coastal plains, forming deep narrow gorges which open out as



Yemen Arab Republic, geographical regions.

they reach the coast. The eastern slopes of the mountains are more gentle, running into the desert area at the Saudi Arabian border known as the Empty Quarter. The country is comprised of four distinct geographical areas, differentiated by elevation, climate and vegetation, and therefore, by potential for agriculture and urban development.

The coastal lowlands of the Tihama cover an area from 30 to 60 km wide, from Bab al-Mandab in the south all the way into Saudi Arabia. The area begins at sea level and rises in elevation to about 200 m as one moves inland. The land is flat or gently rolling, and is broken by the wide and shallow wadis. Rainfall is very low, and average temperatures vary over the year between about 24°C in winter and 36°C in summer.

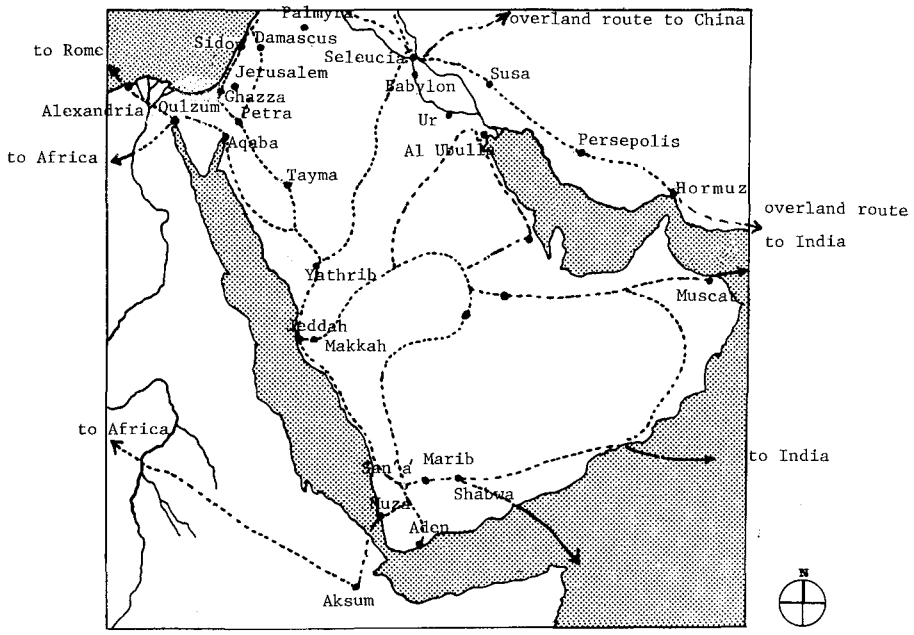
The foothills and midlands are at elevations of 200 to 1500 m, and extend from the Tihama plain east to the highlands. The wadis run through narrow gorges, and the mountains are steep and rugged, making communication between settlements difficult. In lower areas, annual rainfall averages about 400 mm, and is heaviest in August. With altitude it increases to 600 mm, falling in two peak seasons, April-May and July-September.

The central highlands reach elevations of 1500 to 3700 metres. Annual rainfall is heaviest in the agricultural southern end of the region, at over 1000 mm. It drops off to the north, to 300 mm in the central city of Sana'a and 200 mm near the Saudi border. High plateaus, at elevations above 2000 metres, mark the break between the rugged mountains to the west and the smooth slopes to the east. At the southern end temperatures average in the low twenties in the winter months and the high twenties in the summer; they are a few degrees cooler further north.

The eastern plateau slopes gradually down from the highlands, dropping to an elevation of 1000 metres. Although no measured metereological data are available for this region, it is known to have very low rainfall, and is considered a semi-desert. It joins the Great Arabian Desert at the eastern border of the country.

History

The early history of the Yemen is extremely vague. It is not until the rise of the Sabaean Kingdom in the eighth or ninth century B.C. that some clearer historical information begins to emerge, but, though the Sabaeans represent the point in ancient Yemeni history when some sort of centralised, urban-based political authority came into existence, international trade involving the Yemen far pre-dates their rise. The Egyptians, in particular, were interested in southwest Arabia because of the frankincense produced there and the role the area played as a transit point in sea trade with Mesopotamia, Persia and India. Political organisation in the Yemen prior to the



Trade routes in the Middle East.

Sabaeans probably never advanced much beyond the level of tribal confederations geared to the production and export of frankincense.

When the Sabaeans, a tribal group originally from the area of Najran, took power in the Yemen and the Hadramawt, they united the pre-existing tribal confederations under a centralised administration. They created a hierarchical feudal system whereby the state was divided into districts called *mihfad*, ruled by a feudal lord referred to as *dhu*, or master of that particular district. A group of districts fell under the authority of a *qayl* and constituted a province, *mikhlaf*. Since this hierarchical system was superimposed upon the tribal order, whenever the central authority weakened, the lower levels tended naturally to slip back to the older tribalism. This pattern of fluctuation between centralised authority and local autonomy would continue throughout the history of Yemen.

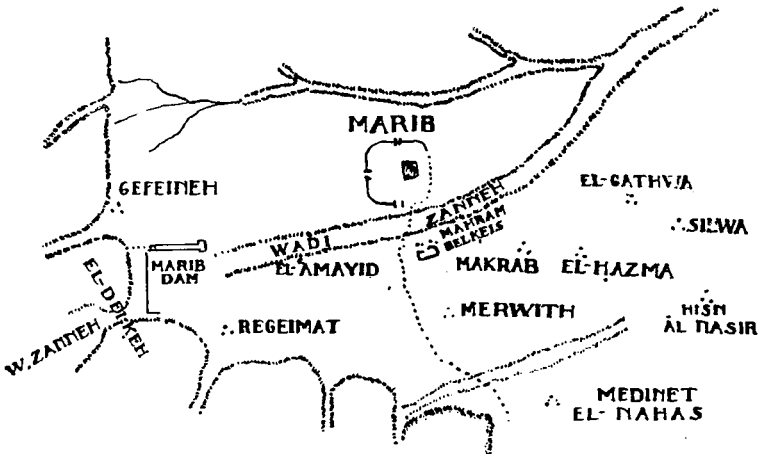
At first, the kingdom was headed by a priest-king, whose seat of power was at Sirwah, west of Ma'rib, where the ruins of the city and the temple of the moon god Almaqah can still be seen. A secular ruler replaced the priest-king around the end of the seventh century B.C., and the capital was transferred to Ma'rib, 100 kilometres east of Sana'a. Ma'rib was significant for several reasons.

Located inland and over 1000 metres above sea level, it was relatively inaccessible to foreign invaders, a topographical advantage which was supported by the construction of several military fortresses. Ma'rib was also the point of intersection of the trade routes attached to the frankincense-producing areas of the Hadramawt and those leading northward to the Mediterranean ports, most notably Ghazza. The Sabaeans constructed at Ma'rib a great dam across the Wadi Saba', stimulating sedentarised agricultural development in the area, as well as eliminating the possibility of destructive flooding.

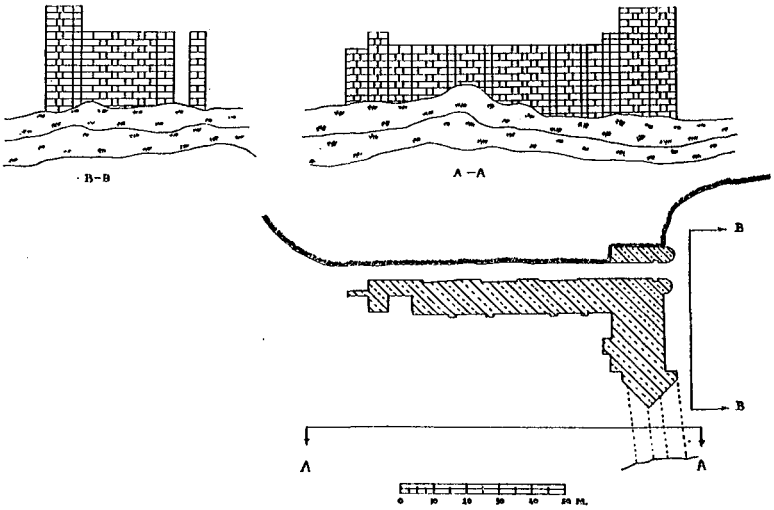
Contemporaneous to the Sabaeans, and often falling under their political control, were three secondary states, the most notable of which was the Minaean Kingdom. The two most important Minaean cities were their capital of Qarnaw (modern Ma'in) and their religious centre of Yathil, northwest of Ma'rib. The second, the Hadramawt Kingdom, which began in the fifth century B.C. and continued intermittently until the end of the first century A.D., had its capital at Shabwa, an important cross-roads of the routes bringing frankincense northward out of the Hadramawt.

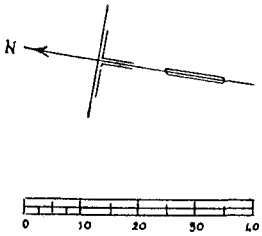
Finally, the short-lived fifth-century B.C. Qataban state of the area immediately east of present-day Aden had its capital Tamna' where, among the ruins, can be seen the temple of the sun god Ashtar. It is difficult to determine the relationships which these four groups maintained with one another; however, it would appear that close commercial co-operation generally existed, and that at least until the third century B.C. the Sabaeans were the region's dominant force.

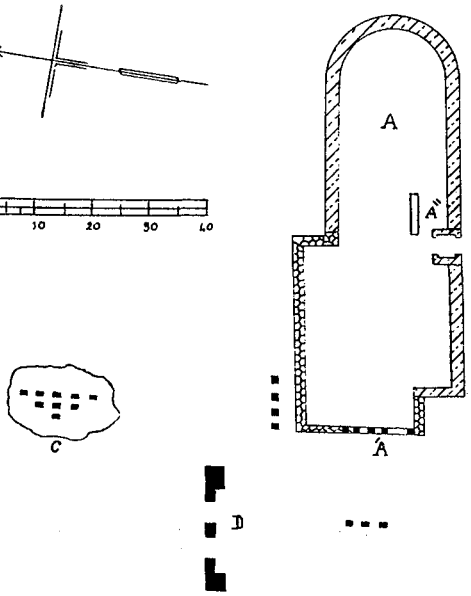
The Sabaeans, whose primary power base was in international trade, built an extensive network of roads, warehouses and watch-towers which extended well into northern Hijaz. They built a royal residential complex at Shabwa during a period when they held ascendency over the Hadramawt Kingdom. During the third century B.C., the centralised Sabaean administration began to disintegrate and, in 115 B.C., the Banu Himyar, a military branch of the greater Sabaean tribe, took power and reunited much of the Yemen, absorbing the remnants of the Minaean Kingdom as well. With the exception of a brief interregnum of Abyssinian domination during the fourth century A.D., the Himyarites would rule over the region until the beginning of the sixth century A.D. The Himyarites built a new capital at Zafar, 150 km north-east of Mokha on the road to Sana'a, on top of a large circular hill. Security against bedouin raids was a consideration which went into the design of almost all Himyarite architecture.



Map of Sabaean Marib showing the Palace Enclosure, the Temple of Balkeis and the Great Dam.







Plan/section of the South Sluice Gate of the Marib Dam.

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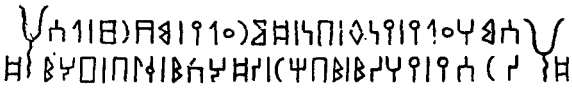
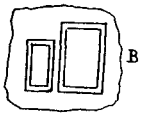


Inscription recording the foundation of the Southern Sluice Gate.



Sketch Plan of some of the Ruins at Sirwah.

Source: Ahmad Fakhry, Archaeological Journey to Yemen, *Vol. 1, pp. 31, 66, 84 and 96.*

It is difficult to reconstruct the physical plans of any of the early Yemeni cities, for they have disappeared without leaving an imprint on the existing urban centres, which acquired their current forms during the Islamic period. The Himyarites were largely responsible for converting the Yemen into what Yaqut called "the land of castles". The most impressive of their citadels was Qasr Ghumdan at Sana'a, dating probably to the first century A.D. The completion of this *qasr* marked the transfer of the royal court from Zafar to Sana'a. Vivid descriptions of the scale and grandeur of this palace are provided by al-Hamdani and Yaqut, but it has since disappeared.

During the later Ptolemaic period, Roman and Egyptian navigators discovered the regularities of the monsoons and were able to break the Yemeni monopoly over international maritime trade. The Himyarite Kingdom contracted, and was briefly occupied during the fourth century A.D. by the Abyssinians, but the restored kingdom was never able to duplicate the glory of the first.

Judaism and Christianity began to spread into south-western Arabia at about this time. Jewish colonies appeared throughout the region and rapidly increased in both numbers and influence, to the degree that the last Himyarite ruler, Dhu Nawas, found it expedient to convert to Judaism. Simultaneously, important Monophysite Christian centres grew at Najran in the north and 'Adan in the west. Competition and political tension grew between the Jewish and Christian groups. Continuing threats of an Abyssinian Christian invasion finally prompted Dhu Nawas to launch a campaign of persecution against the Christians and send an expedition to destroy the church at Najran. This event, referred to in the Holy Qur'an (85: 4-8), resulted in a large-scale Abyssinian invasion in 523 A.D., and for fifty years Yemen remained under their control.

The third Abyssinian viceroy Abraha made Sana'a his capital, where he built a magnificent cathedral, known as al-Qalis, using stones taken from the ruins of the Sabaean city of Ma'rib. Pilgrimage to the church brought great wealth to Sana'a and increased the influence of Abraha's government among the bedouin tribes of the region. In 570-71, Abraha launced a military campaign against Mecca which ended in failure. This defeat is mentioned in the Holy Qur'an (105: 1-3). At about the same time, the neglected dam at Ma'rib burst, symbolising the culmination of the process of internal decline which had been taking place in Yemen during the previous three hundred years. This is also mentioned in the Holy Qur'an (34: 15-20).

In 575, Sasanians sent an expedition to assist a descendant of the old Himyarite dynasty, Sayf ibn Dhi Yazan, in ousting the Abyssinians. This victory made Dhi Yazan an everlasting hero of Arabic literature and folk tales. The defeated Abyssinians were decimated. However, upon Dhi Yazan's death, nominal Himyarite rulers continued to reside in Sana'a, but in reality the Yemen was governed as a Persian satrapy. In 628 A.D. the Persian governor of Yemen, Bazan, embraced Islam, which had by that time emerged as the primary religious and political force in the Arabian Peninsula.

Many important Yemeni tribes converted to Islam during the lifetime of the Prophet, but after his death some abandoned the faith and, during the Ridda Wars, the Caliph Abu Bakr sent a force to recover the Yemen. Thereafter, the Yemen would remain in the Islamic *umma*.

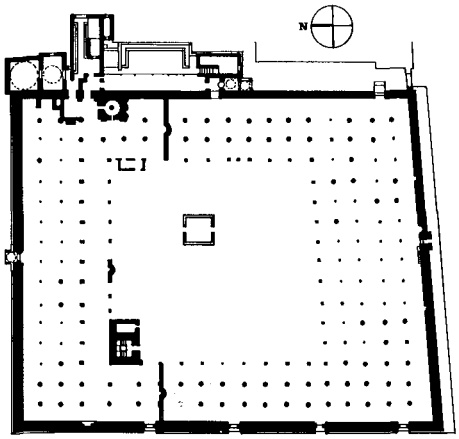
During the early Islamic period, under the Orthodox Caliphs, Yemen was a very important province, supplying abundant natural resources and income, manpower for the armies, leaders for the government and the military, and settlers for Muslim cities. Large Yemeni contingents were among the population of the new garrison cities, *amsar*, such as Basra, Kufa and Fustat, and as many as 27,000 Yemenis are said to have settled in Alexandria. But, with the shift in the political focus of the Islamic state out of the Hijaz to the new capitals of Damascus, Baghdad, Cairo and finally Istanbul, the Yemen came to occupy an increasingly peripheral position with respect to central political authority and imperial urban culture.

During the Umayyad period, the Yemen was divided into two administrative districts, the northern one centred at Sana'a and the southern, which included the Hadramawt, at Janad. The governors of Yemen tended to rule with a good deal of political autonomy as long as tax obligations were met. Meanwhile, various Shiite groups were beginning to build up power bases within Yemen. There were continuous challenges to Umayyad and early Abbasid rule, including several major popular uprisings against the governors.

Finally, in 822, the Abbasid governor Muhammad 'Abd-Allah ibn Ziyad broke away in all but name from Baghdad, establishing the new city of Zabid as his capital. The regional unity of Yemen quickly disintegrated. The north became a haven for various Shiite groups, the most important of which were followers of 'Ali Zayn al-'Abidin, who came to Yemen from East Africa. A Himyarite revival took place in the central highlands, and other tribal groups exercised autonomous control over local areas. This sort of fragmentation would characterise the general political state of affairs of Yemen until the thirteenth century.

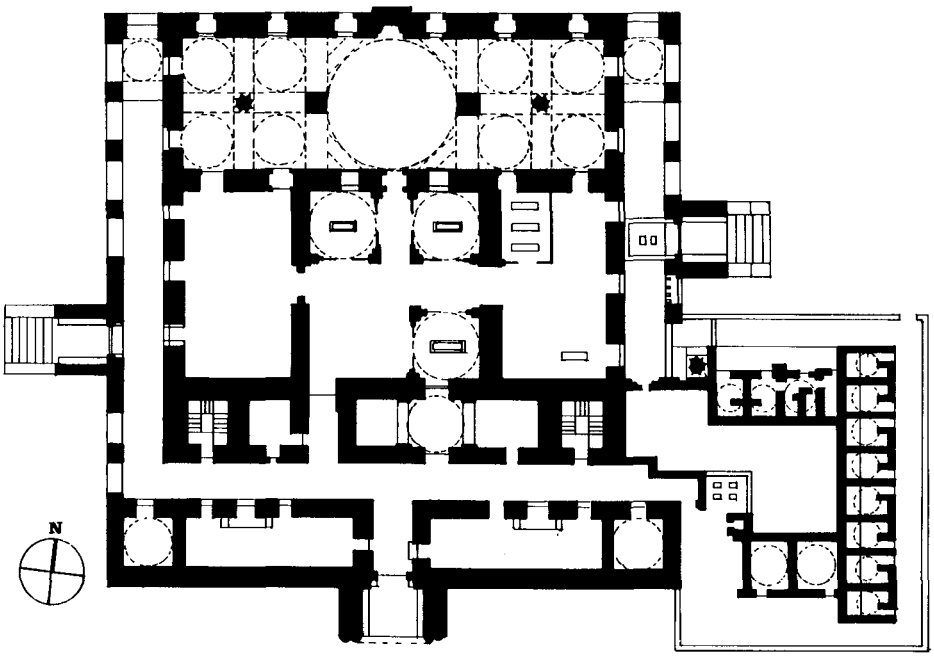
Towards the end of the ninth century, Yemen became a base of operations for the Fatimid Shiism, which met with a good measure of success there. But in the early tenth century the focus of the movement shifted to North Africa, and the Yemeni groups lost much of their importance.

Their primary rivals were the supporters of the Zaydi Imams, based around Najran and Sa'ada. Battles between the two groups were continual, with nume-



Sana'a, Great Mosque of the Rasulid period, 13th and 14th centuries.

Source: George Michell, Architecture of the Islamic World, *p. 210.*



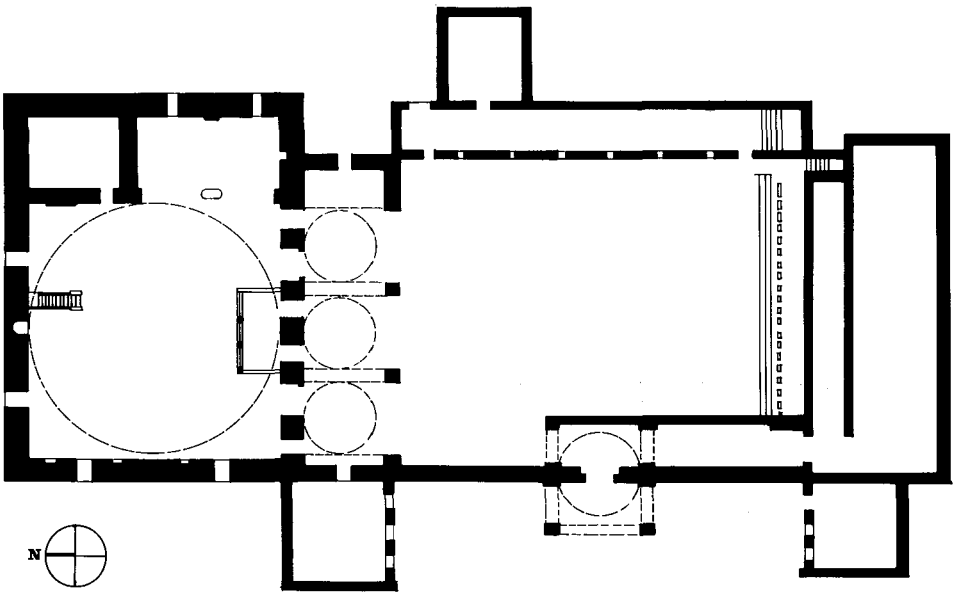
Ta'izz, Ashrafiyya Mosque, 7th-17th centuries.

Source: George Michell, Architecture of the Islamic World, *p. 211.*

rous local dynasties and tribal chiefs taking one or the other side. By the middle of the twelfth century, the Fatimids had been largely eliminated, and Yemen emerged from the struggles of the previous two centuries, divided into five major states, each with its minor vassals and dependents.

Political reunification began with the Ayyubid conquest in 1173, and the subsequent transfer of power to the Rasulid dynasty, who had been their allies. For a brief period during the thirteenth century, the Rasulids governed a united Yemen which extended from southern Hijaz to the Hadramawt. From their capital, Sana'a, they continued to rule over most of the region until the mid-fifteenth century, with serious opposition from the Zaydis in the Najran-Sa'ada area and the Sharifs of the Tihama region.

The Mamluks of Egypt and the Ottoman Turks successively launched campaigns into the Yemen during the first half of the sixteenth century. Both managed to occupy the coastal Tihama region, but failed to establish full control over the interior of the country. Their authority was never accepted by the people and



Sana'a, Mosque of al-Bakiriyya, Ottoman period, 1597.

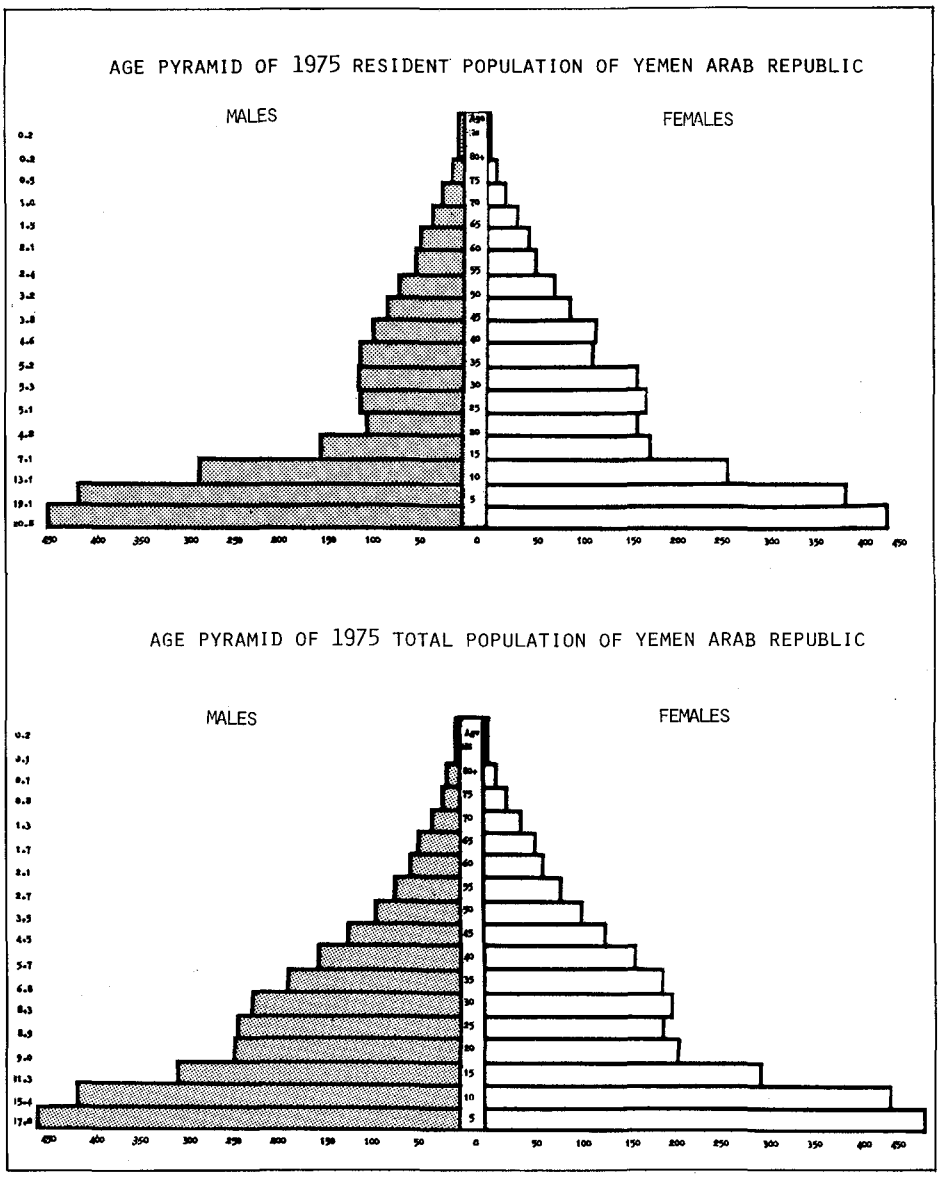
Source: George Michell, Architecture of the Islamic World, *p. 211.*

leaders of Yemen, and they were eventually forced to withdraw. By 1547, the Ottomans were able to extend sufficient control over the interior to allow them to remain in the area until 1635, when they were finally expelled. The Yemen again reverted to a state of general political fragmentation with varying degrees of unity achieved by successive rulers of the Zaydi dynasty of al-Qasim, whose capital was at Sana'a.

The Ottomans returned to the Yemen in 1848 and managed to re-take the interior by 1872, only to withdraw once again in 1918 after their defeat in World War I. Their departure left much of the country under the authority of the Zaydi Imam Yahya. Meanwhile, the British had established a strong presence in the south and the Hadramawt, and the followers of 'Abd al-'Aziz al-Sa'ud were entering the Najran region from Najd. This critical situation led Imam Yahya to accept a treaty with the British in 1934, only to abrogate it within months in favour of the Treaty of Muslim Friendship and Arab Fraternity, which formed the basis for continued friendly relations with the Kingdom of Saudi Arabia.

In 1962 a republic was declared in Yemen. There ensued eight years of civil war between the Republican forces and the Royalist supporters of the deposed Imam. In 1970 a constitution was promulgated, and a new republican government established. Remaining opposition was defused by integrating its leadership within the new administrative structure. The country is now ruled by a Constituent People's Assembly, which elects the president.

The political history of the 1970s has been dominated by efforts to strengthen the central authorities and to work towards agreement between the North and South Yemen.



Population Chart.

Source: Yemen Arab Republic, Statistical Yearbook 1981.

Demographic Characteristics

Data on the population of Yemen come from two sources. For 1975, detailed information on demographic characteristics and geographical distribution of population are available from the Population and Housing Census. For 1981, summary population data are available from the Confederation of Yemen Development Associations. Detailed breakdowns from the second census have not yet been published.

The total population of the Yemen Arab Republic was given by the 1975 census as 6,492,530. That number included 1,234,000 people who were then working outside the country.[1] By 1981, these figures had risen to 8,540,119 and 1,394,778, according to the census taken by the Confederation of Yemen Development Associations (CYDA). However, these statistics indicate an annual growth rate of 6 per cent, so it would appear that either the 1975 census underestimated the resident population or that the CYDA counts are too high. Whatever the case, it is clear that the number of migrant workers is levelling off.

The distribution of population between urban and rural areas show the effects of both internal and external migration. In general, men are moving from rural areas and small towns either to larger towns and cities, or abroad. Thus the 1975 census showed an overall male:female ratio for the country of .91, whereas it was well over 1.0 in four of the five largest cities (see Table 2). Although growing, the seven largest cities, which account for 75 per cent of the urban population, still represent less than 10 per cent of the total resident population.

There are no exact data on vital statistics in Yemen; official records of births and deaths are not kept and many people do not know their exact ages. On the basis of the 1975 census and supplementary sample surveys, the Population Centre (an agency of the Central Planning Organisation) estimated the natural population increase at about 2 per cent per annum. This was derived from a birth rate of 46 per 1000 and a death rate of 27 per 1000.[2] This growth rate estimate was subsequently raised to 2.5 per cent, but it still seems too low even when allowance is made for an over-estimate in the CYDA census of 1981. A growth rate of 3.4 per cent is suggested in the Second Five Year Plan (1982-1986).[3] Although population growth is not perceived as a problem now, it could be a problem in the coming decades, as the death rate declines with improved medical care.

Education levels in Yemen are very low. According to the 1975 census, 82.6 per cent of the population (65 per cent of males and 97.3 per cent of females) ten years and older were illiterate. Statistics from the 1981 census show enrollment in primary schools in 1980-81 at 34 per cent of population in the corresponding age group, enrollment in preparatory school at about 4 per cent, and in secondary school at less than 3 per cent (see Table 3). Enrollments in the latter two cycles are expected to grow following improvements in attendance at the primary level.

Table 1 **Population Estimate, 1975-1981**

	1975 Census	1981 CYDA Census
Resident population	4,540,230	6,439,363
Population of uncovered areas*	294,500	
Population unenumerated	423,800	705,978
Yemenis outside the country	1,234,000	1,394,778
Total	6,492,530	8,540,119

**Geographical areas which could not be reached by the census takers. Populations were estimated using aerial photography.*

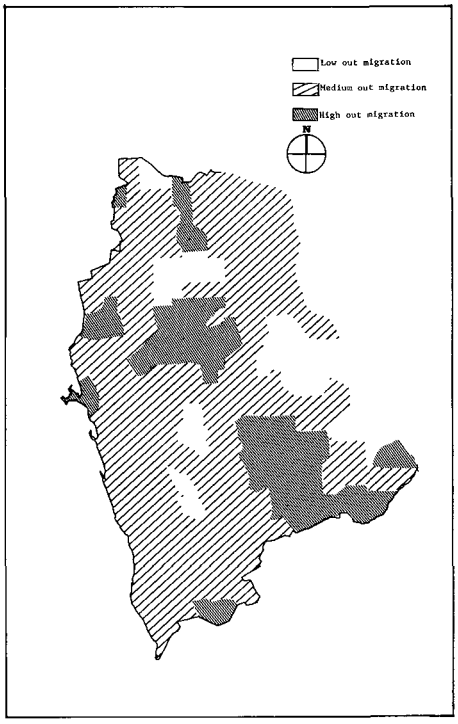
Table 2 **Population of Major Urban Centres, 1975**

	Population (1975)	Per Cent of Total	M:F Ratio*
Sana'a	135,625	3	1.33
Ta'izz	79,720	2	1.27
Hodeida	72,895	2	1.37
Ibb	17,496	—	1.10
Dhamar	19,540	—	.94
Total, 5 largest cities	325,276	7	1.23
Total resident population	4,540,278	100	.91

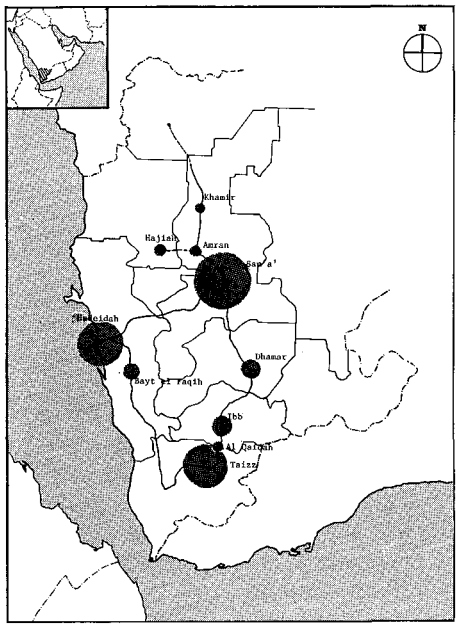
**Source: World Bank,* Yemen Arab Republic: Urban Sector Report. *World Bank Report No. 2699-YAR (Washington, D.C., March 1981).*

Economy

Prior to 1970, communication within the Yemen was difficult, external trade was very low, and agriculture accounted for nearly half of the domestic product. In the past decade, the migration of labour to oil-producing countries and the establishment of a government specifically interested in development have generated rapid change in Yemen's income and economic structure. With an estimated doubling of real per capita GNP to $390 in 1976/77,[4] physical and economic conditions have improved, but a host of new problems have arisen.



Migration patterns in the Yemen Arab Republic.



Major urban centres.

Table 3 **School Enrollment**

	Enrollment 1980/81	M:F Ratio	Per Cent of Population in Corresponding Age Group
Primary (Ages 6-11)	412,573	7.10	34
Preparatory (Ages 12-14)	19,037	4.82	4
Secondary (Ages 15-18)	9,815	6.94	3

Table 4a **Gross Domestic Products at Market Prices, by Sectors, 1971/72-1981**
(at constant prices of 75/76, in millions of riyals)

Kind of Economic Activities	71/72	73/74	75/76	77/78	80/81	1981*
1. Industries:						
Agriculture, forestry & fishing	1550	1661	1850	1653	2111	2177
Mining & quarrying	27	35	32	64	74	75
Manufacturing	159	221	257	309	448	460
Electricity, gas & water	8	12	17	22	43	46
Construction	170	205	283	511	469	481
Wholesale & retail trade	475	751	948	987	1059	1032
Restaurants & hotels	44	54	64	72	83	84
Transport & communications	116	132	150	200	217	220
Financial institutions	47	77	141	338	448	452
Real estate and business services	170	201	207	221	265	272
Community, social & personal services	28	36	42	52	63	64
Sub-Total	2794	3385	4152	4429	5280	5363
Less: Imputed bank services charge	−51	−72	−134	−305	−418	−422
Sub-Total	2743	3313	4018	4124	4862	4941
2. Producers of government services	340	397	509	585	833	885
3. Producers of private, non-profit services to households	10	12	14	19	24	24
4. Import duties	222	266	394	887	836	785
Total	3315	3988	4935	5615	6555	6635

**Provisional*

Table 4b **The Structure of Gross Domestic Product at Market Prices by Sectors, 1971/72-1981**
(at constant prices of 75/76, in millions of riyals)

Kind of Economic Activities	71/72	73/74	75/76	77/78	80/81	1981*
1. Industries:						
Agriculture, forestry & fishing	46.8	41.7	40.8	29.4	32.2	32.8
Mining & quarrying	0.8	0.9	0.6	1.1	1.1	1.1
Manufacturing	4.8	5.5	5.2	5.5	6.8	6.9
Electricity, gas & water	0.2	0.3	0.3	0.4	0.7	0.7
Construction	5.1	5.1	5.7	9.1	7.2	7.2
Wholesale & retail trade	14.3	18.8	19.2	17.6	16.1	15.6
Restaurants & hotels	1.3	1.4	1.3	1.3	1.3	1.3
Transport & communication	3.5	3.3	3.0	3.6	3.3	3.3
Financial institutions	1.4	1.9	2.9	6.0	6.8	6.8
Real estate and business services	5.1	5.0	4.2	3.9	4.0	4.1
Community, social & personal services	0.9	0.9	0.9	0.9	1.0	1.0
Sub-Total	84.2	84.8	84.1	78.8	80.5	80.8
Less: Imputed bank services charge	−1.5	−1.8	−2.7	−5.4	−6.3	−6.3
2. Producers of government services	10.3	10.0	10.3	10.4	12.7	13.3
3. Producers of private, non-profit services to households	0.3	0.3	0.3	0.4	0.4	0.4
4. Import duties	6.7	6.7	8.0	15.8	12.7	11.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

**Provisional*

Table 5 **Employment Structure** (in thousands of workers)

	1975/76	%	1980/81	%
Agriculture	830.6	75.4	830.4	69.1
Extractive Industries	0.6	0.1	1.3	0.1
Manufacturing	33.9	3.1	52.9	4.5
Utilities	1.5	0.1	3.9	0.3
Construction	52.5	4.8	72.0	6.0
Trade	69.0	6.3	71.1	5.9
Transport	24.7	2.2	31.6	2.6
Finance	2.0	0.2	4.5	0.4
Government Services	85.8	7.8	133.9	11.1
Total Resident Labour Force	1,100.4	100.0	1,201.6	100.0

Source: YAR Central Planning Organisation, Second Five-Year Plan, 1982-1986 *(Sana'a, 1982), p. 18.*

Table 6 **Index for Wages and Salaries, 1975/76-1980/81**

Year	Index of average wages and salaries
1975/76	100.0
1976/77	124.8
1977/78	188.3
1978/79	254.6
1979/80	307.0
1980/81	319.1

Source: YAR Central Planning Organisation, Second Five-Year Plan, *1982-1986 (Sana'a, 1982), p. 19.*

Labour migration to the oil-producing countries has had perhaps the most dramatic impact. An estimated 30 per cent of Yemen's male labour force are employed abroad at any one time.[5] Their greatly increased earnings, saved or sent home to their families, have generated vast increases in consumer demand which cannot be met at current levels of production capacity. This has caused serious shortages, and has contributed to an inflation rate which has averaged 30 per cent per annum. At the same time, public investment in infra-structure of all kinds has been increasing, with projects to build roads, expand ports, provide electricity, develop water and sewer systems, improve education and health services, and so on. The combination of labour migration, industrialisation, and increased public investment has resulted in domestic labour shortages. This has created a problem for the government, which is unable to respond as quickly as the private sector with increased wages and therefore cannot compete effectively for skilled workers.

Table 4 shows the growth and sectoral break-down of gross domestic product from 1970/71 to 1981. Total product nearly doubled, with most of the growth occurring in the modern sectors of manufacturing, construction, financial institutions, and electricity. At the same time the share of agriculture dropped sharply, which is typical of developing economies.

Table 7 **Capital Formation Finance during the first Five-Year Plan** (millions of Riyals)

	76/77	77/78	78/79	79/80	80/81	Total
Gross Capital Formation	1,391	3,567	4,475	5,237	5,520	20,190
Domestic Savings	−1,836	−674	−1,825	−2,425	−2,721	−9,481
Net Foreign Factor Income	994	1,332	1,743	2,160	1,855	8,128
Net Foreign Current Transfers	3,450	4,382	3,936	4,022	3,362	19,192
Total Savings	2,648	5,040	3,854	3,757	2,540	17,839
Net Foreign Capital Transfer	54	200	453	169	(234)	632
Net Foreign Borrowing	1,311	1,673	(168)	(1,311)	(3,214)	(1,709)
Gross Domestic Product	6,478	8,220	10,166	11,919	12,629	49,421
Domestic Savings as Percent of G.D.P.	(28.3)	(8.2)	(18)	(20.3)	(21.5)	(19.2)
Final Consumption (public & private)	8,323	8,894	11,991	14,344	15,350	58,902
Consumption as Percent of G.D.P.	128.3	108.2	118.0	120.3	121.5	119.2

Source: YAR Central Planning Organisation, Second Five-Year Plan, 1982-1986 *(Sana'a, 1982), p. 25*

The results of the First Five-Year Plan show corresponding shifts in the sectoral distribution of employment between 1975/76 and 1980/81 (Table 5). They also show dramatic increases in wage and salary levels in response to the labour shortages, from a base of 100 in 1975/76 to 319.1 in 1980/81 (Table 6), while per capita GNP rose from $380 to $450.[6]

However, the statistics suggest that this unprecedented growth may be tapering off. The overall growth rate of the GDP peaked at 11 per cent between 1974/75 and 1975/76, and the changes in sector shares of output slowed down after 1978. This corresponds to a decrease in the nominal level of remittances after 1978. In part this drop may be attributable to a narrowing of the gap between wages of unskilled labourers in urban Yemen and Saudi Arabia. Demand for Yemeni workers abroad may also have decreased as waves of new workers have reached Saudi Arabia from Pakistan, Korea and elsewhere. Although the remittances help the Yemeni economy, the resultant labour shortages are difficult to contend with, and there are differences of opinion within the country as to encouraging or discouraging migration.

This points to a key feature of Yemen's economic expansion, that it is based almost entirely on capital flows from abroad rather than on increases in domestic productive capacity. Table 7 shows the growth of the GDP and expenditures from 1976 to 1981, and gives levels of foreign finance from workers' remittances and other sources. Over the five years an average of 80 per cent of public and private consumption expenditures were financed with foreign income, of which 58 per cent came from remittances. This fact is recognised by the Central Planning Organisation which seeks to build up local production in both the agricultural and manufacturing sectors during the Second Five-Year Plan. The stabilization of the demand for expatriate Yemeni labour places even greater urgency on domestic economic development.

A large proportion of the remittance money is going into investment in housing. This may be due in part to a traditional Yemeni distrust of impersonal financial institutions. To a greater extent, it is due to the basic desire to have a house of one's own and the prevailing high rates of inflation which make real estate an attractive investment. It has resulted in rapid increases in the cost of house construction, both through higher prices of building materials and higher wages. One outcome has been a shift to the use of imported materials and away from labour-intensive traditional construction technologies.

There are no direct data on the impact of the remittances on income distribution. Some general trends can be predicted, however. The migrant workers come, by and large, from poor rural areas. They place a high value on traditional family ties, and it would appear that much of their increased wealth ends up being distributed among their relatives in the form of housing, investment in equipment to increase agricultural output, and consumer goods. The supply shortages and consequent price inflation, however, are benefitting a limited segment of manufacturers and merchants who, at least in the short run, are reaping windfall profits. Additional demand is also leading farmers to switch from growing food and export crops to growing the more lucrative *qat*, a plant whose leaves are chewed for a mild stimulant they contain.

Urban Growth and Development

Before the revolution of 1962 and the economic boom of the 1970s, Yemeni towns served only as regional market centres for their agricultural hinterlands. Since then the few largest cities have witnessed considerable expansion; however, the country is still overwhelmingly agricultural, as Table 8 shows.

Table 8 **Urban Population, 1975**

	1975 Census	STCS Estimate*
Cities over 10,000 Residents:		
Sana'a	135,625	138,625
Hodeidah	72,895	82,724
Ta'izz	79,720	81,001
Dhamar	19,540	20,051
Ibb	17,496	19,638
Bayt al-Faqih	12,033	12,703
Al-Bayda'	10,419	n.a.
Sub-total	347,728	354,742
46 Towns, 2,000-10,000	166,504	169,645
83 Towns, 1,000-2,000	n.a.	110,026
600 Villages, 500-1,000	n.a.	403,098
Rural Areas (under 500)	n.a.	3,680,508

*Estimates prepared for the Yemen Arab Republic by the Swiss Technical Co-operation Service, using aerial photography and house counts.

Source: World Bank, Yemen Arab Republic: Urban Sector Report *(Washington, D.C., March 1981), pp. 4-5.*

Table 9 **Access to Electricity**

	Number of Subscribers	Per Cent of Households
Sana'a	23,973	77.2
Ta'izz	9,587	56.4
Hodeidah	7,871	41.5
Ibb	2,168	54.0

Source: World Bank, Yemen Arab Republic: Urban Sector Report *(Washington, D.C., March 1981), p. 37.*

Physical Conditions

The major cities are only beginning to respond to population increases. By and large infra-structure is non-existent. The most glaring lack is paved roads; in the three largest cities only the major streets are surfaced, and heavy rainfalls combined with dense traffic cause severe damage to the roads. The road problems are compounded by the lack of any system for drainage of storm water and inadequate traffic regulation. Traffic congestion is a problem despite the fact that few people own vehicles, and most of the limited public transportation is provided by privately organised jitney and taxi services.

Water and sewer systems are severely lacking in all Yemeni cities. About 50 per cent of the combined populations of Sana'a, Hodeidah and Ta'izz have piped water. Other people rely on surface wells or water vendors. None of the cities has an operating sewer system, though in all three these are under construction or in planning. In the absence of sewers, most urban areas rely on septic tanks, cesspools or soakage pits. This causes high levels of ground-water pollution, a serious problem where drinking water comes from wells. The National Water and Sewerage Authority, founded in 1973, is responsible for seeking solutions to these problems, although work is just beginning.

Demand for electricity far exceeds supply in all three of the major cities. This, combined with recent increases in productive capacity, has given rise to a thriving black market. Table 9 gives World Bank estimates of the proportion of households served in four major cities. Households without electricity have to rely on kerosene, which at average usage levels costs more per month than electricity. Initial connections, which cost $150 at official rates, command as much as $890 on the black market.[7] This is a clear indication of the severity of the shortage, the priority placed on the service, and the relative affluence of some consumers.

Projected Growth

The recent growth of Yemeni cities has been the outcome both of natural population increase and of migration from rural areas. The World Bank has estimated that by 1975 internal migration accounted for about 25 per cent of the residents of cities over 15,000, or some 70,000-80,000 people.[8] These migrants, mostly single males, are attracted by the availability of jobs in the urban-based manufacturing and construction sectors which have grown the most markedly in the past decade.

The Bank projections for urban growth in Yemen to the year 2000 take into account the different economic roles played by the major cities: Sana'a, the capital and link to the rest of the world; Hodeidah, the largest port, with cheap land available for expansion; Ibb, a rapidly growing agricultural centre; and Ta'izz, the old capital, constrained in its growth by its rugged topography. The high growth projection shown in Table 10 assumes a rate of natural increase of 2.7 per cent and holds temporary emigration constant.

Administration and Finance

Urban administration in Yemen is primarily the responsibility of the central government. The country is divided into eleven governorates, each headed by an

Table 10 **Urban Resident Population, 1975-2000** (High Estimate)

	1975 Adjusted Resident Population	1975-80 Annual Growth Rate (%)	1980 Absolute	1980-85 Annual Growth Rate (%)	1985 Absolute	1985-2000 Annual Growth Rate (%)	2000 Absolute
Sana'a	138,625	8.8	211,000	8.0	310,000	6.0	742,900
Hodeidah	82,724	9.0	118,800	9.5	187,000	9.5	729,500
Tai'zz	81,001	6.6	111,500	6.0	142,200	6.5	383,700
Dhamar	20,051	5.5	26,200	5.5	34,200	7.0	94,400
Ibb	19,638	10.2	31,900	9.0	49,100	9.0	178,800
Bayt al-Faqih	12,703	4.5	15,800	5.0	20,200	6.5	52,000
Al-Bayda'	11,088	6.5	15,200	4.5	18,900	4.5	36,600
Total Urban Population (over 10,000 residents in 1975)	365,830	7.7	530,400	2.8	768,600	2.9	2,217,900
Population in 9 Towns of 5,000-10,000 in 1975	61,144	5.5	79,900	6.0	106,900	7.5	316,300
Population of 38 Towns of 2,000-5,000 in 1975	113,888	3.6	135,900	4.0	165,300	5.5	369,000
Population in Rural Settlements of Less than 2,000 in 1975	4,717,716	2.2	5,251,800	2.2	5,847,200	1.9	7,734,800
YAR Resident Population	5,258,578	2.7	5,998,000	2.8	6,888,000	2.9	10,638,000

Source: World Bank, Yemen Arab Republic: Urban Sector Report *(Washington, D.C., March 1981), Table 9.*

appointed governor. Within these, the municipalities are run by centrally appointed directors-general. Several ministries are involved in managing the cities. The Central Planning Organisation is responsible for co-ordinating development programmes of the individual ministries and implementation of the five-year plans. It therefore has a role in all municipal programmes, but it is severely handicapped by insufficient technical staff. The Ministry of Public Works handles surveying and mapping, public buildings, rural water supply, and supervision of the Port and Highway Authorities. It also operates the Land Registration Office, which maintains records of all private land and property holdings. The ability of the Land Registration Office to keep accurate records will determine the government's ability to settle ownership disputes or impose property taxes.

The Ministry of Municipalities and Housing has primary direct responsibility for urban affairs. The major activity of its central office (the Physical Planning Department) has been the preparation of master plans for the five largest cities, focussing on densities and street lay-outs. The ministry is now trying to implement these plans; however, since it has neither the funds nor the legal authority to acquire land for its schemes, it is encountering some difficulties. Local offices of the ministry are responsible for providing construction, maintenance and sanitary services, but they rarely have sufficient staff to accomplish all of their duties. They are also responsible for the issuance of building permits, an authority that could provide a basis for maintaining records or controlling construction.

Funding for municipal government comes from the central administration. The municipalities have no power to collect funds or levy taxes for their own use, but they have responsibility for collecting certain fees and fines that are turned over to the central government. The only "urban" taxes, a 10 per cent real-estate sales tax on non-agricultural property within a specified radius of the city centre, and a rent tax, are collected by the Ministry of Finance. But the inadequacy of the land ownership records makes any property tax system difficult to enforce. In some cities, municipal projects have been funded from local contributions and voluntary "betterment taxes" levied by the Local Development Associations (see below, Rural Development). The development of an accurate system for recording urban properties, their owners, and their values is seen as a first step towards better management of city finance.

Housing

Housing shortages are not a problem in Yemen, as they are in many developing countries. Densities are low at 380 people per hectare in the most build-up parts of Sana'a, and over-crowding of the kind common in other parts of the world is

rare. Data on housing space standards indicate that even the poorest families occupy an average of 67 square metres, and most dwellings are occupied by single families.[9]

Several factors account for the relatively loose urban housing market. In part it is simply because Yemen has not yet undergone the volume of urban growth experienced elsewhere. The traditional character of Yemeni society may also account for the lack of over-crowding; the value still attached to family privacy has been credited with deterring the migration of entire families if this would require sharing accommodations with unrelated people. The availability of relatively inexpensive land for new construction may also be a contributing factor. In Sana'a large areas of government land have been sub-divided and sold at prices affordable by low-income groups. Because it is poorly serviced peripheral land and because the plots are small, the prices have not been bid up by higher-income people. Moreover, the inadequacy of ownership records makes land tenure uncertain, decreases demand for some plots, and helps keep prices down. In Hodeidah government land has not actually been sold, but squatting is widespread. Although the settlements have not been legalised, people have not been forced out.[10]

Nevertheless the cost and quality of housing pose problems in Yemeni cities. Increased demand for urban housing generated by remittances and by rural urban migration has driven up prices and reduced the ability of low-income people to maintain traditional living standards. In 1978 a Housing Credit Bank was created both to capture the workers' savings and to provide housing finance. It is operating at a fairly small scale, and eligibility requirements include steady income, thirty per cent equity, and legal title to the land. Consequently, it has not been of help to the lowest income groups. Moreover, restrictions placed on it by the Central Bank have kept it from expanding the scope of its operations, and the required margin between its borrowing and lending rates keep it from operating at a profit.

The government is involved with six public housing projects, all but one of them in planning or under construction as of the latest information available. These have generally been designed for particular target populations not defined by income. Funding comes from a number of sources including the Yemen Bank for Reconstruction and Development, the Ministry of Labour, the military, the Ministry of Municipalities and Housing, the United Nations, and the University of Sana'a. In addition, the World Bank is financing core housing and squatter settlement upgrading projects in Sana'a and Hodeidah.

Rural Development

Like the country as a whole, rural areas experienced very little economic growth or development before the 1970s. The difficulties of travel posed by the country's terrain and the lack of intervention by previous governments in rural areas resulted in the neglect of rural infrastructure requirements. Investment in modern communications and transportation has just begun, with the first long-distance paved road, connecting Sana'a to Hodeidah, completed in the early 1970s.

The prosperity of the 1970s has had a direct impact on the rural areas, as new consumer demands have changed the structure of Yemeni agriculture. With new capital from remittances, and with shortages of labour, farmers have invested in mechanical equipment, fertilisers, pesticides and better seeds. Fields have been switched from barley and wheat to crops offering higher profits (including the highly profitable *qat*). On the whole, these changes have increased productivity and boasted rural incomes. However, they have also created problems of conservation and environmental protection. Use of pumps has increased water supplies, but is lowering the water table and threatening to present salinity problems. Terraces, which are valuable to labour-intensive farming, are now less profitable and are consequently falling into disrepair. Over-grazing and misuse of capital equipment such as tractors lead to moisture depletion and erosion.

Since 1962 rural development in Yemen has been the responsibility of Local Development Associations (LDAs). These are voluntary associations, organised at the sub-district level, with an elected leadership and broad popular participation. They are responsible for setting priorities for infra-structure investment and for managing the construction and maintenance of projects. Reflecting the concerns of district residents, their expenditures are concentrated in a few areas, with 70 per cent allocated to roads, 19 per cent to schools, and 6.6 per cent to water projects.[11]

The LDAs receive strong support from the government. Local initiatives are integrated into central plans and budgets, and the ministries provide as much technical support as they can. Local district officials defer to LDA representatives on development issues, and the assistant secretary-general of the Confederation of Yemeni Development Associations is a cabinet minister.

LDA funding comes from several sources. The central government grants a fixed 75 per cent of the religious taxes of each district to its LDA, and 2.5 per cent of customs duties are allocated for LDA use. The government also provides contributions to specific projects, technical assistance and equipment. A Co-operative Development Bank has been established, with initial contributions from the government and the Confederation of Yemeni Development Associations. Individual contributions from project beneficiaries, assessed on the basis of ability to pay, provide a substantial portion of the costs of many projects. Additional assistance comes from foreign

donors, international agencies, and charitable organisations.

The LDAs have apparently been very effective as a system both for directing local development and for stimulating popular participation in planning. In large measure this may be attributable to the cultural values of rural Yemen, which suggest that a locally managed system of development could be more effective than a highly centralised one. It may also be a result of the strong support the Associations receive from government. Moreover, unlike municipal administrations, the LDAs have direct control over collection and disposal of their own funds, and this gives them the power they need to ensure active local participation.

1981-86 Five-Year Plan

The 1981-86 Five-Year Plan identifies the major constraints on Yemeni development and sets out objectives and strategies for future growth. In general its goals are to restrain rural to urban migration, and to reduce dependence on imported goods and services by relying on the resources available within the country. In agriculture, this involves increasing output both for domestic consumption and for export, while avoiding further damage to the environment through inappropriate techniques. Elsewhere, it means strengthening the country's ability to build roads, sewerage systems and other large infra-structure projects anticipated for the next few years. In industry it involves identifying extractive and manufacturing opportunities and encouraging their development.

Strategies for the implementation of these goals include projects to improve conditions in rural areas, among them electrification, water purification and construction of systems for sewage disposal. In agriculture the government plans to encourage the use of co-operatives and the development of food-processing industries. They will work on the building of roads to link remote areas to the rest of the country, and on improving telecommunications. Water resources development is also given priority, both in finding new sources and in preventing waste and misuse. There is a general interest in regionally-balanced development, which means building infra-structure outside the major cities and providing incentives for industrial development in peripheral areas.

Other strategies are designed to keep urban growth under the control of municipal authorities and to discourage further rural to urban migration. Projects are planned to map the cities, register all real estate properties, and to develop codes and regulations to protect public property from illegal seizure by squatters. The streets are to be named, all houses assigned numbers, and the master plans prepared by the Ministry of Municipalities and Housing revised and updated. Co-operation with *waqf* authorities will allow use of *waqf* land for housing complexes, markets and cemeteries. The responsibilities and powers of each level of government are to be defined, with links to executive agencies clarified.

In the areas of economic policy and finance, the government hopes to use a tight monetary policy to reduce consumption and control inflation. The objective is to increase savings, especially in financial institutions which will be able to lend money locally for productive investments. Particular importance is given to improving the tax system, finding new tax bases, and developing the administrative mechanisms to collect them.

The plan sets out four specific criteria for the allocation of investment:

- In agriculture and industry, resources go to regions with high development potential.
- Infra-structural allocations are to be directly related to population and remoteness of the district.
- Allocations for housing and services are to be based on district population.
- Major productive investments are to be located near to, but outside of, the three largest cities.

Rural Architecture

Basic Characteristics

Traditionally, Yemeni rural architecture has displayed a closely-knit, highly organic pattern governed by defence considerations. Villages consisted of clusters of stone and brick structures on high, commanding locations. The inhabitants had a clear and unencumbered view of the surrounding territory, which made these settlements very difficult to attack. The house and village forms are the result of family patterns, both nuclear and extended, interacting with land-ownership patterns and the exigencies of the site.

The structures range from simple watchtowers, similar in form over a wide geographical area, to complex tower houses and fortified hamlets. An interplay of solid masses and voids articulating the space between structures creates a rich composition that emphasises the main central space and location of both religious and commercial buildings.

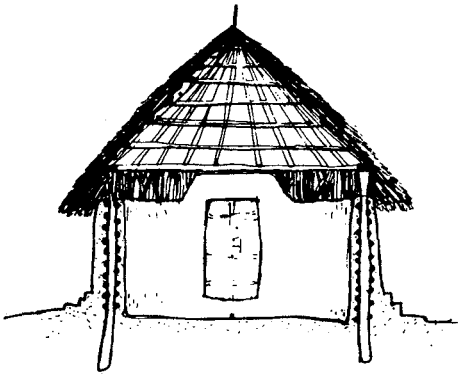
The architecture of Yemen is noted for its verticality. Tall, narrow structures reach unusual heights and create a distinct style. These structures frequently have granaries and store-rooms on the ground floor, with few, if any, windows. The upper floors are for residential use. This practice enables the residents to have a view of the spectacular scenery and is also an efficient defence.

The size and complexity of a settlement reflect the composition of the group who inhabit it. Ideally, a hamlet is the home of members of the same family or clan and a village houses members of the same tribe. *Bayt*, the word for 'house', which is used to designate a patronymic lineage, may also be used for a 'small agglomeration' often bearing the name of the original family who settled there. The

house of the village leader is often the centre of, and the starting point for, the development of a settlement. His house is the largest and can perform the role of a citadel when members of the settlement need to seek protection.

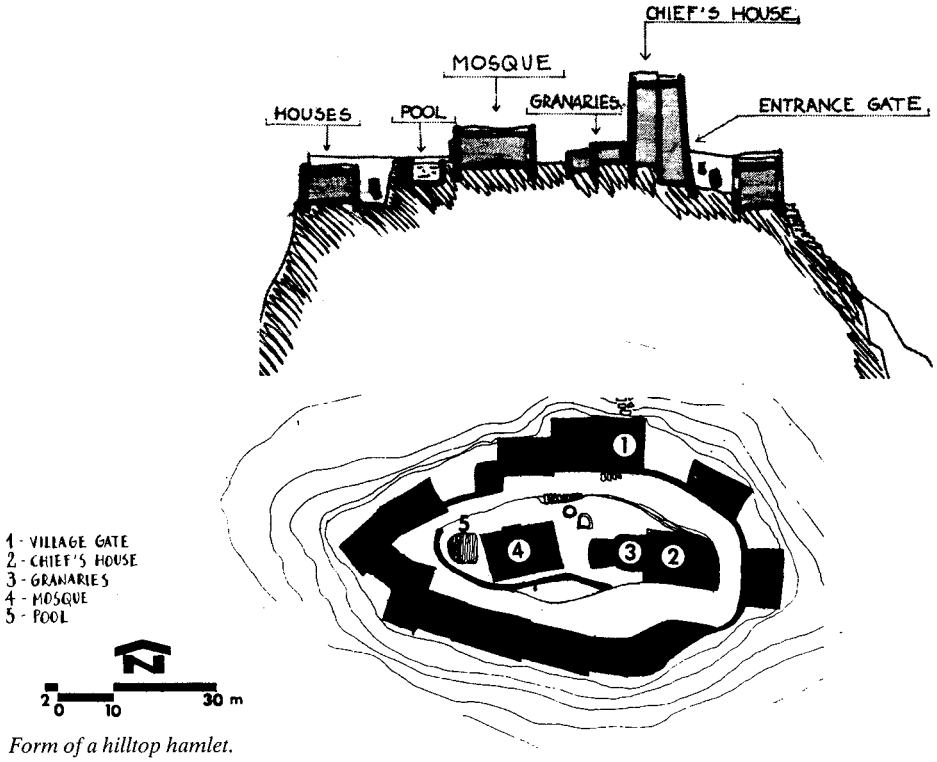
The architecture of Yemen also varies from area to area, each region having its characteristic settlement patterns, densities, house forms and building materials. In the Tihama, the coastal strip, reed and brick are the traditional building materials, though mud is often used with reed as a binding and insulating agent in interior finishing, or to create compound walls. Reed is used for both market buildings and houses. These buildings exist in a great variety of circular and rectangular plans, roofing forms, methods of weaving fibres, interior and exterior surfacing, decoration and general spatial organisation. Religious buildings are more monumental and are built in brick or stone masonry; mosques are at times covered by brick domes.

In the midlands and the highlands, stone architecture predominates; combinations of mud and stone are sometimes used in the valleys and flatlands. The quality of the stone and face cutting vary by region, as do ornamentation (inlaid or painted), and the importance given to fenestration. The architecture of this area varies from tall buildings of well-cut, almost white limestone, with richly decorated facades



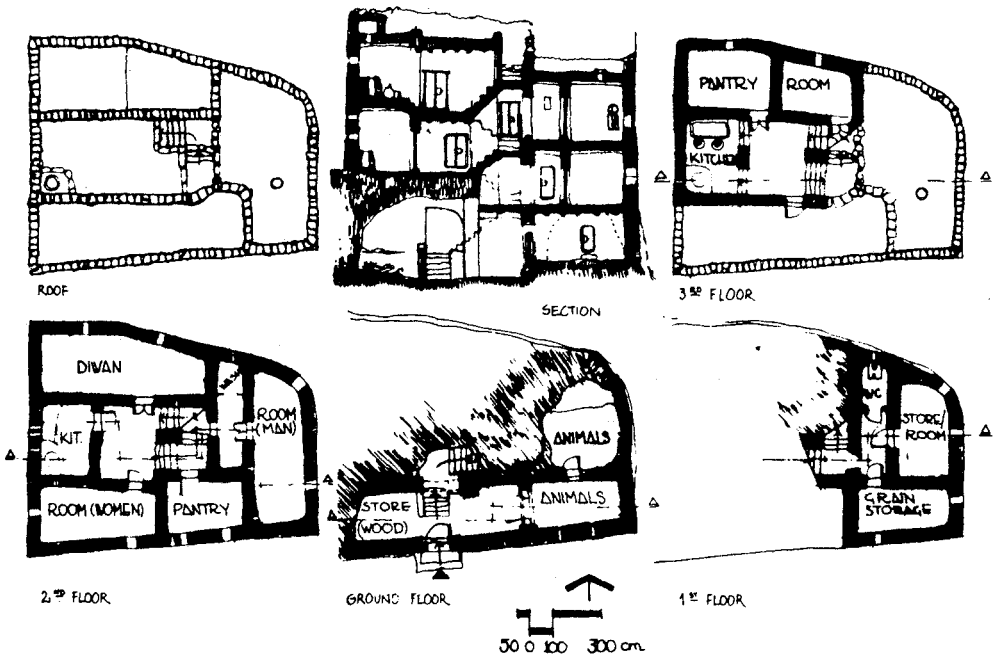
Section of a typical reed house.

Source: Fernando Varanda, Art of Building in Yemen.



Form of a hilltop hamlet.

Source: Fernando Varanda, Art of Building in Yemen.



Typical highland house plan.

Source: Fernando Varanda, Art of Building in Yemen.

and windows, to stone-walled huts with thatched roofs in isolated or grouped hamlets. Most striking are the tall, majestic houses displaying sophisticated stonework and fan-light fretwork.

In the eastern highlands and plateaus, construction is entirely in mud in the north and north-eastern fringes. However, in the semi-desert mountains of the south-east, stone is used alongside and in combination with mud in a characteristic style. The two basic forms of mud building are coarsed clay, *zabur*, and sun-dried blocks, *labin*. The architecture varies from simple walls with strongly marked separations between the mud layers to a distinctive grooved band of mud along the top of buildings. Colour is the main decorative device; it is applied to interiors and exteriors in stripes of red ochre, alternating with bands of yellow ochre and white plaster around the openings. Roofs are often topped by a row of white, plastered, triangular motifs.

Changing Patterns

Changing patterns in site selection and configuration of agglomerations are slow to emerge since investment in fixed assets mitigates against movement and change. Nevertheless, certain trends are noticeable, as the need for individual and communal defence decreases with the growing strength of the central authorities. Proximity to roads, with their promise of accessibility to utilities and services, is increasingly prized, as new wealth makes possible immediate benefits, particularly piped water and television.

The impact of urbanisation and migration abroad has had its effect on rural areas. Depopulation, initially of working males and subsequently of entire families, has left villages deserted, especially in the poorest agricultural areas of the north.

Urban Architecture

Verticality is as predominant a characteristic of Yemeni architecture in the cities as it is in the country side. Multi-storey structures house several families, and frequently have shops on the ground floor with residential spaces above.

The settlement patterns of Yemeni towns are typical of traditional Islamic cities: a tightly knit fabric composed of markets (*suqs*), caravanserais, mosques, shops, warehouses (*samsarahs*), and residential quarters. Almost all larger towns and cities in Yemen are fortified. Major thoroughfares are enriched by the often elaborate facades of the houses which always face onto the street. Streets are also spaces where children play, and marriages, funerals and other processions take place. In larger towns, small residential streets sometimes serve as gathering places for women. Although some stone-paved streets can still be found, little remains of the old paving.

The houses perpetuate the archaic defensive prototype of the countryside, while at the same time adapting well to the urban pressures of high land values and limited building space. In Sana'a, very high residential densities are balanced by cultivated areas within the city walls.

Densely-packed houses from five to nine storeys high give rise to shaded, narrow streets edged by 20 to 50 m high facades. The lower portions of the house walls are usually of stone, stark, with a few openings, and white washed for protection against rain. The upper portions of the walls are built of baked brick with relief decoration and windows with plaster decoration around them. Roofs are flat, well water-proofed, and used for various functions such as drying clothes and growing plants and herbs. The rear elevations of houses overlook communal gardens and orchards owned by the *awqaf* and often attached to particular mosques.

The combination of building materials characteristic of rural Yemen extends to its urban areas: mud and brick, in the southern part of the eastern plateau; mud, brick, and stone to the north. In Sana'a, mud brick dwellings are highly appropriate to the temperate climate. In Ta'izz, buildings require a higher level of maintenance and water-proofings to withstand the longer monsoon period. Hodeidah's hot and humid climate dictates the need to have exterior shaded spaces and cool interior spaces. This is achieved by its mud, clay and grass structures.

Architectural Elements

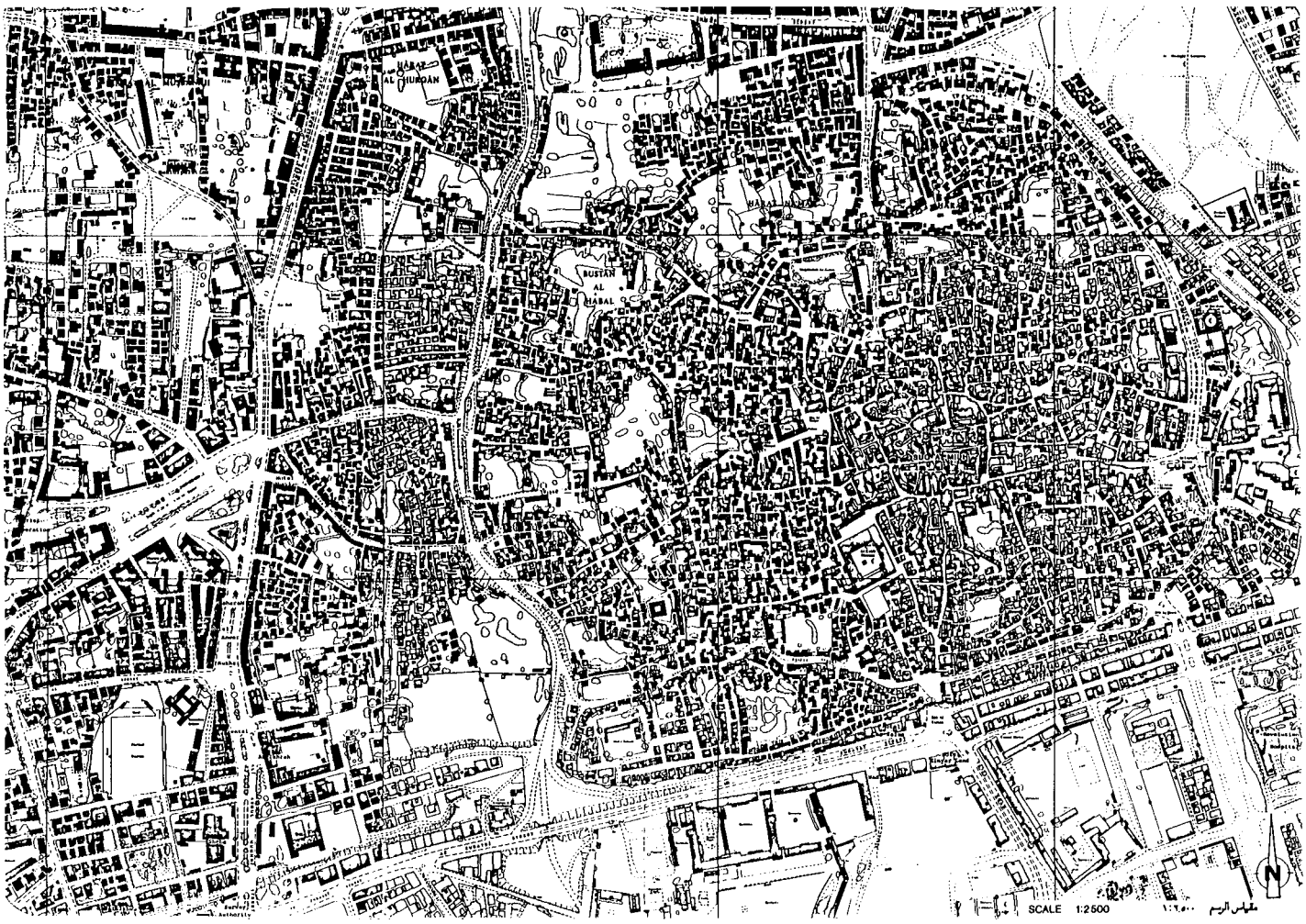
Siting

Perched on mountain tops and hilltops, the preferred locations for most highland settlements, villages blend so extremely well with the surrounding landscape that they are often hard to distinguish from the dramatic rock formations found in these parts.

In settlements on flatlands or in valleys, the lack of natural vantage points was compensated for by watch-towers that constituted an advanced guard line. In other cases, the defence requirements of a settlement or town were met by forts or citadels situated on high points overlooking the site. These are found throughout the country; most were built in the Ottoman period.

House Style

The Yemenis take great pride in their houses and painstakingly devote attention to their construction, decoration and furnishing. In terms of spatial organisation, seven house types have been identified in Yemen, four in the mountains and three on the coastal plain. The most important of these is the tower house, which includes all the elements observed in the other types.



Old city of Sana'a.

Source: Yemen Arab Republic, Survey Authority, Sana'a, 1982.

The most elementary house has one storey, is built in stone or stone and mud, and is divided into rooms for living, for keeping animals and for storage. Its shape is adapted to natural features of the landscape and adjacent housese to form clusters. Houses often have no windows; they are lit and ventilated by openings in the roof. There are no sanitary installations within the dwelling. The plain interior surfaces are plastered with mud.

A more developed house type, built in stone, mud blocks, or stone and mud, has two storeys, with an external stair to the living quarters on the upper floor. The ground level is used for storage and keeping animals, and sometimes accommodates the kitchen. Sanitary facilities are not generally included within the house. The windows have regular shutters with a fan-light above. Interiors may be finished with lime or gypsum plaster but are more usually surfaced with mud. Parapets and windows may be adorned with simple decorative motifs. This house type usually occurs in rows and is common in small towns between the midlands and the highlands.

The tower house, probably evolved from the watch-tower, is built of earth, stone, baked brick, or a combination of these materials, with three or more storeys and an interior staircase that allows vertical expansion as more space is needed. A common feature is the *shubak*, originally

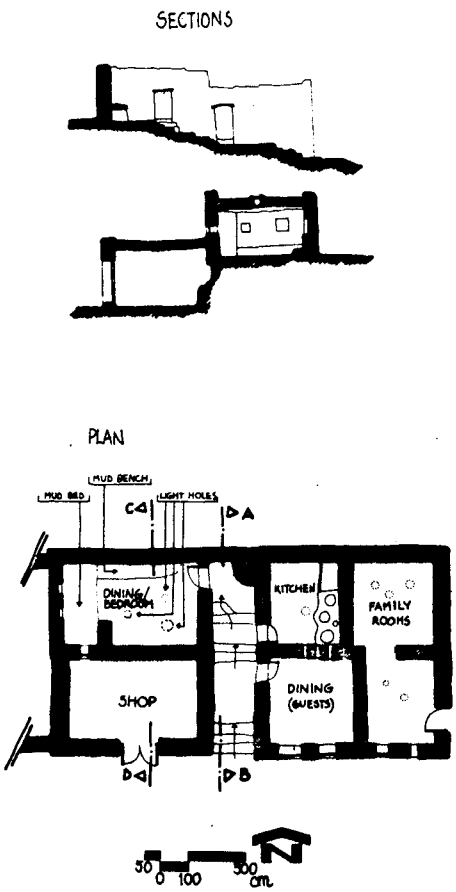
the observation casement in a watch-tower and later the fenestrated, cooling box in a box. Circular house forms exist, but the quadrangular plan is most common. Light and ventilation are usually provided through windows and wall ventilation slits (*shaqus*). Additional light may be provided by fan-lights of alabaster or coloured glass set in stucco tracery frames which cast richly coloured patterns. Bathing and toilet facilities are included within the house.

A variant of the tower-house form exhibits a top floor courtyard with light wells (*shamsiya*) for the lower floors, a feature of uncertain origin. The distinction between rural and urban houses, clearly apparent in their external aspect, is also evident in the allocation of interior space. Urban houses allot more space for living quarters, not only for the family, but also for the reception of visitors, an important part of social life.

Patterns of use vary with social practice. In rural areas married sons often build their own houses. However, it is not uncommon for three generations and several nuclear families to live together in the large houses of the wealthy, each family unit having its own room or storey and sharing certain communal rooms. The best rooms are usually reserved for the oldest members of the household, and are the best lit and ventilated ones.

In the houses of the highlands, circulation and service areas face north; the best rooms face south. This orientation changes in the south and in the Tihama region because of the hot climate. In large houses, even in the highlands, room use frequently changes according to the season, allowing people to sleep in the warmest rooms during winter and the coolest in the summer.

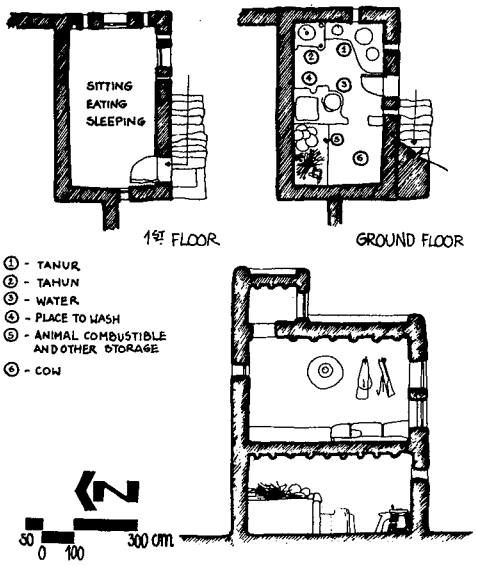
The hierarchy of space within the house is further articulated by different floor treatments. The difference between circulation zones, where shoes are worn, and living rooms, where shoes are taken off, is often emphasised by the raising of door thresholds, defining the beginning of the living quarters.



Schematic drawing of an elementary house form.

Source: Fernando Varanda, Art of Building in Yemen, *p. 78.*

The ground floor of the house usually contains a lofty entrance hall, *dihliz*, stables and store rooms. Rural houses include storage for farm equipment and fodder and may also contain an underground storage pit, *madfin*. The ground level of houses near the market is often used for shops. Stairs lead from the ground to the top floor around a stone newel, *qutb*, the solid backbone of the house. Stairs are of either stone or mud, in short runs with corner landings. Finished stone steps average 25 cm riser and 25 cm tread. Most stairs are lit and ventilated by reticulated windows at the landings that constitute, together with the *shubak*, the cross-ventilation system of the house.

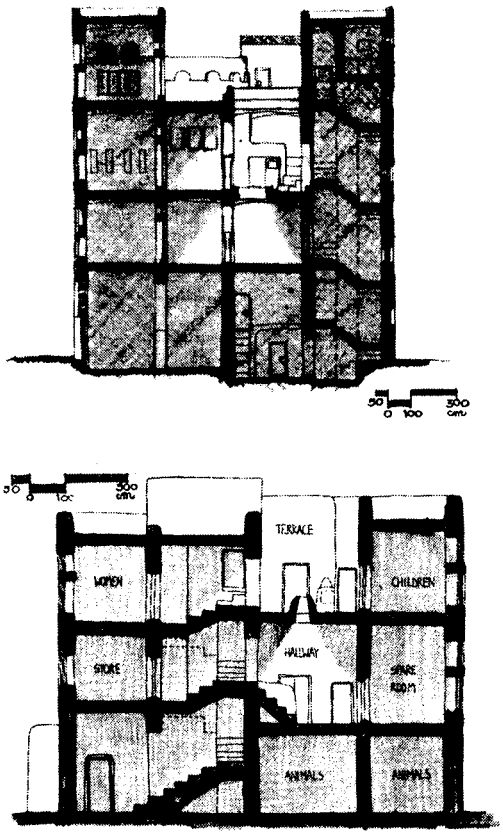


Simple form of a two storey house.

Source: Fernando Varanda, Art of Building in Yemen, *p. 79.*

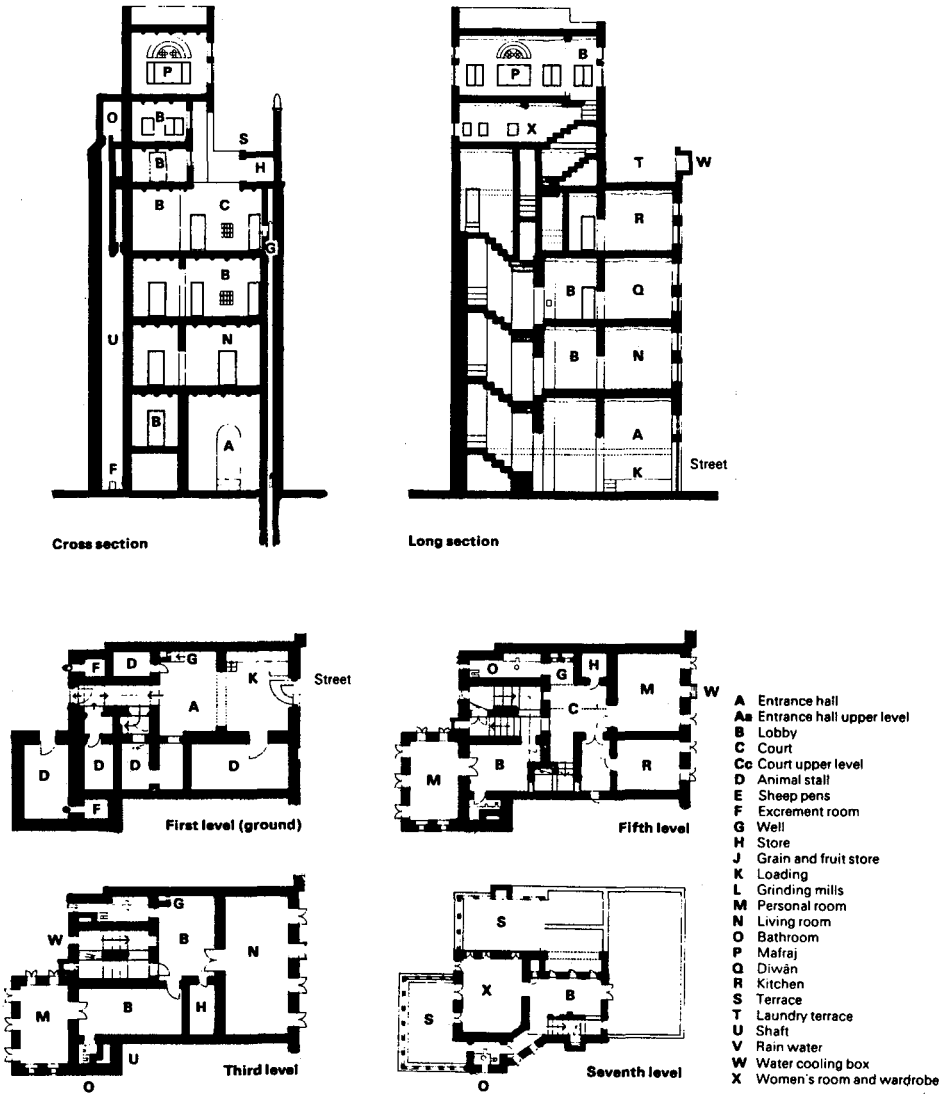
The second floor, sometimes also the third floor, contains additional store rooms, household pantries, and the largest room in the house, the *diwan*. The *diwan* is a reception room for special functions, and it is also the room where tribesmen meet. Because of structural limitation, its width usually does not exceed 3 m, but it may run the entire length of the house. Larger houses may contain more than one *diwan*. The ceilings of the bathroom, kitchen and hallway may be lowered to provide additional storage space.

The upper floors of the tower house containing the sleeping rooms, sitting rooms, dining areas, kitchen and bathroom, are the most private. A segregation of sexes is maintained. The most privileged rooms in the house are the *mafraj* or *manzar*. The *mafraj* is generally about 12 to 18 sq. m. in area and is located on the top



Tower house with a top floor courtyard.

Source: Fernando Varanda, Art of Building in Yemen, *p. 82.*



A highland town house.

Source: James Kirkman, ed., City of Sana'a, *pp. 49-50.*

floor; the *manzar* is a separate attic at the top of the house, exclusively reserved for the house owner and his special guests. Another important feature of the house is the ablution facilities, *masfa*. It may be in the ante-chamber, at one end of a room, or on the roof. In some houses an adjacent space for prayer is provided.

The bathroom consists of a store or mud latrine, a washing area, a large water container, and a shallow trough which channels liquid waste outside. Liquid and solid waste are separated. In tall houses, liquid waste flows down a surface water-proofed with lime plaster (*nura*), evaporating before it reaches the ground. Mud

houses may use a drain-pipe which juts out from the wall. Low houses have a drainage sump to collect the waste. In the east and south-east, solid waste from the latrine falls down an inclined stone to the outside where it quickly dries. In the highlands and the old town of Sana'a, solid waste is collected to be used as fuel, particularly for public baths, and the ashes as fertilizer. Elsewhere, human excrement is used as manure. The introduction of domestic piped water before an alternative sewage system was devised has unfortunately resulted in open sewers.

Response to Climate

The traditional Yemeni architecture is well adjusted to the hardships of the various climatic regions of the country. In dry climates where diurnal variations in temperature are great, houses are built with stone, brick or mud walls of a thickness of 50 cm and over. The insulating quality of these walls reduces the differences in temperature within the dwelling. In hot and humid areas, the traditional buildings have high ceilings and large openings for cross-ventilation.

Decoration

Yemeni architecture has been notable for its heavy use of decoration. Stone and brick structures have elaborate facades with complex geometric designs. On structures made of mud bricks, the facade is covered with a mud/lime "plaster", and a gypsum-based white-coloured plaster is used to accentuate the windows. Plaster and glass mosaics are prevalent in urban centres in certain parts of the country.

Changing patterns of decoration reflect both economic considerations and skill constraints. The rising costs of decorative work and the scarcity of skilled labour have tended to make modern facades much less elaborate and sophisticated. Yet the presence of wealth generated from migrant labour has inevitably led to ostentatious displays of affluence, leading to painted facades. This type of decoration eschews subtle design for bold patches of colour and a primitive assertiveness.

Building Construction

Tower houses may have as many as eight storeys. They are constructed with load-bearing walls of exposed hewn stone or rammed earth or earth-blocks, depending on the material available in the region.

Problems of stability in structures of such heights have given rise to a number of ingenious engineering solutions. In Sana'a, stone or brick walls are strengthened horizontally at intervals by exposed timbers parallel to the faces of the walls, held in place by short wooden cross-pieces. These timbers take up stresses caused by unequal settlement or earthquake shocks. The lower parts of the tower-house walls are of more massive construction than the upper storeys; they are made of stone or at least have stone foundations. The upper storeys are of burnt or semi-dried brick or cob, and become progressively thinner with each floor. The roofs are flat, made of timber beams, branches, and a layer of 40 to 50 cm of earth. The walls and the ceilings are plastered with gypsum plaster; the floors are usually paved with flag stones in halls and circulation areas, but with plaster in the rooms. Doors and windows are made of imported hardwood.

Most structures outside the big towns are built with the traditional construction methods. They give very satisfactory results, but have one major handicap: the roof cannot have a span much wider than 3 metres because the local timber, a kind of acacia, comes in irregular shapes and in pieces not longer than 3.50 m.

Recent construction in the towns relies mostly on reinforced concrete frames. Walls are made of concrete blocks. Sometimes an additional facing of local stone is added, but it is extremely expensive. Cement blocks are usually plastered with terrazzo tiles and doors made of imported hardwood or steel and frequently painted.

Construction Costs

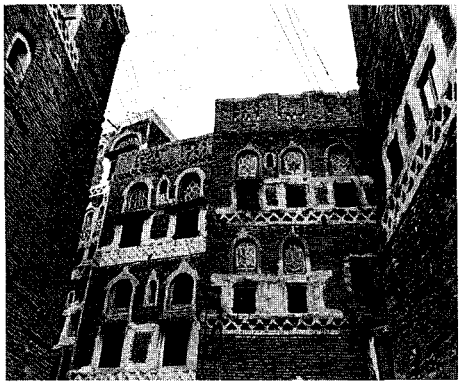
In a sharp reversal during the past decade, traditional construction actually became much more expensive than modern construction: 1800 YR/m^2 for stone and slab as against 1200 YR/m^2 for cement block.[12] Part of the general increase is attributable to the inflation in the prices of materials, but the bulk is accounted for by the high cost of skilled and semi-skilled labour due to the shortage created by massive migration.

A recent World Bank study[13] noted that the costs of construction have been rising much more sharply than any other economic indicator, with labour costs the most important factor in this escalation. Between 1975 and 1981 construction costs rose by 262 per cent; the daily wages for skilled workers rose by 600 per cent; and the wages of unskilled labour by approximately 300 per cent.

The Effect of Urbanisation on Architectural Form

The urban areas are finding it difficult to cope with the influx of population, while rural areas are becoming depopulated and agriculture is suffering from a labour shortage.

The urban housing problem is a new problem for Yemen. Pressure on urban land has led to the proliferation of squatter settlements. Demand is pushing up prices, and lower-income people are



Ornamental facades in the Sana'a region.

Photo: C. Little/Aga Khan Awards.

being edged out to peripheral, unserviced zones, often outside the legal land market.

In squatter settlements, accommodations vary in size and construction in different cities in response to the availability of land and building materials. In general, shacks have average areas of 12 sq. m. and construction materials include cardboard, bamboo poles, wood, plastic, metal, tin sheet, auto parts, stones and cans. Activities like cooking and washing take place in semi-private areas outside, since the rooms are extremely small. With almost no basic services, people have to depend on their own ingenuity to survive. The government has chosen to launch sites-and-services projects and upgrading programmes rather than to eradicate these settlements.

That architectural form is changing is as evident in the buildings of the rich expatriate workers as it is in the houses of poor squatters. Recent construction has exposed Yemenis, local residents as well as expatriate workers, to architectural forms and technologies sharply contrasting with traditional styles, methods and materials.

Informal sub-contracting, self-help and mutual-help have always been common practices for building houses and small-scale projects, but modern large-scale projects require formal contracting methods, eliminating the participation of the smaller local contractors. Foreign construction firms have provided services for building ports and airport facilities, public buildings, and factories. Local techniques and materials are not suitable for large-scale projects where speed of execution is of vital importance. Economic development made the introduction of modern construction technology unavoidable.

Retaining the traditions, the received social patterns, and the value placed on family privacy is becoming extremely difficult. Families are smaller and require less space, and population movements are disruptive of neighbourhood cohesion. The preference that a single family should occupy a complete house is often precluded by escalating land cost and rents, and competition from commercial uses.

Government authorities have encouraged retaining the traditional character of buildings through regulating the use of stone and other local material for cladding, window decoration and so forth. But traditional decorative motifs are not sufficient to make a building harmonise with its surroundings. Structures with reinforced concrete frames stand out among older buildings because of the marked difference in scale, proportions, and number and type of openings.

Cement blocks are ubiquitous in large cities as well as smaller towns. Glazed windows are common, but not always climatically appropriate. Decorations are less elaborate and often not hand-crafted. However, social status and wealth are exhibited through facade decoration in the neo-traditional style. This is clearly a reflection of the deeply-rooted attachment of the Yemenis to their cultural heritage.

Reference Notes

[1] Unless otherwise noted, all data in this section, are from the YAR Central Planning Organisation, *Statistical Year Book 1981* (Sana'a, April 1982).

[2] World Bank, *Yemen Arab Republic: Development of a Traditional Economy* (Washington, D.C., 1979), p. 19.

[3] YAR Central Planning Organisation, *Second Five-Year Plan* (Sana'a, 1981), p. 13.

[4] World Bank, *Yemen Arab Republic: Development of a Traditional Economy* (Washington, D.C., 1979), p. i.

[5] *Ibid.*

[6] YAR Central Planning Organisation, *Second Five-Year Plan* (Sana'a, 1981), p. 13.

[7] World Bank, *Yemen Arab Republic: Urban Sector Report* (Washington, D.C., March 1981), p. 36.

[8] *Ibid.*

[9] *Ibid.*, p. 52.

[10] *Ibid.*, p. 43.

[11] World Bank, *Yemen Arab Republic Local Development Associations: A New Approach to Rural Development* (Washington, D.C., March 1981), p. xx.

[12] Ismail Serageldin, "Rural Architecture in the Yemen Arab Republic: The Impact of Rapid Economic Growth on Traditional Expression", *The Changing Rural Habitat: Proceedings of Seminar Six* (Geneva: The Aga Khan Awards, 1982).

[13] *Yemen Arab Republic: Urban Sector Report* p. 48.