

# ALGERIAN OASES

## David Etherton

The Sahara covers about a third of the total surface of Africa, and a quarter of this area, two million square kilometres, lies within the national boundaries of Algeria. Although these boundaries are in many ways meaningless, the varied geography and climate and the different types of traditional oasis found in Algeria are representative of the Sahara as a whole. Sixty years of European colonisation and the discovery of oil and gas in the desert have transformed many of the oases, and now a new government is faced with the thousand-year riddle of developing the Sahara. Ninety-five per cent of Algeria's population lives in the fertile coastal strip between the Atlas Tellien and the sea. The pastoral nomads of the north occupy the Hauts Plateaux: red stony plains studded with clumps of halfa and *armoise*, reaching four hundred kilometres inland to the Atlas Saharien and the Aures mountains. Below this is the Algerian desert, four times the size of France.

There are more people living in the city of Algiers than in the entire Sahara and the average Arab from the capital could no more withstand the desert life than would a city dweller from any part of the world. Those who remain in the desert are the last survivors of a society which has adapted itself over hundreds of years to the rigours of the Sahara. The nomad has extended his senses to a degree which enables him to smell water and to hear movement over enormous distances, and his sense of orientation is uncanny. If you offer a nomad a ride in a car, don't expect him to tell you where he wants to go. It may be two hundred kilometres between one village and the next on a road which is the only mark on the landscape, but suddenly you must stop and he will stride off into what you think is still a completely flat and empty space.

To the western anthropologist, the ethnic autonomy and social qualities of the Nomad are cherished; to the newly independent government they are an embarrassment and a mark of underdevelopment. To the nomad the anthropologists are freaks, and the governments a nuisance; but plastic buckets, detergents and transistor radios are duly accepted by him as useful additions to his entourage.

The ecological balance which enabled the Saharan to live 'with' the desert has been upset, more than anything else, by modern communications. The technological possibility of compressing a thousand years of adaptation into an air conditioned capsule means that anybody can now live 'in', rather than 'with' the desert.



### KEY TO COMMUNICATIONS MAP

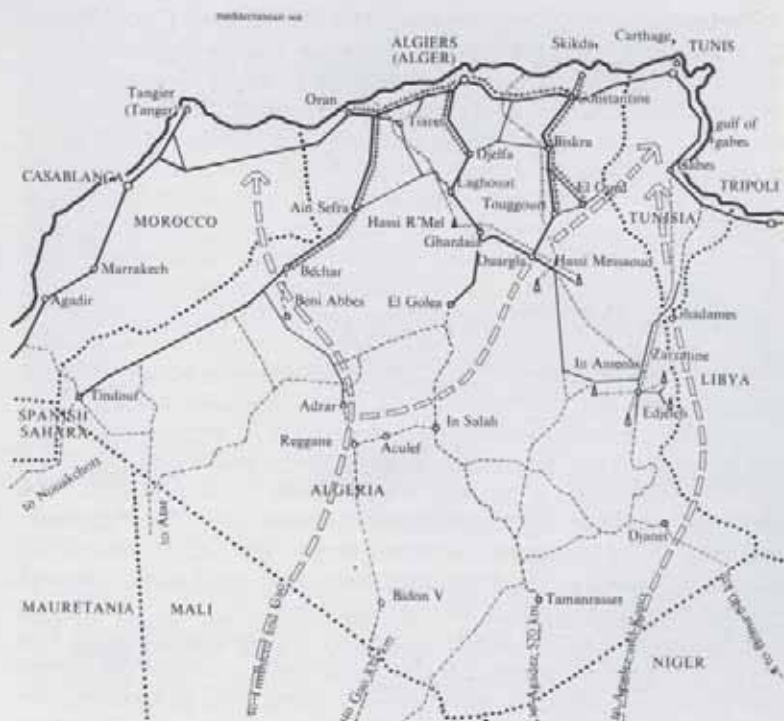
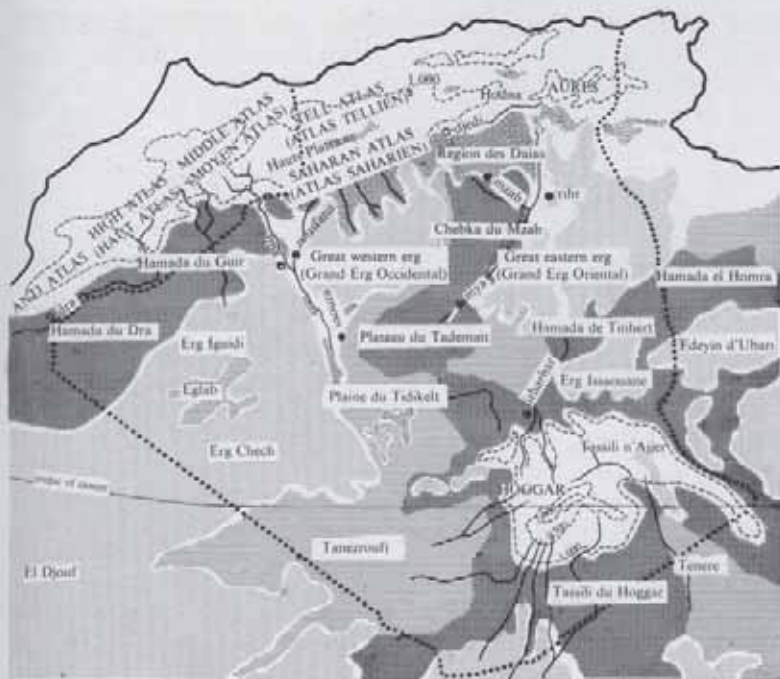
PLACE NAMES	Principal Oases/towns marked giving administrative fiction. i.e. All names mentioned in text. Oil-towns marked showing pipelines.
RAILWAY	Indicated.
ROADS	Surfaced roads and 'pistes' indicated. Caravan routes indicated.
BOUNDARIES	National and Departmental boundaries indicated.

### KEY TO POPULATION MAP

DENSITY	Oases and regional population indicated graphically.
ETHNIC	Main tribal areas indicated graphically.

### KEY TO PHYSICAL MAP

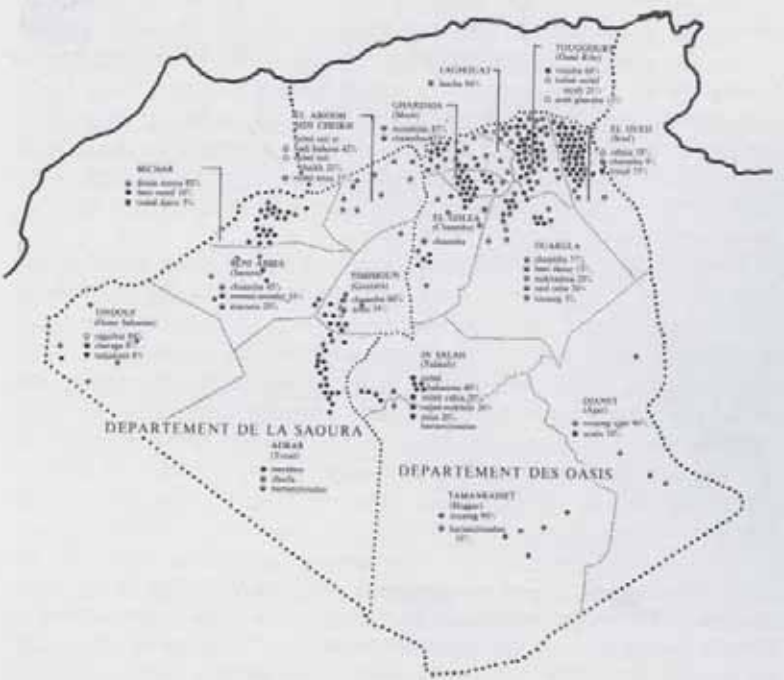
MOUNTAIN RANGES	(Tone/names marked on map) The Hoggar and the Tassili n'Ajjar are part of a Saharan mountain range extending from the Adrar des Tibesti in Chad.  The 'Tassili' is a massive sandstone plateau 1,900 m high, the 'Hoggar' a dome of crystalline rocks culminating in a series of volcanic peaks of which the Akator 3,500 m is the highest.
SAND DUNES	(Tone/names marked on map) 'Erg' covers only about a third of the Algerian Sahara. Chech and Iguidi are part of an uninterrupted region of sand covering Mauretania and Mali.
ROCKY PLATEAUX	'Hamada'
GRAVEL PLAINS	(Tone/names marked on map) 'Reg'. The Tanezrouft is the largest and most desolate of the entire Sahara.
STEPPE	(Tone/regions marked on map) 'Chotts'. A series of open depressions, sometimes below level with a surface deposit of salt. 'Daya'. Small fertile depressions; the only areas in the Sahara where cultivation is possible without irrigation.
RIVERS	(Tone/regions marked on map) 'Oued'. Usually dry river valleys, but extremely dangerous after rain. (Main 'oueds' named and marked on map)



**3 POPULATION**  
 The figures in brackets are those of the principal towns in each area. The ORCS reorganisation from an 'arrondissement' using the figure of 100,000 'Administrative Circles'.

- 2,000 sedentary population
- 2,000 nomads
- percentages are based on 1961 figures
- 'arrondissement' boundary
- ..... 'departement' boundary
- ..... national boundary
- railway
- primary surfaced road
- secondary surfaced road
- primary tracks
- secondary tracks
- ▲ gas
- ▲ petrol
- pipelines/oil and gas
- □ □ principal caravan routes 5th-18th century
- ..... national boundary

- 1 PHYSICAL**
- contours
  - 'hamada' - rocky plateaux
  - 'erg' - gravel plains
  - 'erg' - sand dunes
  - 'oued' - river or dry river valley
  - 'chott' - large open depressions, sometimes below sea-level, good pasture.
  - 'sehks' - closed depression with chemical deposit, unsuitable for cultivation
  - 'mass' - closed fertile depressions spaced 10-20 km apart in an otherwise barren region
  - ..... national boundary





Today the ratio of nomads to settled population in the Algerian Sahara is about 3:7. This proportion must have been reversed at a time when the oasis was little more than a well serving the Berber trade caravans. As the trade routes became established, certain tribes claimed the right to use familiar wells which they were then forced to protect. The oasis is as much a product of its surroundings as any other indigenous settlement. Yet the resources are more limited, the conditions more hostile, and the ingenious results contrast more sharply with the surroundings, than elsewhere. The first settled tribes built their towns on high ground in densely packed clusters of courtyard dwellings, surrounded by high walls. These *ksour* form the nucleus of almost all oases. The original wells made a certain amount of cultivation possible and the oases were soon able to offer refreshment, security and trade to the great trans-saharan caravans.

In the ninth century Ghadamès was the most important oasis in the Maghreb. Here merchants from Carthage exchanged salt, cloth and arms for gold, ivory and Negro slaves from the south. The two main routes across the Sahara have always been from Timbuctu and Gao at the source of the Niger, across the Tanezrouft and up the *Oued Saoura* to the Moroccan coast; and from Kano, through Agadez and the Hoggar to the Gulf of Gabès.

The idea of a settled life suggested by the oases appealed at first only to the pastoral nomads of the north. The Touareg of the central Sahara and the Reguibat remained aloof, preferring to leave cultivation to their Negro slaves and visiting, or raiding, other oases only when it pleased them. Even today national independence and international boundaries mean absolutely nothing to the Touareg or Reguibat tribesman. The contrast between the life of the nomad who lives, not so much in a tent but in the desert, and the oasis dweller hardly needs emphasis. Shelter to the nomad might mean the shade of a rock or tree, and even when he visits the oasis his tents will be pitched at a respectable distance from it. To the *ksourien* shelter means a house, but in a sense which is unfamiliar in Europe. In the Sahara the house is a commodity which, until a money economy was introduced, cost no more than the effort to make it. Wealth is expressed in the number of wives you have; in camels, or in goats. If your wealth increases you will build more rooms or enclose more courtyards, but they will be built the same way and look the same as every other house in every other oasis.

Traditionally in the Arab world, the courtyard house ensures that from the age of fourteen women may be seen only by their husbands and children. Only one door opens on to the street and the small windows of each room face inwards towards the miniature oasis of the courtyard itself. Although it may appear to be restrictive, the courtyard is a cool and beautiful place, a protected world for women, children and young animals. Most courtyards are interconnected so that women can pass from one to another without having to walk in the streets. Where there is more than one storey, these connections often cross the streets transforming the *ksar* into a private upper-level town for women, and a lower-level commercial town for the men. The use of rooms surrounding the courtyard is fairly standardised. The man entertains and eats in his own room which is always placed next to the courtyard entrance. Cooking and weaving sometimes take place in the courtyard, although there is often a loom

fixed to the wall of the women's room. Also since the settled life brings more possessions, separate rooms are built for storage. The entrance of the rooms is connected, although there may be an arcade passage between each room which opens on to the courtyard. Except where there has been European influence, and in places where scorpions may be particularly dangerous to sit or sleep on the ground, there is no furniture. In places where there are European you might have the dubious honour of sitting on a broken, secondhand, upright chair in the house, while you sit comfortably crosslegged on a superb carpet, which you have dirtied by forgetting to take off your shoes.

With the exception of the Souf, each *ksar* has a modular appearance arising out of a standardised roof plan limited by the length of the date-palm trunks. These are supported by thick walls of masonry made of mud and straw bricks, and rendered with the same colour of plaster. Unlike the chateau forts of the Haut Atlas and the great oases of Mali and Niger, there is rarely any external decoration to be seen; the regular grid of courtyard houses is broken by an arcaded market and a mosque, which is the only building in the *ksar* likely to be given a distinctive form. It is unusual to see vegetation of any kind in the narrow streets and public spaces of the *ksour*. The *palmerie* is always clearly defined as a separate part of the oasis and provides an acceptable point of contact between the nomad, who often comes to the garden, and the *ksourien* whom he employs to look after it. In the central Sahara this has resulted in a situation where the population of most of the oases are descendants of the original Negro slaves, the *harratin*, bought from Niger by the Touareg.

Perhaps the greatest paradox of the Sahara is the quantity of water below it. A subterranean reserve known as the *Albien* covers an area the size of France, lies between seven hundred and two thousand metres below the desert. Other supplies are trapped in the underground galleries of the *hamada* and *chebka*. The best water lies under the sand where the sand filters the salt and harmful chemicals which it contains.

Typical 'balance' well on the edge of an oasis. Small whitewashed shrine in background.





Two types of cultivation are possible in the Sahara. Dry culture or *bour* is confined to the few areas where plant roots reach the water table two to three metres below ground level. Otherwise some form of irrigation is necessary. Of the many ingenious methods used to bring water to the surface the medieval *foggara* are the most audacious. These make use of the reserves of water trapped in the fissures of the rocky plateaux. The water runs by gravity through underground channels linking the plateaux with the oasis. Holes at ten to twelve metre intervals above the *foggara* provide access for excavation and ventilation, and cylindrical walls are built around them above ground to prevent sand and dust drifting into the *foggara* and to cut down the loss of water through evaporation. It took four men one year to tunnel one kilometre and there are four thousand kilometres of *foggara* in the Sahara!

In Arabic they are called 'the fingers of light' and it is no wonder that date palms have become the object of special rites and festivals in the Sahara. The palm is well adapted to soil and climate variations and is unaffected by the sharp temperature changes of the desert. Apart from its fruit it provides essential shelter for cultivating other crops in the oasis. Wheat, sorghum and maize are the principal cereals and a more exotic variety of fruits including pomegranate, fig, peach and apricot may be grown, thanks to its protection.

Apart from cutting off direct sunlight, the palm provides a wind-break, induces humidity, and retains a blanket of warm air close to the ground at night, when the temperature would otherwise drop abruptly. Palm wood is far too valuable to burn. The trunks are sometimes sawn into planks for door construction, but more often used whole as roof beams, since the wood has a dense, fibrous texture which makes it hard to cut.

The thick ends of the branches are cut and often packed together between roof beams to form a base for a stone and plaster roof. The thinner portion of the branch is resilient and strong enough to be bent into a circle without splitting. In the Souf, branches are used to construct simple furniture, and in the Mzab as permanent centring for arches. Palm leaves are woven into baskets and even the felt from the base of the trunk is made into shoes. A kind of palm wine, is fermented from the sap and date stones are used as game counters.

The *ksar* with its mosque and market, the *palmerie* and its wells, and the necropolis were the original clearly defined elements of the oasis. They were planned in clusters around the oldest settlement and the number of separate oases in a group varies from two or three in the Hoggar to over a hundred in the region of Touat. The important oases are located in the Saoura valley and along the north-eastern edge of the Sahara where the rainfall is highest and the underground water supply fairly easy to reach. Over half the population of the Algerian Sahara is concentrated around three oases: Ouargla, Touggourt and El Oued, each with a few days' march of the other. In the really arid area on either side of the Tropic of Cancer the oases are small and extremely isolated.

The greatest changes in the traditional structure of the oases are a result of European influence in this century. Phoenician, Roman, Byzantine, Arab and Turkish domination of North Africa preceded the arrival of the French in Algiers in 1830. Twenty years later the area between the Saharan Atlas mountains and the coast became part



Fort Mirabel. Deserted Compagnie Saharienne fort in the Plateau de Tademaït between El Goles and In Salah.

of *la France Metropolitaine*. The military adventurers whose job it was to 'pacify' the Sahara met tough opposition, and their success was made possible only by enlisting local tribes and forming efficient camel mounted units, later known as the *Compagnies Sahariennes*.

In 1902 the French were able to define the *Territoires du Sud* within approximately the present boundaries of the Algerian Sahara between the AOF and AEF\*. The *Territoires du Sud* were administered by military and civilian officers with the help of the *Compagnies Sahariennes* now reorganised into six units with headquarters in Beni Abbes, Adrar, In Salah, Djanet, and two in Morocco. The *mehari* racing camels used by these units could cover two hundred kilometres of any kind of terrain in a day and the French invented a propellor-driven, rubber-wheeled contraption for crossing sand dunes. However, the really significant effects were to come as a result of new methods of communication set up to link these administrative headquarters. *La mission civilisatrice* began to change the appearance and significance of the traditional oasis. First came barracks, medical centres and an airstrip, and later European houses and schools grouped together on flat ground near the *ksar* with a simple pattern of roads and water supply from a reservoir. Bidon V was the first oasis of the twentieth century. Installed in 1926 as a refuelling station for aircraft and motor traffic on the Imperial Mauretanian *piste* from Bechar to Timbuctu, it was originally no more than a petrol tank placed next to a well. Now there is a small village depending on the petrol tank in the middle of the flattest, most desolate part of the desert, the Tanezrouft.

Geological expeditions, made possible by new means of communication, gradually revealed the mineral riches of the Sahara and renewed France's interest in its development. In 1947, the old *Territoires du Sud* were divided into two Departments, but it was ten

\* AEF, *Afrique Equatoriale Française*, 1910-58 (French Equatorial Africa) originally included Niger, Chad and the Central African Republic. AOF, *Afrique Occidentale Française*, 1895-1958 (French West Africa) originally included Mauritania, Mali, Ivory Coast, Guinea, Upper Volta, Togo, Dahomey and Senegal. A referendum of 1958 attempted to make most of these countries member states of the French *Communauté*.



years later that *L'Organisation Commune des Régions Sahariennes (OCRS)* was formed as a serious attempt to tackle its economic development and to reorganise the administration. By this time oil had been drilled in Hassi Messaoud and the war for independence had begun in the North. *La France Métropolitaine* extending from Dunkirque to Tamanrasset was a dream which never came true. As the war became more bitter in the north, petrol exploration continued in the Sahara, and by the time Independence was gained in 1962, 158 million tons of oil had been released from the principal oilfields of Hassi Messaoud, Edjeleh and Zarzatine.

The *OCRS* had divided the Algerian Sahara into two Departments, one on either side of a two-thousand-kilometre line drawn due south from Algiers, with a more logical northern boundary defined by the Atlas Saharien. Apart from border disputes between the three countries of the Maghreb, the frontiers of the two Departments have

*Djanet. A cluster of houses at the foot of the Tassili n'Ajjer not far from the oasis.*



*Djanet. Part of one of the old ksour showing masonry houses and zeriba.*

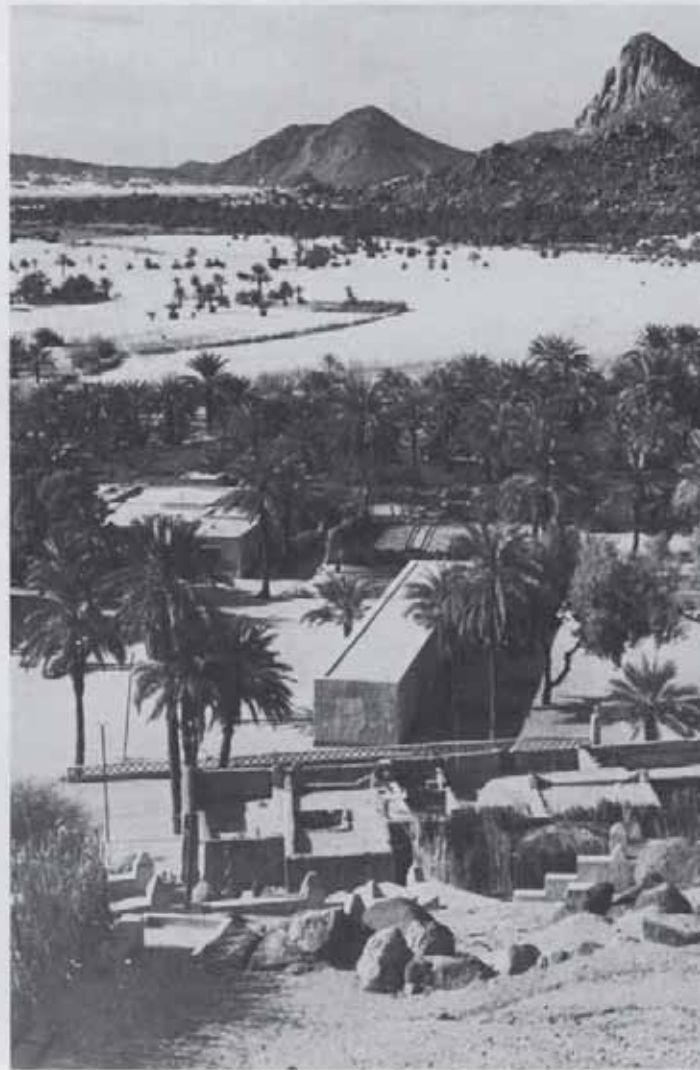


remained unchanged with their *Préfectures* in Bechar and Ouled Touggourt; Adrar and Laghouat remained *Sous-Préfectures*. The effects of colonial development make it easy to distinguish the ksour from the subsistence oases, which have an average population of only two thousand five hundred.

#### *Region Des Ajjer*

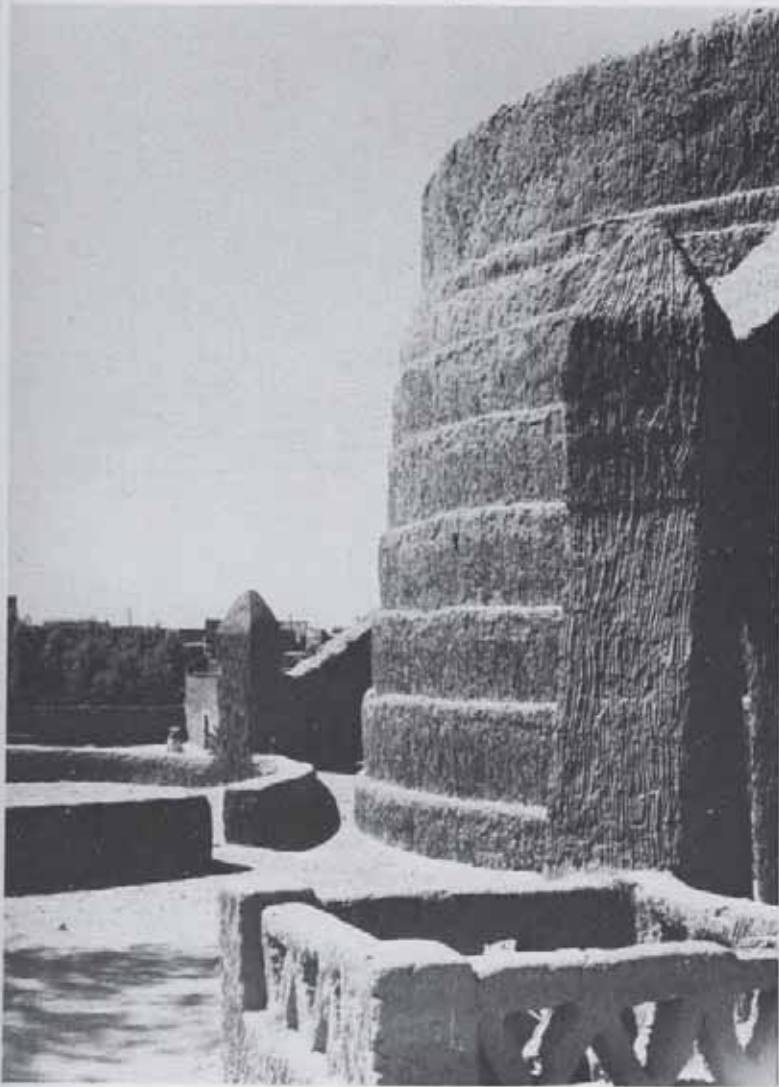
The paradox of these picturesque but declining oases is that they are overpopulated. Still relying on primitive methods of cultivation, they are unable to support a steadily growing sedentary population. With a dwindling number of caravans to serve, the economic functions have collapsed. The oasis of Djanet is a good example. Its *ksour* and *palmeraie* grew around sixty springs at the foot of the great escarpment of the Tassili n'Ajjer which reaches two thousand kilometres. It is as though the grey shale from the plateau

*Djanet. View of the valley from the old French fort. The buildings are fairly new, but the traditional grass huts, zeriba, constructed behind them.*



formed itself into the crumbling hollow cubes of the *ksar* at its foot. Both the Touareg nomad and the *ksourien* have used a type of elephant grass from the *oued* to construct light shelters in which they sleep during the summer. These yellow *zeriba*, scattered among the more permanent buildings of the *ksar* and in the *palmeraie* completed the picture of Djanet before it became the headquarters for the *Compagnies Sahariennes*. Although they built on flat ground, the administration followed the simple shapes and courtyard pattern of traditional housing, using local materials in their new buildings which were dominated by a fort. For about twenty years the pre-medieval society of the Ajjjer was overawed, but never much affected, by European technology. The trucks were unable to compete with camel transport in negotiating the mountainous country, and over-land communications remained a great problem in the Ajjjer. For this reason the OCRS moved the administrative centre to Tamanrasset, a

*In Salah. Mud rendered water reservoir, possibly built under French direction.*



town which had grown up around an insignificant oasis after 1930, because of its favourable climate and position on the Trans-Saharan land route. Since then, Djanet has fallen back on its own resources which include the attraction of tourists to its magnificent landscape and the famous *rupestrian* cave paintings of the Tassili.

#### *Region Du Tidikelt*

A similar story can be told of the Tidikelt and the oases surrounding Aoulef and In Salah. It is the hottest, most exposed area in the Sahara and you will still find an air-conditioned office and a chilled-water fountain in what used to be the administrative headquarters of the Tidikelt and Hoggar regions. At In Salah both the three *ksour* and the Quartier European are plastered like iced cakes with the same red mud and a pattern of scooped vertical lines. The lines are supposed to carry water off the face of buildings into drain channels, but with an

*The oasis of In Salah. Town centre and mosque.*



*Touareg in front of a zeriba in Djanet. The blue veils or litham of the Touareg are imported by camel caravan from Kano.*





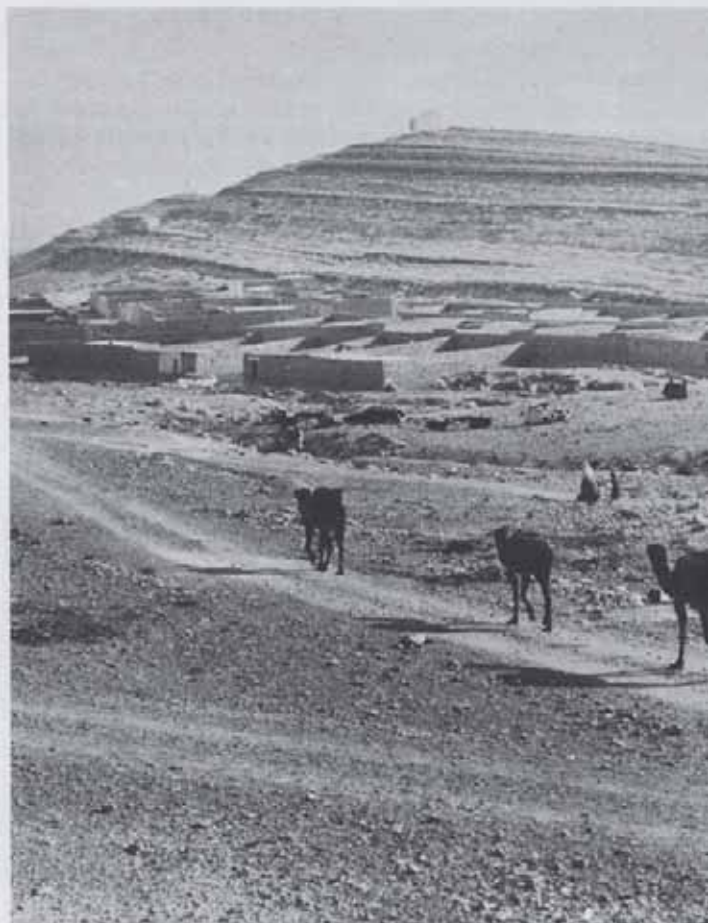
average annual rainfall of 14.1 mm there is no danger of the houses dissolving. (By comparison, Algiers has an average rainfall of 762 mm per year.) Geographically the Tidikelt is important because the road from Reggane to In Salah is the only link between the two trans-saharan land routes. That the caravans still operate is partly due to an old colonial law which forbade the transport of salt by lorry, but by now the Touareg, who are too busy posing for photographs, prefer to send their *harratin* servants on the annual trek. (The blue veils make it hard to tell the difference in any case.) Aoulef and In Salah still form the trading bridgehead between the silent caravans from the south and the oases of the Saoura valley.

#### *Region Du Touat*

This important group of oases extends along the Saoura Valley eight hundred kilometres from Bechar to the plateau of Tademaït. The region of Touat includes one hundred and thirty-five *ksour* strung out two hundred and fifty kilometres along the Rue des Palmiers. The harvest from about a million date palms (the second highest production in Algeria) is exported south direct to Mali or via the Tidikelt to Niger. The *foggara* in this region are exceptionally long, a single gallery sometimes extending thirteen kilometres. The region of Touat can still be described as productive although most of its population lives at subsistence level. The oases which are linked by surfaced roads to the northern urban centres are in a healthier position. The average population of these is 14,000.

Bechar has an exceptionally high population of twice this figure, due to its importance as *Préfecture*, and to coal-mining. After Independence it was agreed that the French army stationed in Bechar should remain there for a further five years to continue their nuclear experiments in the Sahara. This also meant that the local population continued to receive the only medical services available.

*Nomads on their way to Touggourt. Young wives and babies, water, firewood and the tent are all carried by camel. A light wooden frame, covered with cloth provides the traditional privacy for the women. Rubber inner-tubes from car tyres are a common addition to the goatskin gherba used for carrying water.*



*Hauts Plateaux. Part of a village most of which was built since 1900 as a French military outpost. On the top of the hill is a shrine. Farther down on a water reservoir built by the French, and below the houses, wrecked cars.*







*Rhoufi, a small hillside village on the southern slopes of the Aures Mountains. A sophisticated type of gourbi with the living room open on one side, placed above a closed basement 'store'. All the living rooms overlook a spectacular gorge.*

*Rhoufi, Aures. Detail showing roof construction reminiscent of tent structure.*



The problem of attracting indigenous professional people to work in rural areas is the same everywhere. In the Sahara it is almost impossible.

### *Hauts Plateaux*

In describing the other important oases in the north, something should be said about the Hauts Plateaux which forms a geographical buffer between the desert and the fertile coastal strip. The OCRS boundaries excluded Aïn Sefra, Djelfa and the oases of Biskra from the two Saharan Departments and like the small towns and scattered hamlets in the Djebel Amour and Hodna regions, they are commercial centres for the large semi-nomadic population of the steppe. Depending on the rainfall, the area around the salty depressions of the *chott* is reasonable grazing land. In the 1920s a million sheep were exported annually to France from the Hauts Plateaux. This tradition of sheep-rearing which encourages soil-erosion, is a threat to any serious agricultural development in the area. Nowadays, the nomads often travel north by lorry to the outskirts of Constantine and Oran for the wheat harvest, and south to the large oases of Touggourt and the Souf for the date harvest. Their sheep and part of the clan usually remain near good pasture in the steppe. This tendency to settle has led to the building of small mud and stone shacks, *gourbis*, next to the tent. The simplest type of *gourbi* has two adjacent rooms, each with only one opening and usually without a door, facing a corral of piled stones, or dried thorn clumps. Flat or sloping roofs imitate the tent construction with a central post supporting beams and purlins of oleander or *laurier rose*. Even the more sophisticated courtyard houses of the Hauts Plateaux are no more

*Nomad tent, Hauts Plateaux. Interior view of the male side of the tent showing the secondary row of wooden supports. A rope is tied to the poles at ground level and is used to tether lambs at night.*



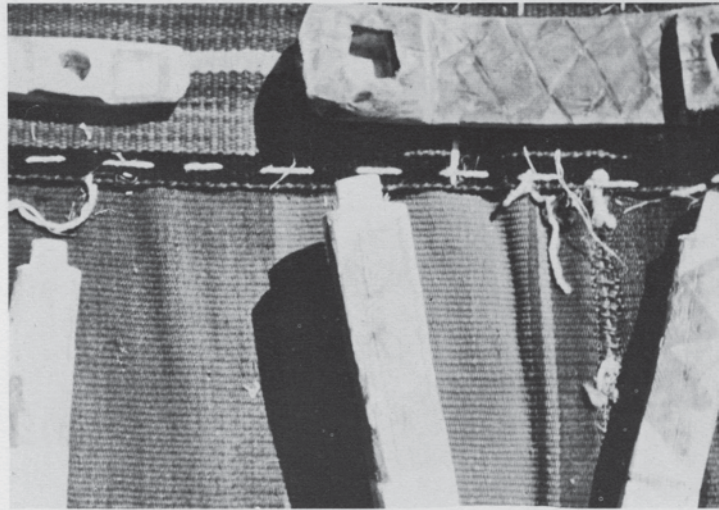


than improved *gourbis* based on the two-cell plan of the tent. One section is for men, saddles and weapons, and the other for women, children, young animals, spare clothes and cooking material.

#### *Region De 'Oued Rirh*

The oases of Touggourt still provide seasonal work for a large number of semi-nomads from the Hauts Plateaux. Intensive cultivation of dates for export was instigated by the French and the vast regimented plantations stretch one hundred and twenty kilometres from the north to south. The original *palmeraie* soon exhausted the superficial layer of water and it was necessary to drill artesian wells (1,700 m) to irrigate the oases. Today the plantations are run by co-operatives and continue to produce and export the best dates. Touggourt is linked by road and rail to the northern ports and has a population of 17,000. Early in this century two English ladies passed through Touggourt. Evidently they were not feminists, but were appalled at the brutal treatment of animals. The society for the

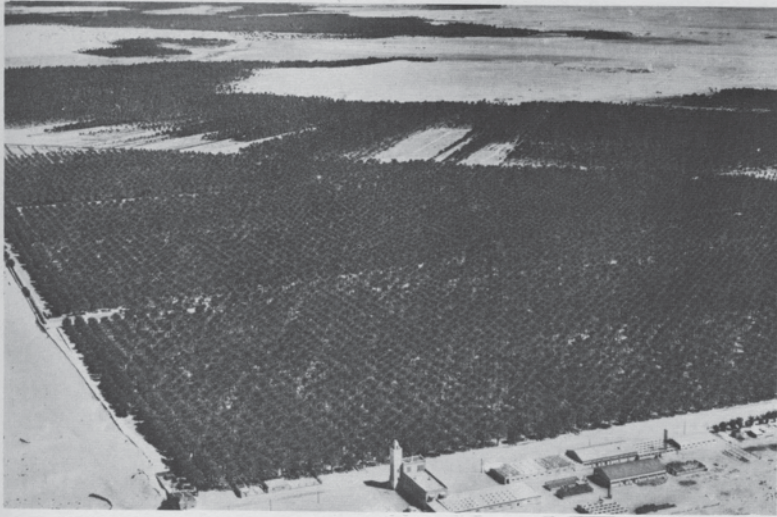
*Ouled Naïl tent showing the male side of the open end of the tent with part of a thorn bush corral in the foreground.*



*Interior detail of Ouled Naïl tent showing the crossed central poles and the woven strip into which they are morticed. A woven strip reinforces the tent along the pole supports.*







*The industrial Palmeraie of Touggourt.*

protection of North African animals which they founded, still has a dispensary in Touggourt and they have patented the design of a painless bit for donkeys. . . .

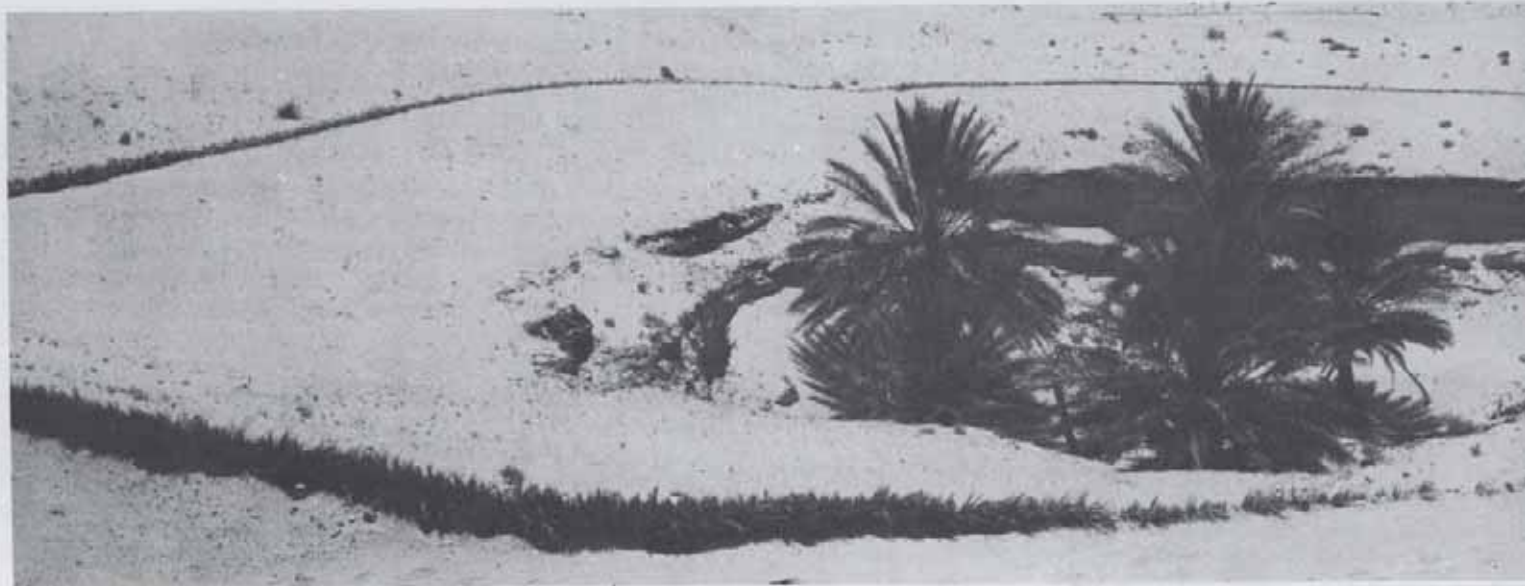
### *Region Du Souf*

Although separated by only a hundred kilometres of sand dune, the industrial oases of Touggourt are removed by centuries from El Oued and the nineteen smaller oases which make up the region of the Souf. Its main tribes are the Troud, who settled in the fourteenth century and the Rebaia who have maintained their nomadic life since their arrival from Libya three hundred years later. Together with a number of smaller tribes they make up the largest regional population in the Sahara (100,000). Although a small quantity of dates and tobacco are exported, the Souf is another overpopulated region relying on a subsistence economy. Until Independence there was a tradition of migration from the Souf to the region of Constantine and to France. These emigrants, who returned annually for the date harvest,

*Aerial view of El Oued in the Souf, showing the courtyards and cumulative cell structure of the houses.*







*The deep depression of a ghout in the Souf on the road between Touggourt and El Oued in the Grand Erg Oriental.*

assisted in bolstering the economy rather than in reducing the population.

Two conditions determine the unique ecology of the Souf. First, water, only a few metres below ground level, which enables dry culture, and second its situation in the dunes of the Oriental Erg. In order to maintain the relationship of the gardens to the water level they are grouped in the middle of deep circular depressions (*ghout*), which must be constantly cleared to keep back the sand. To give extra protection from a wind a more permanent sand well (*djerid*), is piled around the perimeter. El Oued, although an agglomeration of courtyard houses, is atypical, both because of the methods of its construction and, since it is neither fortified nor built on high ground, in not being a *ksar*. The town is grouped around a market place and divided into separate areas each with its own mosque. Individual rooms surrounding each courtyard are covered by a plaster dome, *dar* of about 2 m radius. The modular planning of El Oued and its system of incremental expansion is a delight. Prevented by the domes from settling on the roof, sand forms an acoustic carpet on all the streets. The ingenious method of dome construction relies on a setting-out rod which determines the radii of diminishing circular courses of plaster blocks laid one on top of the other to form a hemisphere. The rod, which is equal in length to the radius of the dome, is revolved about one end which remains on the centre point at the base.

#### *Region D'Ouargla*

Like Ghadamés, Ouargla was a northern terminus for the medieval caravans from Agades and Timbuctu. Whereas Ghadamés has decayed with some dignity, Ouargla has taken a severe social and environmental battering. Developments associated with the colonial

administration, the military and now the petrol companies have binned to transform the original oasis town. What looked like Hollywood Foreign Legion forts turn out to be churches, cinemas and a museum. As well as the usual collection of handicrafts, the museum has a superb permanent exhibition describing the workings of the oil fields at Hassi Messaoud. Discarded oil drums are a favourite gatepost ornament, and the outskirts of the town are littered with wrecked cars and military debris. Ouargla is a unique evidence of the way in which nomadic tribes have adapted to a sedentary way of life. On a smaller scale than the example of urbanisation such as is experienced in all the oil capitals, and is due to Ouargla's new role as a service centre. Hassi Messaoud sixty-five kilometres away. Three new settlements have grown up about two kilometres outside Ouargla in areas of the Saït Otba, the Beni Thour and the Mekhadma nomads traditionally camped.

These new villages differ from the traditional *ksour* not only in density but also in the type of house which is eventually built. The process is gradual and begins with the tent and its enclosed courtyard spaced at the usual distance from the neighbouring tent. As more become available individual rooms are built inside the courtyard. Soon the tent is folded for the last time. The buildings may begin with the familiar materials of the squatter settlement but are soon replaced by more substantial constructions of stone and plaster with domed vaulted roofs similar to those of the Souf.

These three new villages were built in anticipation of employment in Ouargla or in Hassi Messaoud itself. The work offered to the people can only be accepted by men, and is limited to labour and domestic service. The nomad tends to treat his wage as a means rather than as a means of abandoning his traditional way of life. In contrast, the oil-technicians are either foreign or Algerians employed in the north. The kind of environment they demand, and which they continue to demand, has to be transplanted in the desert.





Hassi Messaoud oil field and artificial oasis.

The valley of the Mزاب looking north. Ben Isguen, the Holy Town, in the foreground. Melika, the 'Queen' to the right and Ghardaïa, the capital, in the background. Each ksar is dominated by the tower of its mosque. Dark patches of date palm conceal the 'summer towns'.



Messaoud has its air-conditioned offices and flats, a cinema, and secretaries in bikinis decorating the swimming pool.

Now that the Algerian Government has greater control over the oil-companies, the foreign employees feel less secure and their life in the desert has lost some of its luxury. There will still be cold beer in the ice boxes, high salaries with 'hardship' allowances and frequent leave, but the days when ladies were flown to Rome for their monthly shopping are almost forgotten. Much is known of the oases which served the ancient caravans and of the modern towns and additions built as a result of colonial interest and mineral exploration, but the oases of the Mزاب Valley are unique. They represent the culmination of human effort and enterprise in the Sahara and their original social and physical structure can still be identified.

### Region Du Mزاب

The rocky plateau which divides the oriental and occidental *erg* is known as the *chebka* (Arabic: net). Rising once every thirteen years, the *oued Mزاب* traces a dry course through this eroded maze of clefts and ravines. One thousand years ago the valley of the Mزاب was chosen by the Ibādites as the site for seven new towns.

The Ibādites were descendants of the Kharijites (*khariji*: dissenter) whose fundamentalist brand of Islamic puritanism led to their expulsion from Iraq in the ninth century. Ibn Rustem, the leader of the Ibādites had a quick following of sympathetic Berber tribes when he arrived in the Maghreb. He founded the kingdom of Tiaret and as its theocratic ruler advocated an austere life devoted to study and trade. As his popularity grew so also did the opposition from orthodox Muslim fanatics and in A.D. 909 Tahert, the capital, was destroyed and the Ibādites fled to Ouargla. Sedrata was built near by as the first new Ibādite town. It was well situated for trade and quickly attracted other persecuted Ibādi communities. However, it was unprotected and the need for expansion demanded a new site located away from the main caravan routes (Sedrata was destroyed by Berber tribes in 1071). Of the seven Mزاب towns, five are situated in the valley itself. El Atteuf was founded in A.D. 1011 and the other four valley towns before A.D. 1052. Guerrara and Berriane were built in the seventeenth century, fifty kilometres north of the valley.

Those Ibādites who settled in the valley became known as the Mozabites (Ghardaïa). Almost half the total population of 38,000 live in Ghardaïa, the capital, 13,000 in Guerrara and Berriane and 4,000 in Beni Isguen. Metlili, Bon Noura and El Atteuf each have a population of about 2,000.

The Mزاب has more in common with the modern artificial environment of the petrol companies than with many traditional oases. The *chebka* is an unfavourable site from almost every point of view; water is far below ground level and communications are difficult. Rain falls on an average of twelve days a year and in the hottest months temperatures reach a maximum of 45°.

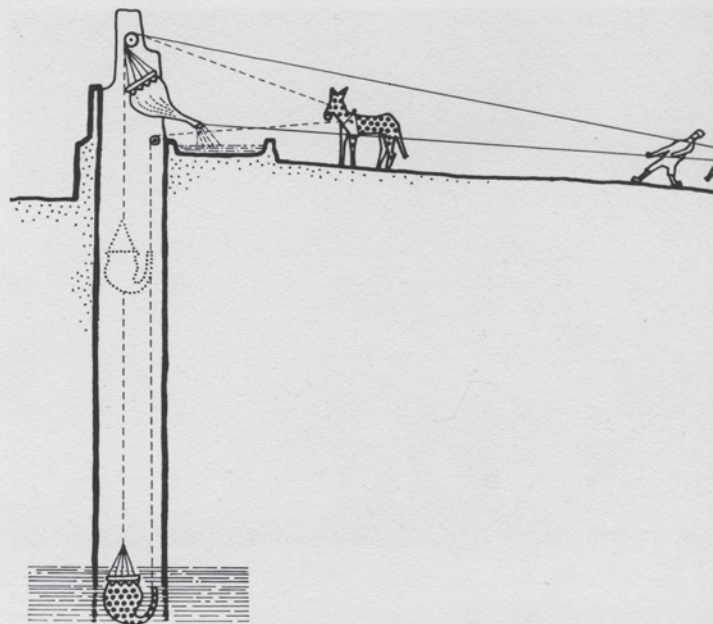
The physical planning of the valley follows a consistent pattern. Each of the five towns is made up of the same three elements: a fortified *ksar* or winter town, an oasis and summer town and a necropolis. The five town groups are linked by an elaborate hydraulic system which follows the course of the *oued*, but are separated



visually by rugged, open areas of desert. The hydraulic system consists of barrages built across the *oued* to create surface and subterranean reservoirs. Rainwater is guided from the barrage into the crevices of the *chebka*, sometimes 80–120 m deep, or straight into the gardens through an ingenious network of irrigation channels – *souagui*. Over three thousand wells are connected to the underground reservoirs and the above-ground structures supporting the well-pulleys are a characteristic feature of the Mزاب.

Except in the common need for fortification, the *ksour* of the Mزاب differ fundamentally from the Berber *ksour*. Whereas each Berber town was occupied by blood relations of the same tribe or clan and was dependent on a higher authority, the Mozabites founded each town with a number of family groups. While retaining their individual identity, these groups surrendered juridical and executive power to a common higher authority, the *Quabā il*. Elders elected from the *Quabā il* of each town in the pentapolis, formed a higher assembly known as the *Jum'a* which held its meetings in the mosque. The church was supreme and had the power to excommunicate clans or individuals. All five *ksour* are built on high ground with concentric bands of courtyard houses falling away from the central mosque and its dominant tower. Originally the limits of each town were set by a fortified outer wall. The close texture of streets, ramps and steps is broken only by an open market and alcoves sheltering the public wells.

*The western wall of Beni Isguen, the 'Holy Town'. A paved prayer surface can be seen in the necropolis on the opposite hill.*



*Diagram of well operation. The tirst (skin containers holding about 10–13 of water) are drawn in rotation by two donkeys. A pull on the cord releases the tirst and discharges water straight into the irrigation channel.*

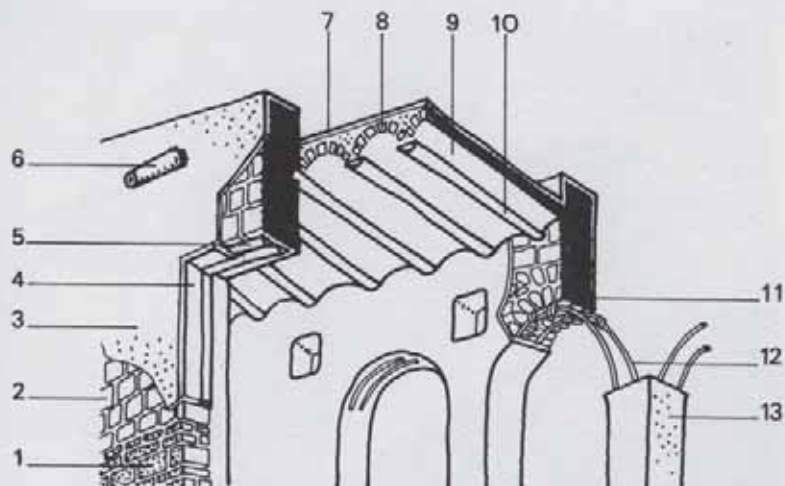
*Houses in the 'Summer town' of Ghardaïa.*





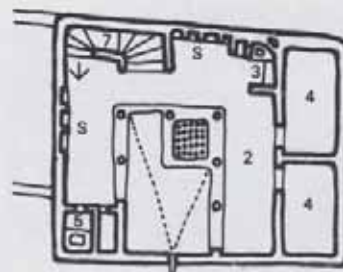


Ghardaia market, showing the south-west side of the Ksar.

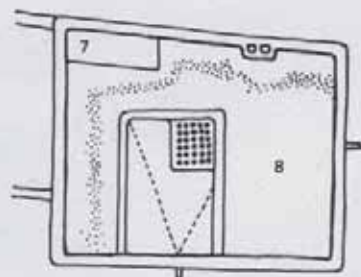


- 1 Masonry foundation and plinth
- 2 Mud block wall (15 x 15 x 35 cm 'toub')
- 3 'Timchent' rendering, coloured or natural
- 4 Reveal with smooth rendered finish.  
Colour contrast with 3
- 5 Double palm-wood lintel.  
Inner member continued around opening as door-frame
- 6 Baked clay gargoyle
- 7 'Timchent' roof covering
- 8 Small-stone vaults consolidated with 'timchent'
- 9 'Timchent' internal rendering often painted blue
- 10 Split palm-branch beams (2 m span @ 0.7 ccs)
- 11 Stone block arch
- 12 Permanent centering of palm nervures tied together
- 13 'Timchent' rendering

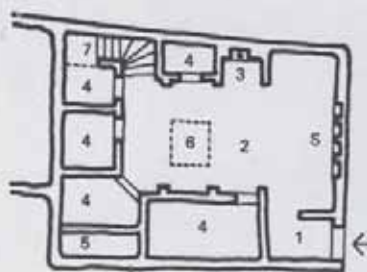
Typical well-house plan in the Mزاب.



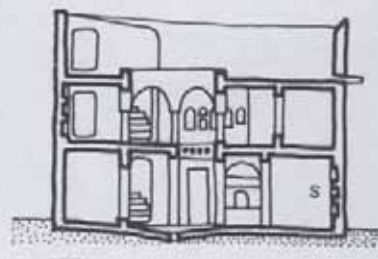
first floor plan



roof terrace plan



ground floor plan



section

- |               |             |
|---------------|-------------|
| 1 Terrace     | 1 W.C.      |
| 2 Living area | 4 Mud light |
| 3 Kitchen     | 7 Stair     |
| 4 Splice room | 4 Terrace   |

8 Storage alcove

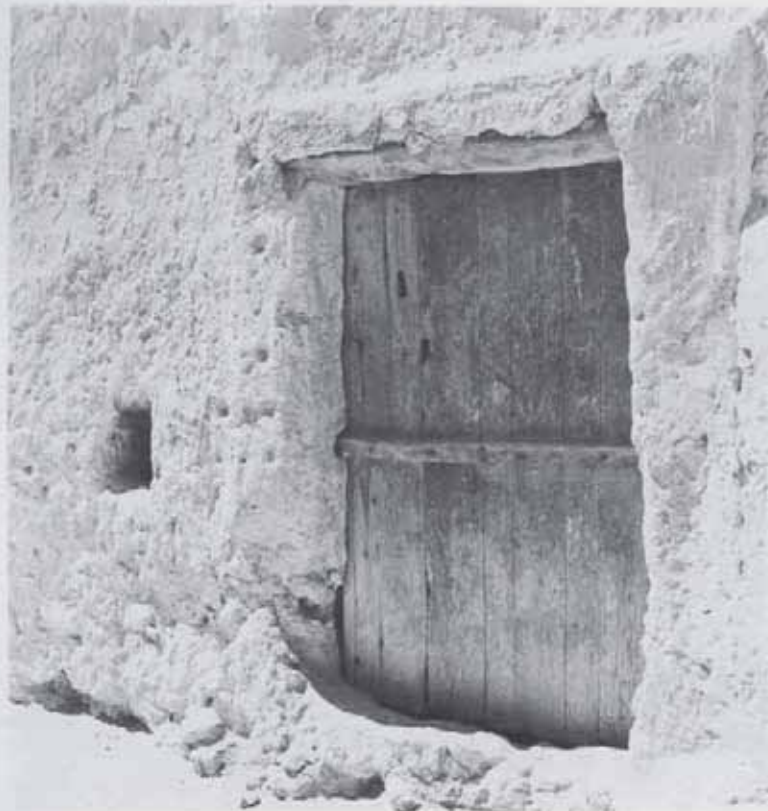
0 5m





*A roof terrace showing the stair exit and an opening over the courtyard below.*

*Palm wood house door and lock-opening. The Mozabite lock is an ingenious sliding wooden mortice which is released by inserting a stick about 30 cm long with a pattern of protruding nails at one end. The nails correspond to holes containing loose wooden pins in the lock. The door and key are symbolic of Mozabite society. The key stick is also an effective weapon.*



*A niche for prayer and meditation in a koubba. The protected opening always faces east.*

There is no vegetation in the *ksour*. Their location on high ground deliberately leaves the flat areas close to the *oued* for cultivation. The whole valley has about 180,000 date palms grouped in separate plantations around each town. These are less productive than the palms of most oases but they play an additional role in protecting the summer towns and their gardens from the sun. At the hottest time of the year it was the custom for most of the population to leave the *ksour* and to move to the summer towns. During these months the *ksour* remained silent and parched and a new life of cultivation began in more pleasant surroundings. Today the annual exodus is less marked and the summer towns are treated more as a second home for prosperous Mozabite traders. Shaded by the foliage of apricot, pomegranate and date palm, the streets and houses of the summer town are cool, and a sense of refreshment is heightened by splashing water in open channels and the constant noise of water over pulleys. Until the beginning of this century, the life of the Mozabite was centred on the agricultural exploitation of the valley. There was still enough fruit and wheat grown to serve local needs. Each town has its own necropolis in the open desert area near the winter town and occupying about twice its area. Separate burial grounds for each clan are grouped around the tombs of famous saints. The individual gravestones are unmarked and large whitewashed areas are left open for prayer meetings.

The physiognomy of the Mzab towns was achieved during the first forty years of their existence – the time taken to build all the summer towns. The original conditions imposed two guiding principles: speed and economy and these formed the basis for construction and planning. A clear policy for expansion and growth of the towns was anticipated the steady influx of population during the first half of the eleventh century. The best use of land dictated that when one winter town reached its optimum size, a new one should be added on the same ground. There is no hierarchy of building types in the Mzab.



same materials and methods of construction were used for hydraulic work, houses, public buildings and the mosque. The size of family determined the size of house and public buildings were no more than a number of typical houses joined together to provide extra space.

The individual house plan reflects a pattern of life which has hardly changed since the Ibādites first settled in the Mzab; an austere and secret life, proud of its early hardship and achievements and highly regulated in every detail. Until 1878 no stranger had set foot in a Mzab town, and even today visitors to Beni Isguen, the Holy Town, must leave before sunset. Women remain locked in their houses and are forbidden to leave the valley. Only women, children and old men remain in the towns for more than a few months at a time.

The traditions of Mozabite trading go back to the days of Sedrata, and today, they are the most astute and successful merchants in the Maghreb. A Mozabite general store will be found in almost every town and village of Algeria. Boys are sent from the Mzab to learn the trade with relatives and return home to marry at the age of 14–16. They leave the valley again, and only settle permanently in the Mzab when enough capital has been made to retire and continue house building.

The implacable blind walls of streets and narrow alleys express only the secrecy and austerity of the Mzab. Seen from above, the buildings take on a new meaning and the subtle organism of courtyard dwellings becomes clear. On all but the south-facing slopes of the winter towns, houses are open to the top with a central courtyard diminishing in area through two or three storeys to a small roof-light over the lowest floor. This is either at ground/entrance level or one floor below ground. It is the coolest part of the house during the day and consists of a large living space surrounded by small rooms on two sides. The next floor provides a more open living area with arcades around a central court. After sunset a violent drop in temperature changes the function of the roof terrace from parasol to sleeping area.

On the southern slopes of the winter towns the walls which usually surround the terrace on all four sides are left open to the south. The arcades efficiently cut off the vertical rays of summer sun and admit winter sun. The very small openings in external walls are limited to the south. There is evidence of Andalusian ornament in the ruined town of Sedrata yet no applied decoration appeared in the building of the Mzab. The only feature which is repeated is the semicircular arch and the four-pronged termination of the mosque towers. Otherwise the shapes and sizes of walls and openings were determined by orientation, privacy and the irregularities of the site.

Building materials and constructional details were the same for all buildings. A hard quick-drying plaster (*timchent*) processed from river silt was used for making building blocks, as mortar and for rendering. The external rendering of buildings is still applied in the traditional way with palm branches, giving an energetic surface texture to the wall. Stone was used only as rough reinforcement for wall openings, arches and vaults, and for foundations. Woodwork was limited to the ingenious use of palm; large planks sawn from the trunk for doors and shutters, branches cut in two as initial support for vaulted roofs, and the nervure bent and tied to form permanent centering for arches.



*The Valley of the Mzab. The outline shape represents the area of the valley given protective classification by the Service des Monuments Historiques, Algiers.*





Bou Noura, 'The Town of Light', built up to a rocky edge of the oued on the western slope of the hill.

Discussing the ways in which dwellings can be tailored to suit the particular requirements of the individual while at the same time satisfying agreed common criteria, Christopher Alexander makes a distinction between 'mass' and 'fine adaptation' (to the environment). In the Mzab, a common solution is found in building for climate and for privacy, and at the level of 'fine adaptation'; the interiors of houses are literally moulded to suit the individual family. This is achieved partly by carving out a variety of storage alcoves from thick walls and also by taking advantage of the speed at which *timchent* partition walls can be dismantled and rebuilt within the basic plan.

In the 1966 'Review of the Algerian Ministry of Tourism', M. de Maisonneul suggests that Le Corbusier's work and thinking were deeply affected by visits which he made to Algeria in the thirties. He points out similarities in the forms of several buildings in Ghardaïa and the Chapel at Ronchamps, and observes that Le Corbusier's interest in curved planes dates from the time of these visits. This quite common attitude to indigenous buildings seems to ignore the fact that their forms are an unselfconscious and inseparable product of social, geographical and climatic conditions. Of an aeroplane flight which he made over the Mzab Valley in 1935, Corbusier himself writes, '... every house a place of happiness, of joy, of a serene existence regulated like an inescapable truth, in the service of man, and for each'.

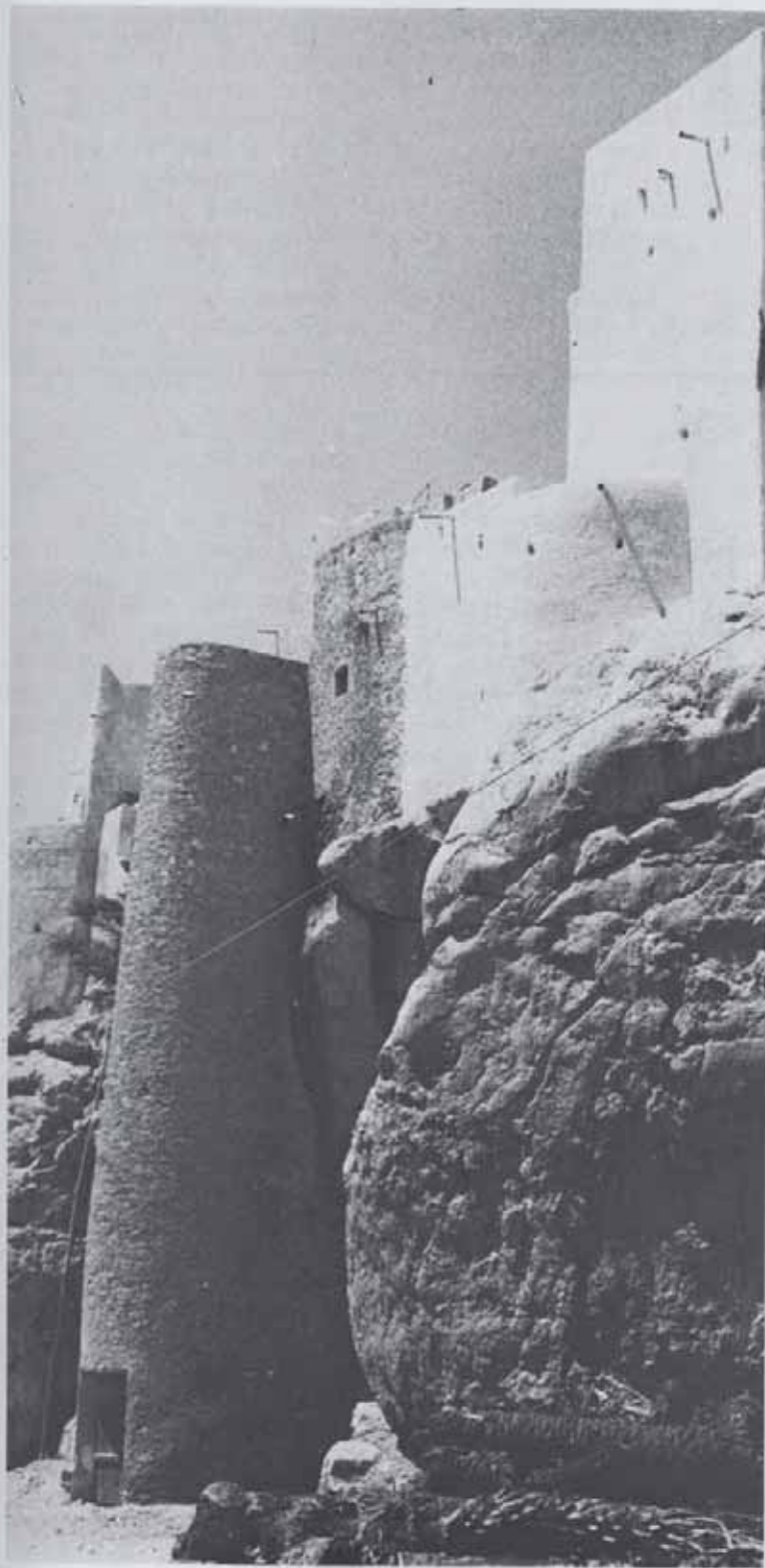
Recently, through the influence of industrialisation, under political pressure and through a slackening of religious practice, Mozabite society and its environment show signs of change. Inevitably the

beginnings of change go back to the early days of colonisation. Ghardaïa became the military centre of an area stretching about a hundred kilometres from Djelfa in the Hauts Plateaux to El Goléa on the edge of the oriental *erg*. Gradually the effects of an alien culture took shape in a variety of administrative buildings, missions, a military camp and hospital and schools. One of the most damaging effects was the introduction of water-borne waste disposal. Traditionally, naturally decomposed waste proved a useful fertiliser and was regularly collected from each house for the purpose. Due to the infrequent rising of the *Oued* a large area outside Bou Noura became silted-up, resulting in a vast stagnant pond of accumulated waste from Melika and Ghardaïa.

The discovery of oil at Hassi Messaoud, two hundred and twenty kilometres east of Ghardaïa, has had a profound effect on the region, including the Valley of the Mzab. The trunk road from Algiers branches at Ghardaïa, making it an important relay town for traffic on the Tamanrasset route and for the eastern oil-towns. There is an airport twelve kilometres from Ghardaïa and the valley is beginning to attract a large number of tourists.

The extent to which the fabric of the Mzab towns can accommodate change is significant. Since the arrival of the petrol companies the desert interstices between the towns have become disorderly. The untouchable cemeteries around the *ksour* have helped to reduce the degree of legibility. To the modern Mozabite the acquisition of wealth is still seen as a means of fulfilling a moral obligation to maintain and improve the community. With his Citroen DS parked under the shade of a date palm, he may see no reason why





Detail of the fortified western edge of Bou Noura.

building in which his family has lived for three generations should not easily accommodate the most up-to-date technological equipment, nor why his wives should ever want to leave the Mزاب Valley.

The Mozabites are now on the point of expanding their towns and re-modelling their environment with full awareness of twentieth-century technology. There seem to be a number of choices open to them: either, a continuation of the *laissez-faire* pseudo-oriental building which is already blunting the clear definition of the original towns; or an attempt to encourage the traditional use of craft skills and materials still practised by small builders and to restrict the siting of new projects; or a complete freeze on new buildings in the old towns and the creation of a new separate town following the original expansion principle of the old winter towns. In reality this kind of planning speculation is academic and the future of the valley depends very much on the reaction of the Mozabites to the economic restrictions imposed on them by the government since Independence. Now that it is more difficult for them to invest money abroad, they may well grasp the opportunity of developing the Mزاب.

Many possibilities for the development of the Sahara as a whole have been dreamed about, written down, and some worked out in great detail. New explorations will uncover more reserves of minerals and oil, and, provided that the underground supplies of water are tapped, agriculture is possible on a large scale. In 1870 Ferdinand de Lesseps was asked to solve the technical problem of creating an inland sea, linking the region of the *chotts* to the Gulf of Gabes. Mussolini was attracted to the idea fifty years later, but still it came to nothing. Another ancient project was revived in 1964 when the governments of Algeria, Tunisia, Mali and Niger met to discuss the construction for a trans-saharan road, linking in effect, the Maghreb with the seaboard countries of West Africa.

All these projects are technically possible and their realisation would provide new reasons for living in the Sahara – reasons which would be hard to find in what remains of the ancient oases.

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