CHAPTER 1
BACKGROUND TO THE ARCHAEOLOGY OF FAZZĀN

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INTRODUCTION

The *Archaeology of Fazzān* reports seek to advance knowledge of human settlement and adaptation in the world's largest desert, the Sahara (Cloudsley Thompson 1984; Laureano 1991, 1-43 for good general overviews on the Sahara). The archaeology of the Sahara is at best only partly appreciated (Allan 1981; Phillipson 1992; Shaw *et al.* 1993), with most attention hitherto focused on the prehistoric phases (Humbert 1989 is a rare attempt to follow the story to recent times). Whilst the irrigated oases of the Egyptian Western Desert have been a focus for investigation (Churcher and Mills 1997; Fakhry 1942/50; 1944; 1950; 1973; 1974; Giddy 1987; Gosline 1990; Vivian 2000), further west the evidence is poorly recorded. The processes of climate change and environmental degradation provide an essential background to understanding human adaptation to desert conditions, and the interplay of archaeological and geographical data has long been recognised as a key element of research on the Sahara (Shaw 1976).

These reports combine the results of archaeological research carried out in two separate phases, first by Charles Daniels (hereafter CMD) in the 1950s, 1960s and 1970s, and latterly by the Fazzān Project (directed by David Mattingly) in the period 1997-2001 (hereafter FP). This chapter will introduce the region of Fazzān in the Libyan Sahara, outline the history of archaeological research there and describe the methodologies of the CMD and FP work.

Fazzān is Libya's vast south-west desert province, its boundaries variously defined over time to cover an area of 550,000-640,000 km^2 (*Encyclopedia of Islam*, s.v. Fazzān, 875-77; Kanter 1969, 76; Nyrop *et al.* 1973). Broadly it extends from the Algerian border in the west for *c.*600 km towards Egypt and from the southern borders with the Saharan and sub-Saharan states of Algeria, Niger and Chad up to the pre-desert zone and the oases of the al-Jufra (Alawar 1983 is a detailed bibliography covering Fazzān and Chad) (Fig. 1.1). Under Italian colonial rule and in the early Libyan independence period it was one of three main divisions of the country (along with the north-western zone of Tripolitania and Cyrenaica in the east). The south-eastern part of the Libyan desert, centred around the remote oasis of al-Kufra and bordering Chad, Sudan and Egypt, has always been a distinct region and is today part of a separate administrative district. There are in fact significant differences between the eastern and western desert regions of the Libyan Sahara, and it was Fazzān in the west that has historically offered the greatest possibilities for settled communities and well-watered long-range routes (cf. Ball and Beadnell 1903; Beadnell 1901; Gautier 1970, 168-79). Indeed, the oases here form a distinctive cluster within the Sahara and also differ in many respects from those of southern Algeria and southern Tunisia to the west (Gautier 1970, 172-215; Lethielleux 1948, i; Rouvillois Brigol *et al.* 1973; Trousset 1986). Work in Fazzān can be compared and contrasted with, for instance, neighbouring Saharan and sub-Saharan zones of Niger (Bernus and Cressier 1992; Grebenat 1985; Paris 1984), Chad (Recherches Sahariennes 1979; Treinen-Claustre 1982), Mali (Calegari and Simone 1993) and the Nilotic Sudan (Sadr *et al.* 1994).

The modern climate is hyper-arid, with negligible rainfall, even the highest elevations receiving only 5-12 mm average rainfall per year. Summer temperatures

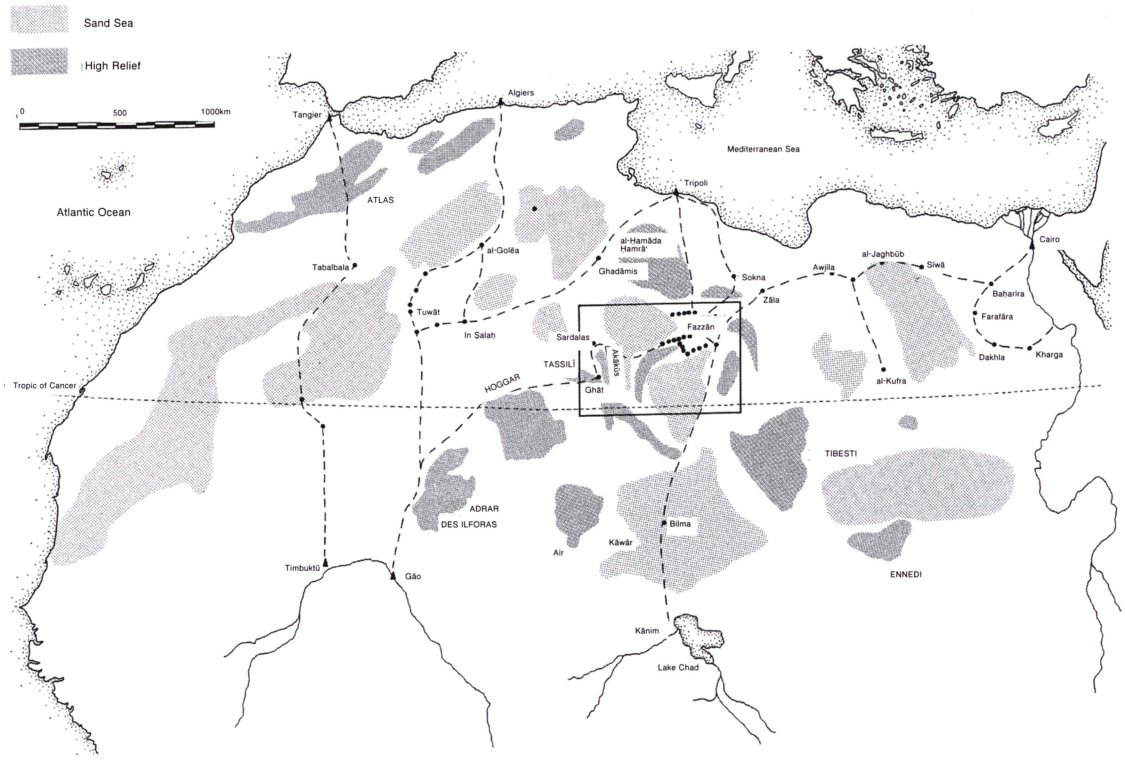

Fig. 1.1. Fazzān in its Saharan context.

frequently rise to 50° C, though winter months are typically warm and dry during the day, with occasional frosts at night. Humidity is low, but hot winds and dust storms are quite common.

The modern regional capital is at Sabhā, a large oasis near the northern edge of Fazzān and on a direct route to Tripoli. However, it has not always been the focus of government and an interesting aspect of the history of Fazzān concerns the shifting pattern of power between a succession of oases. The oases of Fazzān are for the most part fairly small in size, but densely clustered, with groups of them separated by vast tracts of sand or rocky plateaux (at an average elevation of *c.*400-600 m). As recently as 1969, in the whole region there were only 2,700 ha of cultivated land and 1,200 ha of palm groves (total *c.*40 km^2). The majority of the date palms have traditionally not been irrigated directly, being planted in the depressions where water lies close enough below the surface for their roots to tap it (Despois 1946, 158, 161-71; Lethielleux 1948, 193-249). Other trees and field crops can only be cultivated with the aid of irrigation systems. In 1964, the population of Fazzān was 79,000 (Knapp 1977, 176: a density of one person every 8 km^2). The figures indicate clearly that this is one of the harshest desert regions in the world, where human settlement and activity is limited to a few more favoured points in the landscape.

Although geographical studies are the subject of Chapter 2, some preliminary background is required here. The modern sense of the term Fazzān covers a far larger zone than was ever the case in the past. Prior to the 19th century, Fazzān had a much more restricted meaning within the south-western part of the Libyan Sahara, but Ottoman expansionism extended the administrative scope to include Ghadāmis to the north-west and Ghāt to the south-west, whilst also making claims of suzerainty over Tibesti and other Tubu lands well to the south. The Italians gladly inherited the broader territorial definition (Wright 1989, shows how this 'greater Fazzān' approach links forward to

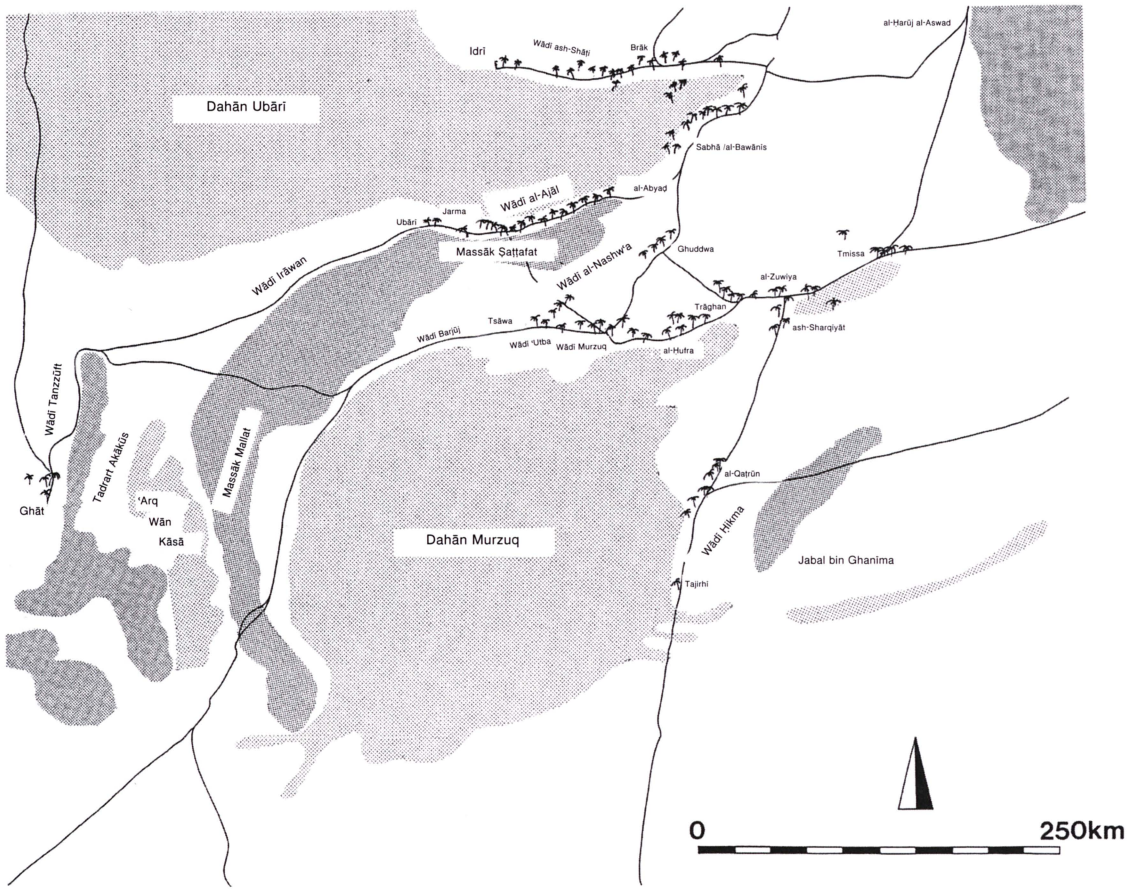

Fig. 1.2. The region of Fazzān.

the Libyan involvement in Chad in the 1980s). Human settlement in Fazzān (Fig. 1.2) has traditionally fallen into three main bands of oases between 24° and 28° latitude, aligned approximately east-west – the Wādī ash-Shāṭi in the north, the Wādī al-Ajāl (now also known as the Wādī al-Ḥayāt – but throughout these volumes referred to as the al-Ajāl) and the Wādī Barjūj/Wādī ʿUtba and the Murzuq/al-Ḥufra and ash-Sharqīyāt depressions in the south (Despois 1946, 1-12, 19-27; Lethielleux 1948, 1-8; Scarin 1934, vol. 1, 1-12; 1937, 603-44; Ward 1968). The Wādī ash-Shāṭi and Ṣabḥā/al-Bawānīs formed the northern boundary, with the Wādī Barjūj, Wādī ʿUtba, Murzuq, al-Ḥufra and ash-Sharqīyāt depressions marking the main southern limits, with the exception of the series of small oases near al-Qaṭrūn on the route leading south towards Chad and Niger (Scarin 1937b, 639-41). To the east, a series of outlying oases were generally counted as part of Fazzān – Tmissa, al-Fuqhā, Wāw al-Kabīr – though they were not of great importance to it (Ward 1968, 33-35). To the west, the oases of Ghāt and al-Barkit, Sardalas and Ghadāmis were only incorporated into Fazzān during the Turkish and Italian occupation of the country (Scarin 1937b, 641-44); though they have at times been closely linked to the region's history, they have more generally been neighbours (*Encyclopédie Berbère s.v.* Ghadāmis, Ghāt). The traditional meaning of Fazzān is thus related to a group of oases in the south-west of the country and the Fazzānī are the sedentary cultivators, as distinct from the wider-ranging nomadic groups, such as the Tuareg, Tubu and Arabs (Despois 1946, 6).

Although much of this desert is not the sand sea of popular imagination, this part of south-western Libya does contain two major blocks of sand desert, the Edeyen or

Dahān Ubārī (64,000 km^2) and the Edeyen or Dahān Murzuq (58,000 km^2) (Despois 1946, 9). The northern approaches to Fazzān are defined by mountains and planar rock desert (ḥamāda) – the al-Ḥamāda al-Ḥamrāʿ, the Jabal as-Sūda, the al-Ḥarūj al-Aswad and the al-Ḥarūj al-Abyaḍ. The two major sand seas of Fazzān are separated by the L-shaped extent of the Massāk Mallat and Massāk Ṣaṭṭafat ḥamāda. To the west of the Massāk Mallat lies the Erg or ʿArq Wān Kāsā sand sea and the north-south aligned mountains of the Tadrart Akākūs. In combination they form a considerable barrier between Fazzān and the oasis of Ghāt in the Wādī Tanzzūft valley on the western side of the Akākūs. Moving west from Ghāt one ascends into the Tāssīlī Azjar mountains of southern Algeria. To the south of Fazzān, the routes all have to cross a high rocky plateau land, which in places rises into spectacular mountain ranges, such as the Tibesti of northern Chad or the Aīr of Niger. By contrast the east side of Fazzān appears much more open, but the flattish gravel desert (*serir*) is deceptive. Due to the long waterless stretches and the dense sand seas that lie in the straight line towards al-Kufra, the direct link between the two oasis areas of the Libyan Sahara was little used until opened up in the 20th century by automotive transport. The route leading towards Egypt and the eastern desert (Fig. 1.1) has traditionally taken a north-easterly course following a line of oases via Zāla, Awjīla and Sīwa (Mattingly 2000c/d/e/f; Rebuffat 1970a/b). Only in the 19th century, after the suppression of slave trading via the Tripolitanian ports, was there a serious attempt to develop a direct trade route from Bornu and Wādāi to Egypt via al-Kufra (Wright 1989, 84-107).

Close consideration of the link between the physical geography of Fazzān and its oases centres will show that these follow depressions along the edge of the major physical features (sand seas and rocky escarpments/massifs). Here water can be found at or close beneath the surface and these depressions have produced some of the earliest evidence for the development of oases in the Central Sahara. The unusual combination of physical and hydrographic conditions makes Fazzān one of the most densely settled areas of the Sahara, comparable in significance to the southern Algerian oases of Tidikelt, Tuwāt and Jurara (Champault 1969; Gautier 1970, 192-99; *Encyclopédie Berbère s.v.* Aoulef, Gourara).

The Wādī ash-Shāṭi, running along the northern edge of the Dahān Ubārī, has been favoured by a series of active springs – the Italians recorded 277 (Scarin 1934, 15-19), though within the past 30 years many have dried up (el-Hesnawi 1990, 21-22). These springs are not 'natural' in that they are the result of human action – digging down into a pressure-driven aquifer (Despois 1946, 19-20). The ash-Shāṭī is not particularly valley-like and most of the springs are dug in a piedmont zone between the rocky slopes of the al-Ḥamāda al-Ḥamrāʿ and the sand sea. The largest springs are in the eastern part of the ash-Shāṭī around Brāk, but there are some important ones further west, notably at Idrī (which is thermal – Scarin 1934, 15). Over millennia of irrigation the soils of the valley have become quite saline and are considered less fertile than those of the al-Ajāl (Despois 1946, 25-27, 223-27; Lethielleux 1948, 43). The cultivated part of the ash-Shāṭī is *c.*150 km long and in the early 20th century supported the largest population density in Fazzān (about 40% of the total, Sahara Italiano 1937, 401-49; Scarin 1934, 19-25; 1937b, 606-16). About 20 km south into the sand sea, there is another east-west depression, where water exists at a shallow depth and this supports extensive palm groves, but no permanent human settlements. This is the Wādī Zallāf, whose dates have traditionally been worked from the villages in the Wādī ash-Shāṭi and by nomadic groups (Despois 1946, 20; Lethielleux 1948, 2-4; Scarin 1937b, 611).

The Wādī al-Ajāl is the most valley-like of the Fazzānī oasis depressions (Figs 1.2, 1.4) and defines the narrow (3-10 km wide) corridor between the southern edge of the Dahān Ubārī and the Murzuq ḥamāda, also known as the Massāk Ṣaṭṭafat (Despois 1946, 21-23; Lethielleux 1948, 4-5; Scarin 1934, 64-75; 1937b, 616-20). In the 19th

century the Wādī al-Ajāl was often referred to simply as The Valley ("al-Wādī"), a clear indication of its regional significance. The Wādī lacks perennial springs for the most part, but in the 19th century the groundwater level was remarkably high beneath parts of the valley floor (at a depth of only 1-2 m). In conjunction with some of the most fertile in soils in Fazzān, it has made the Wādī a favoured area for irrigated agriculture (Despois 1946, 220; Lethielleux 1948, 30 quotes a local saying that it is best to own palms in the ash-Shāṭī and gardens in the al-Ajāl). The eastern and western parts of the valley were often treated separately and had distinct names, al-Wādī al-Gharbī ('the Western Wadi') and al-Wādī ash-Sharqī ('the Eastern Wadi'), with the division between the two at Takarkība, where the valley narrows dramatically, or just east of that at al-Fjayj, where there is a pass through the ḥamāda towards Murzuq (Scarin 1934, 65). Jarma, the focus of the research reported on in these volumes, lay in the western sector of the Wādī, *c.*200 km south-west of Sabhā, and was at various times a regional capital. The al-Ajāl connects with the Wādī ash-Shāṭī via a difficult, but far from impractical, sand crossing from the Ubārī/Jarma area to Idrī (Bruce-Lockhart and Wright 2000, 98-116). To the west of Ubārī, which marks the western limit of modern cultivation, the plain opens up and is known as the Wādī Irāwan, though it is less valley-like in appearance here and has more the character of a broad plain. In the 19th and early 20th century, the plain was still fairly densely covered with acacia and tamarisk trees and was an important area of grazing for the nomadic Tuareg, whose territory extended to the west from here (Richardson 1848, 273; Scarin 1934, 76-80).

To the north-east of the Wādī al-Ajāl and immediately south of the extreme eastern end of the Dahān Ubārī, there is a separate group of oases, originally based around six main villages (al-Bawānīs and Sabhā), and now largely engulfed by the growth of the city of Sabhā (Despois 1946, 21; Scarin 1937b, 620-21). Sabhā is a natural communications hub, a focus for the main north-south routes, because of the presence of water; it also links easily with the settlements in the Wādī ash-Shāṭī and al-Ajāl areas, as well as the southern groups of oases.

The Wādī Barjūj and its eastern extension in the Wādī 'Utba represent the corridor between the Murzuq sand sea in the south and the piedmont slope of the southern side of the Massāk Ṣaṭṭafat. They are by comparison far less well-watered and thus less densely cultivated (Despois 1946, 23-27; Scarin 1934, 115-21). However, slightly further east, the Murzuq and al-Ḥufra depressions offer somewhat better possibilities and contain numerous small oases. The rock desert of the Massāk gives way to gravel plains on the northern side of this depression and the most direct of the trans-Saharan routes cut across that area towards Sabhā and Tripoli. The town of Murzuq is the main oasis in the Murzuq depression, and is situated close to a stagnant lake, indicating the existence of very shallow groundwater that was exploited by hundreds of wells. The al-Ḥufra depression to the east contains a number of springs, as well as shallow aquifers, though most of the oasis villages are of small size (Despois 1946, 216-17; Scarin 1937b, 626-38). Trāghan, which was at one time the capital of Fazzān, is the principal village. The ash-Sharqīyāt is the eastern continuation of the depression along the northern side of the north-eastern arm of the Murzuq sand sea. The principal site is the town of Zuwīla, capital of eastern Fazzān in the early Islamic period. Parts of the Murzuq, al-Ḥufra and ash-Sharqīyāt depressions are occupied by large and sterile salt flats (*sabkhas*).

There are a few other minor oases within Fazzān, of which the most notable is Ghuddwa, an oasis more or less mid-way between Murzuq and Sabhā (its name means 'tomorrow', on account of it taking more than a day's travel to reach Ghuddwa from Murzuq, Sabhā and Zuwīla: Lethielleux 1948, 4). As we shall see, there are various other areas where there are indications of past settlement and oasis cultivation, where no permanent settlement exists today.

As already noted, several outlying oases have at certain times been controlled from the political centre of Fazzān. These include Ghāt and Sardalas in the south-west (*Encyclopédie Berbère and Encyclopaedia of Islam s.v.* Ghāt; Scarin 1937b, 641-44) and the oases of al-Qaṭrūn and Tajirhī to the south of Murzuq (Scarin 1937b, 639-41). Ghāt lies at the southern end of the Wādī Tanzzūft, the natural corridor down the western side of the Tadrart Akākūs range. The oases of Ghāt and nearby al-Birkat are spring-fed, but lie in a region with few other water sources nearby. Sardalas, the nearest major spring, lies 100 km to the north just across the pass over the Akākūs. From Sardalas (previously known as al-ʿUwaynāt) it is a journey of six days or more to the nearest settlement of Fazzān at Ubārī (240 km). Although intimately bound to Fazzān by trade and by the Tuareg people who traversed the 'empty lands' in between, Ghāt and Sardalas have also for much of recorded history maintained a measure of independence. From Ghāt communications run south past the Aīr mountains to Niger and western Chad, west to the Tāssīlī Azjar mountains and the oasis of In Ṣalaḥ, south-west through the Ahaggar and Iforas mountains towards the Niger bend and north towards Ghadāmis. These wider connections of Ghāt are highly significant for its history and explain why it was not considered part of Fazzān until the Ottomans and Italians tried to tidy up the map by incorporating it in their territory. The al-Qaṭrūn cluster of oases in the Wādī Ḥikma has in general had a closer relation with the Fazzān proper, as the main trans-Saharan routes controlled from the oases of eastern Fazzān ran through them and on past the Tibesti mountain, homeland of the fierce and tough Tubu people. Situated on the eastern fringe of the Murzuq sand sea, the al-Qaṭrūn oases depend on shallow ground water. At al-Qaṭrūn itself, the northbound route splits, with one branch heading directly for Murzuq and the other taking a more north-easterly direction to Zuwīla.

The title of this series of reports may seem somewhat presumptuous, as the zone extends well beyond the area in which the fieldwork reported on here took place. However, by focussing in detail on the archaeology of some of the most densely occupied areas of Fazzān, we hope to present a picture of human activity and adaptation to this remarkable desert landscape that will illuminate studies of other parts of Fazzān. A core zone of Fazzān, encompassing the western part of the Wādī al-Ajāl, the Massāk Ṣaṭṭafat, Massāk Mallat and the ʿArq Wān Kāsā, is the subject of a current proposal to create a National Archaeological Park (Liverani *et al.* 2000). Thus the links between the area of Jarma and the wider region are already in the forefront of debate.

Political control of Fazzān has frequently been contested in its history. The region proved too remote for the Romans to attempt to incorporate permanently into their imperial territory. The earliest identifiable regional capital was in the al-Ajāl at Jarma, but at a later date, the Arabs based on Tripoli seem to have sought to dominate the region through control of Zuwīla, which became the capital. Later the African kingdom of Kānim controlled Fazzān and established its own capital at Trāghan. From the 15th century Murzuq emerged as the regional power base of a ruling dynasty, the Awlād Muḥammad, which periodically had to fight off attempts by the Tripoli-based Ottoman and Qaramānli powers to impose rule from the north. Murzuq has only been supplanted by Sabhā in the 20th century as capital.

In the 19th century Fazzān was reckoned to contain *c.*100 villages and 3,000 irrigated gardens (Despois 1935, 7; Lethielleux 1948, 25), with its total population being variously estimated at 26,000-70,000, though with its sedentary component unlikely to have far exceeded 30,000 at that date (Nachtigal 1974, 166-69). The first modern census by the Italians gave a total population of only 25,000 in 1931, whilst the French authorities in the 1940s gave a total of *c.*45,000 sedentary and 6,000 nomads. A persistent theme in the writings of European visitors and administrators in the 19th

Fig. 1.3. Fazzān as a 'land in decline': the ruins of Old Jarma.

and early 20th century was that Fazzān was a land in decline (Despois 1946, 11-12). As Diolé (1956, 131) put it "Everything in ruins here: ruins of the soil which no longer supports more than infinitesimal gardens, ruins of water which stagnates … ruins of enigmatic fortresses … ruins of villages … ruins of men" (Fig. 1.3).

The principal focus of the work reported on in this series of reports is the Wādī al-Ajāl, a long linear band of oases to the south-west of the modern regional capital Sabhā, and forming the middle sector of Fazzān and one of its main zones of cultivation (Fig. 1.4). By road, the study area is 1,000 km from Tripoli, a day's journey by car on tarmac roads, but in the past it represented a 20/30-day caravan journey along desert trails. The term 'wādī' as applied to the al-Ajāl is misleading for anyone familiar with the UNESCO Libyan Valleys Survey, which explored the pre-desert zone to the north of Fazzān in the 1980s (Barker *et al.* 1996a/b). There the wādīs are dry river beds, periodically flooded after seasonal rainfall, but dry for most of the year and with their beds used for cultivation by the local population. The Wādī al-Ajāl on the other hand is not an intermittent watercourse or a large erosion gully. It is simply a large valley-like feature, comprising an exposed plain of gravels, saltpan and mud flat with intermittent ribbon oasis. It is, in fact, a depression between two prominent desert features, and its importance for human settlement lies in the fact that there is a subterranean aquifer at shallow depth beneath the valley. To the north of the plain are the massive dune formations of the Dahān Ubārī (sand sea) and to the south a *c.*200-300 m high sandstone escarpment slope gives onto the planar rock desert of the Massāk Ṣaṭṭafat (see Figs 1.2, 1.5). This rock plateau slopes off to the south, towards the Wādī Barjūj and the Dahān Murzuq, and is incised by true wādīs running south and south-east.

The importance of environment and climate for the history of human settlement and adaptation cannot be overstated in a desert region. The work of the Fazzān Project (1997-2001) has been explicitly interdisciplinary, and the project's environmental specialists review in detail the geographical background in Chapter 2. Water is

arguably the key factor, whether falling as rain, standing in lakes, or obtained from subterranean aquifers by wells or springs. The Holocene period in Libya was marked by initial climatic oscillations, followed by the onset of a still-continuing phase of extreme aridity in the Sahara from *c.*3000 BC onwards. Accompanying this transition from a wetter climate to the hyper-arid one of today, there has been a progressive diminution in the level of the uppermost aquifers and springlines. The significance of this is that whilst the climate was already hyper-arid by around 3000 BC, the landscape may have been greener and more vegetated on account of the greater accessibility of groundwater reservoirs. A key element of the combined geographical and archaeological research, then, has been to assess the means by which the desert was successfully exploited over time by people adapting their strategies of water use. For the historical periods this involved sophisticated and labour intensive forms of irrigation (discussed in detail in Chapter 7).

THE GARAMANTES

> "That name does little more, actually, than designate our ignorance. It is applied to an ill-defined people, a vague territory, a mythical kingdom, an unmeasured period of time. Tombs, chariots, rock paintings – everything has become 'Garamantian', from one edge of the Sahara to the other" (Diolé 1956, 26)

The Garamantes will play a major part in our story of Fazzān's past. Research on the ancient peoples of the Sahara in Libya and neighbouring countries has been comparatively underdeveloped in comparison with the attention paid to the Mediterranean-inspired civilizations of the northern coastal regions (Punic, Greek and Roman). The

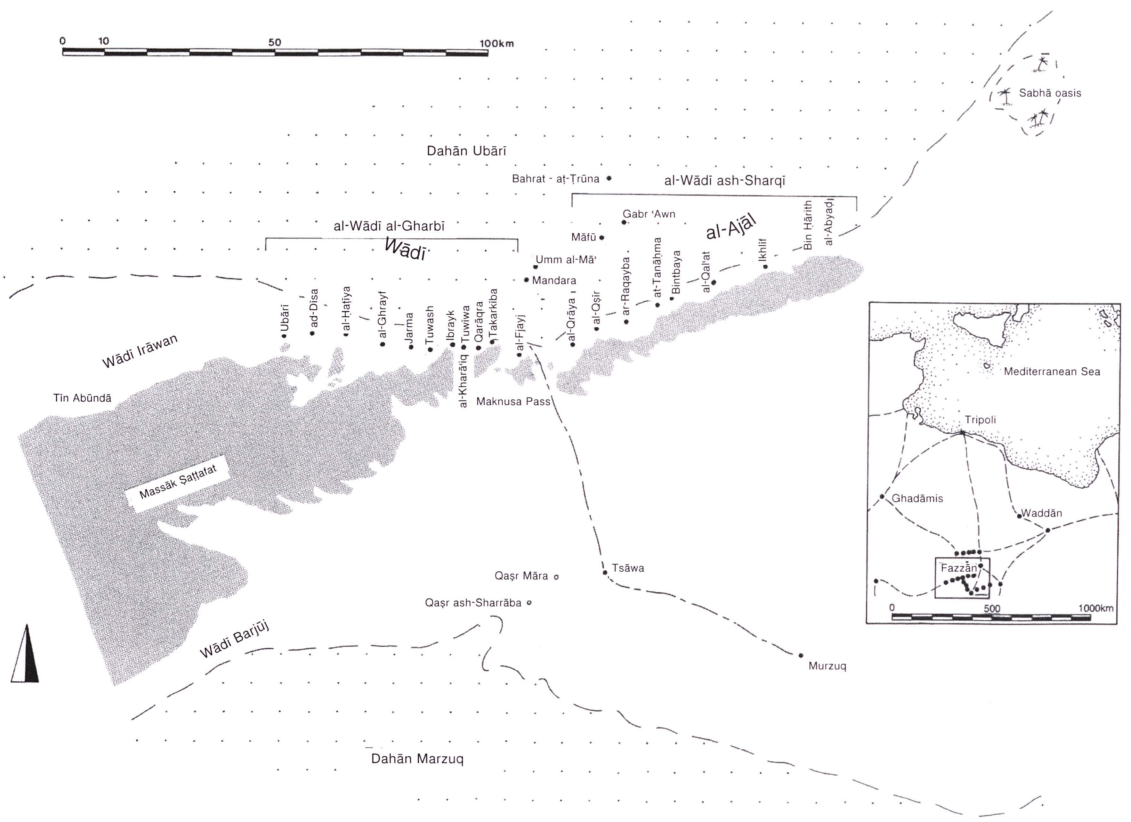

Fig. 1.4. The Wādī al-Ajāl and its principal villages.

a)

b)

c)

d)

e)

Fig. 1.5. Landscapes of Fazzān: a) Wādī al-Ajāl and Dahān Ubārī; b) northern escarpment of Massāk Ṣaṭṭafat and Wādī al-Ajāl; c) Massāk Ṣaṭṭafat and Wādī al-Ajāl seen from the southern edge of the Dahān Ubārī; d) Lake Umm al-Maa in the Dahān Ubārī; e) the Wādī ash-Shāṭī.

Garamantes, who seem to have flourished in Fazzān in the period *c.*500 BC–AD 500, have attracted a large amount of scholarly attention for a number of reasons. Firstly, there are a reasonable number of references to them in the ancient Greek and Roman sources, though these are not unproblematic as we shall see (Desanges 1962, s.v. Garamantes; *Encyclopédie Berbère, s.v.* Garamantes, 2969-71; Mattingly 1995, 26, 33-49, below Chapter 3). They feature in Herodotus' famous account of the Sahara (4.181-84), and his references to their backward-grazing cattle (because of overlong horns) caught the imagination of other ancient writers as well as modern scholars. The greatest problem posed by the combined weight of the ancient sources concerns the extent to which they present an accurate picture of the Garamantes, rather than reflecting a popular stereotype of what desert-dwellers were assumed to be like. Such literary tropes, conforming more with Greco-Roman conventions, expectations and sensibilities than with actual reality, helped sustain the Roman view that they had conquered all the land worth having around the Mediterranean and that what lay beyond was

virtually uninhabitable desert, populated by a few barbaric nomads, of whom the Garamantes were the prime example (see further, Chapter 3). Despite an early reference in Herodotus to Garamantian agriculture, the overall tenor of the sources is that the Garamantes were ungovernable, nomadic barbarians, living for the most part in tents or scattered villages of huts. As we shall see, archaeological evidence presents the Garamantes in a rather different light (Mattingly 2000a).

The Garamantes are an important exception to the general rule that we lack archaeological data on the desert peoples on the fringes of the ancient Mediterranean world, in that they were the subject of pioneering Italian research in the 1930s and in-depth investigation by Daniels (Pace *et al.* 1951; Sahara Italiano 1937; Daniels 1970a; 1971a; 1989). In recent years two syntheses have appeared in German and others in French, though largely summarising data from the sources just mentioned (Ruprechtsberger 1989; 1997; *Encyclopédie Berbère, s.v.* Fazzān, Garamantes). Such a level of detail is not achievable at present for almost any of the other tribal groups in Roman Africa. However, a surprising aspect of the initial FP work and the parallel project to bring the work of CMD to press was the realisation that the traditional picture did not do full justice to the quality and quantity of the information available (Edwards *et al.* 1999; Mattingly *et al.* 1997; 1998a/b; 1999; 2000 a/b; 2001; forthcoming a).

A further aspect of the quest to understand the significance of the Garamantes is the need first to disentangle their history and culture from a mass of modern myth-making. For example, a misinterpretation of the ancient sources led to a 19th-century hunt for 'Garamantian emeralds' (Monod 1974; 1984). In the absence of similarly detailed evidence of other ancient groups in the Sahara, the name of the Garamantes has also been used to account for, *inter alia*, the distribution of chariot scenes in Saharan rock art (Lhote 1982, esp. 117-58). There are numerous popular books on the Sahara that have contributed to this mythologizing. Wellard made a career out of dramatising such archaeological 'mysteries' and, by ignoring even the small archaeological data available at the time, he portrayed the Garamantes as shadowy and unknowable (1964, 31-35 for a good instance of his style). Toy (1964, 67) will stand for many other examples in similar vein:

> "[The] Garamantes, a wild and numerous people who swept down into Fezzan … where the Garamantes came from is not known and who were the original inhabitants of the Sahara is equally shrouded in mystery").

A fundamental aim of the series of reports on the Fazzān Project is to set the Garamantes in their spatial and chronological contexts and to delineate clearly the limits of our knowledge. The story of the Garamantes is infinitely more interesting when extended in time, both back to their distant antecedents and forward to their remote descendants.

MODERN DESERT PEOPLES: NOMADS AND SEDENTARISTS

Whilst the Fazzān is fundamentally a region of oasis cultivation – the 'Fazzānī' were defined by 19th- and 20th-century investigators as the sedentary farmers of the depressions (Despois 1946, 7) – it is also a zone of contact between sedentary farmers and three great groups of Saharan nomads (Briggs 1960 remains the classic study, see also Norris 1984). To the north, especially in the Wādī ash-Shāṭī area, are situated various Arab nomads (UNESCO 1963). These tribes had long-range relationships with the areas far to the north, near the Gulf of Surt and the pre-desert, the historical ranges of the fearsome Awlād Sulaymān (Cauneille 1963; Wright 1989, 70-78). To the west, concentrated around Ghadāmis and Ghāt and extending west and south-west into Algeria and Niger, lie the heartlands of the great Tuareg confederation (Keenan 1977; Nicolaisen and Nicolaisen 1997, Norris 1975). Often assumed to be descended

from the Garamantes (Toy 1964, 52), the Berber Tuareg have played a major part in the history of western Fazzān, with an eastern outpost at Ubārī. They were active as pastoralists and raiders along the Wādīs Irāwan, Barjūj and al-Ajāl until recent times. To the south-east, centred on the mountain fastness of Tibesti, but at times exerting influence over areas far to the south and east, are the negroid Tubu (Tebu or Teda). Less romanticised in Saharan mythology than the Tuareg, the Tubu are no less fascinating for their long-term endurance of some of the toughest inhabited landscapes (Beltrami 1997; 2000; Chapelle 1982; Cline 1950; Lewicki 1988 for the historical depth; Nachtigal 1974).

EARLY TRAVELLERS

A valuable source of information on the geography and history of Fazzān is provided by the accounts of travellers passing through this region. Most attention has focused on the early European travellers and explorers (Bruce-Lockhart and Wright 2000; Hibbert 1982; Mori 1927; Pesce 1969; Rhotert 1978), but the accounts of Muslim travellers and traders (starting with Leo Africanus, or Ḥasan bin Muḥammad al-Wazzān) are also of value (el-Hesnawi 1990, 17-21; Levtzion and Hopkins 1981). However, the Arabic sources are most useful for a reconstruction of the history and contacts of the region, but contain comparatively little detail about the topography, resources or culture of Fazzān. The intellectual curiosity of many of the European travellers, experiencing a strange culture and environment, led to the recording of a great deal of this sort of detail about Fazzān – despite the fact that the scientific goal of many of the travellers was far to the south in sub-Saharan Africa.

The first European to penetrate the Libyan desert was Frederick Hornemann, who arrived at Murzuq in 1798, having travelled along the old caravan route west from Egypt (Bovill 1964, esp. 92-111). After a prolonged stay at Murzuq and a visit north to Tripoli, he set out for the south and disappeared. His surviving accounts of Zuwīla and Murzuq are useful, along with his attempts to collect oral testimony of Fazzān's history and culture (Bovill 1964, 94-95, 98-106). He was the only European to visit Fazzān before the fall of the Awlād Muḥammad dynasty and the extension of Tripoli's control to Fazzān, which while opening up new possibilities for European access, also initiated a period of Turkish extortion and repression that may have contributed much to the well-documented poverty of the region in the 19th century (see below, Chapter 3).

In 1818 a British mission pioneered a north-south route starting from Tripoli and aiming to reach central Africa, but had its progress blocked at Murzuq. Ritchie (who died at Murzuq) and Lyon, who lived to tell the tale (Lyon 1821), were the first of a series of explorers sent out by the extraordinary John Barrow, second Secretary at the Admiralty (Denham and Clapperton 1966, 3-122; Fleming 1998, 1-12, 92-106, 177-214), with the vague and untenable goal of proving his pet theory that the Niger flowed into the Nile. Barrow was encouraged and supported in his ventures by the equally remarkable British Consul, Col. Hanmer Hansen Warrington. As well as providing important details about Murzuq (Lyon 1821, 89-100), Lyon also described Zuwīla and its antiquities (1821, 213-17).

In 1821-22, the expedition of Oudney, Denham and Clapperton succeeded in making the southerly crossing of the Sahara to Lake Chad, despite major personality clashes in the small group (Denham and Clapperton 1966, 8-75) and after considerable hold-ups at Murzuq. Oudney and Clapperton made use of these delays to explore a good deal of Fazzān. Their reports on the state of the country and descriptions of Murzuq, Ghāt, Zuwīla, Trāghan and Idrī are particularly valuable (Oudney's account published in Denham and Clapperton 1826/1966 is now supplemented by additional details in the recently discovered diary of Clapperton, published by Bruce-Lockhart

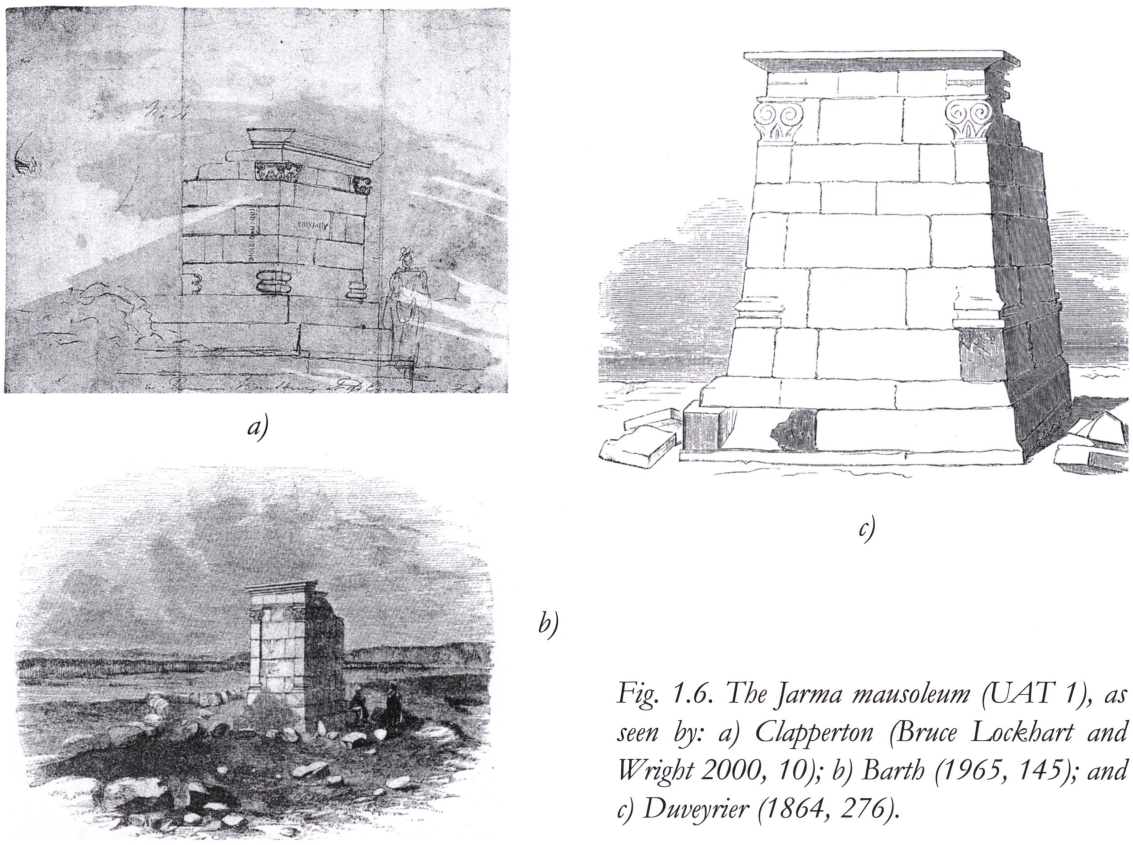

Fig. 1.6. The Jarma mausoleum (UAT 1), as seen by: a) Clapperton (Bruce Lockhart and Wright 2000, 10); b) Barth (1965, 145); and c) Duveyrier (1864, 276).

and Wright 2000). Their time in Murzuq itself was fairly miserable, all of them being ravaged by malaria, but there was the excitement of a threatened attack on the town by a Fazzānī rebel (Bruce-Lockhart and Wright 2000, 167-83; Denham and Clapperton 1966, 277-86). To east of Murzuq they visited the al-Ḥufra and ash-Sharqīyāt areas – around the ancient capitals of Trāghan and Zuwīla respectively (Bruce-Lockhart and Wright 2000, 49-65) and to the west in the al-Wādī al-Gharbī, the Dahān Ubārī, Idrī on the Wādī ash-Shāṭī and Ghāt (Bruce-Lockhart and Wright 2000, 79-165; Denham and Clapperton 1966, 168-93). The description of the western Wādī al-Ajāl is of especial interest (Bruce-Lockhart and Wright 2000, 79-96; Denham and Clapperton 1966, 169-77, 185-86). Oudney and Clapperton provide us with the first descriptions and illustration (Fig. 1.6) of the Roman-style mausoleum ("an altar or a place where a Statue has stood") a few kilometres south-west of Jarma (Bruce-Lockhart and Wright 2000, 87-88; Denham and Clapperton 1966, 172-73). Clapperton's comments on the inhabitants of Jarma and their lifestyle blend astute observation and prejudice (Fig. 1.7):

> "The soil appears much better here than in most parts of Fezzan consisting of a black mould … The town is surrounded by a high wall of mud and flanking towers and there is the remains of a wet ditch which surrounded the town now nearly dried up – the castle is inside the walls but now serves to keep the Sultan's dates in only and a very poor place it is for that – The inhabitants are miserably poor in appearance and the houses are most all in ruins – The waters in most of the wells are sweet and good and we have in various places in Fezzan found wells of excellent water within a few feet of a salt Marshes … Germa is considered by the people of the country as more sickly than any other and indeed it has the appearance of it but the people of the Wady are as drunken a set as are to be met with in any part of the world" (Bruce-Lockhart and Wright 2000, 89-90).

Fig. 1.7. The Jarma kasba (GER 1.65) served only as a date store by the 19th century.

The 1825-26 expedition of Alexander Gordon Laing is famous in equal measure for his folly, his near-indestructability on his epic journey to Timbuktū and the loss of his papers after he was finally killed near Timbuktū (Bovill 1964, 123-385; Fleming 1998, 201-14). Before that he had survived one night attack by Tuareg warriors that left him with:

> "twenty four [wounds], eighteen of which are exceedingly severe … five sabre cuts on the crown of the head and three on the left temple, all fractures from which much bone has come away; one on my left cheek which fractured the jaw bone and has divided the ear, forming a very unsightly wound; one over the right temple and a dreadful gash at the back of my neck … a musket ball in my hip, which made its way through my back, slightly grazing the backbone, five sabre cuts on my right arm and hand, three of the fingers broken, the hand cut three fourths across, and the wrist bones cut through; three cuts on the left arm, the bone of which has been broken but is again uniting; one slight wound on the right leg and two with one dreadful gash on the left, to say nothing of a cut across the fingers of my left hand now healed up" (Bovill 1964, 302).

It is hard to conceive of a more graphic illustration of the dangers of Saharan travel in the 19th century, though sickness (and malaria in particular) were much more commonplace causes of death. The major part of Laing's surviving letters relate to his circuitous journey to Ghadāmis, via northern Fazzān, his stay in Ghadāmis and his journey on towards In Ṣalaḥ and Timbuktū. However, he was a less astute observer of the countryside he passed through and the value of his information is correspondingly far less.

James Richardson was the next British traveller, spending time in Ghadāmis, Ghāt and Murzuq in 1845-46 and writing an overblown two-volume diatribe, mainly directed at the evils of the slave trade (Richardson 1848). Nonetheless there is important information about the Saharan towns he stayed in and occasional important insights

into the landscapes he travelled through. His account of the Wādī al-Ajāl is quite useful (Richardson 1848, vol 2.287-301). For instance, he was the first to mention the irrigation channels (foggaras) and ancient tombs of the Wādī al-Ajāl,

> "what [were] called 'water course of the Christians', ancient irrigation ducts of the people of ancient times. These consisted of raised banks of earth, stretching across the road to the mountains on the right. Along these lines of embakment were large fields of cultivation, showing the country had declined in its agricultural industry ... what he [Omar] styled 'tombs of the Christians' on the sides of the mountains, scattered miles along, showing the Desert to have been cultivated to a far greater extent in past times" (Richardson 1848, 2.289, with other references to tombs of Christians on 291, 298-99)

The German explorer Heinrich Barth was selected by the British government to accompany Richardson on his return trip to Africa in 1849, but when Richardson and his other companion Overweg died in Central Africa, Barth struggled on alone, proving an astute (and intensely competitive) observer (Barth 1857/1858; 1965; cf. Schiffers 1978 on his route). His eagerness to outdo his predecessors led him, amongst other things, to emulate Richardson in getting lost (and nearly meeting his death) on the ill-favoured peak known as Idinen or 'Palace of the Jinns' north of Ghāt (Fig. 1.8, Barth 1965, 186-92). Following in the footsteps of Clapperton and Richardson, Barth revisited Idrī, Ghāt and the Wādī al-Ajāl and provided important additional information (Barth 1965, 142-48, 145-46 for his description and illustration of the mausoleum, 174-80 for his description of the 'Wadi Telisaghe' rock art). Like Nachtigal and Duveyrier later, Barth stands out for his incredible breadth of knowledge and curiosity, and his work is one of the most important contributions to knowledge of Fazzān in the 19th century. Richardson's journals from this expedition were also published posthumously (Richardson 1853), but add little to knowledge of conditions in Fazzān.

Fig. 1.8. The mountain Idinen (of the Jinns) in the Wādī Tanzzūft north of Ghāt almost proved the downfall of at least two sceptical European travelers.

The Frenchman Henri Duveyrier was only nineteen when he set off on a remarkable three-year journey (1859-61) in the Algerian and Libyan Sahara. The enduring account of his discoveries, published before he was 25 years old, includes various observations on Ghāt, Murzuq and the Wādī al-Ajāl (Duveyrier 1864, 67-68, 266-84). His premature death a few years later precluded publication of additional detail of his journeys into Fazzān. He developed a theory that the Garamantian kingdom based on Jarma was a negro culture and attributed to it a wide range of ancient monuments he had seen in the Algerian and Libyan Sahara, including tombs at Ghadāmis and the Wādī al-Ajāl, foggaras, mudbrick castles (*qṣur*) and some of the recorded Saharan rock art (1864, 275-79). He noted the mausoleum near Jarma (1864, 276, with plate XIV). Several of the other sites mentioned can be equated with monuments recorded by the current project (Fig. 1.9): his 'Qecir el-Watwat' is our GER 4, the cemetery of Quecirat er-Roum is almost certainly ELH 2 (the main pyramid cemetery at al-Ḥaṭīya), the large necropolis between Qarāqra and al-Kharāʿiq is CHA 1 (the al-Kharāʿiq pyramid cemetery) (1864, 279 and Pl XV, figs 1-2). Duveyrier provides the key to understanding a series of references to a site referred to as 'Old Jarma' by the early travellers, but which is plainly not the same as the site known by that name in more recent times (it is in fact GER 4, then known as 'Qaṣr Waṭwāt').

Gustav Nachtigal was another influential observer of eastern Fazzān, passing through Murzuq and following the caravan route south to Central Africa in 1869 (Nachtigal 1879; 1974). Although he did not visit the western districts, he is particularly important for his meticulous collection of oral history bearing on the early modern period of Awlād Muḥammad domination (Nachtigal 1974, 144-80). He also

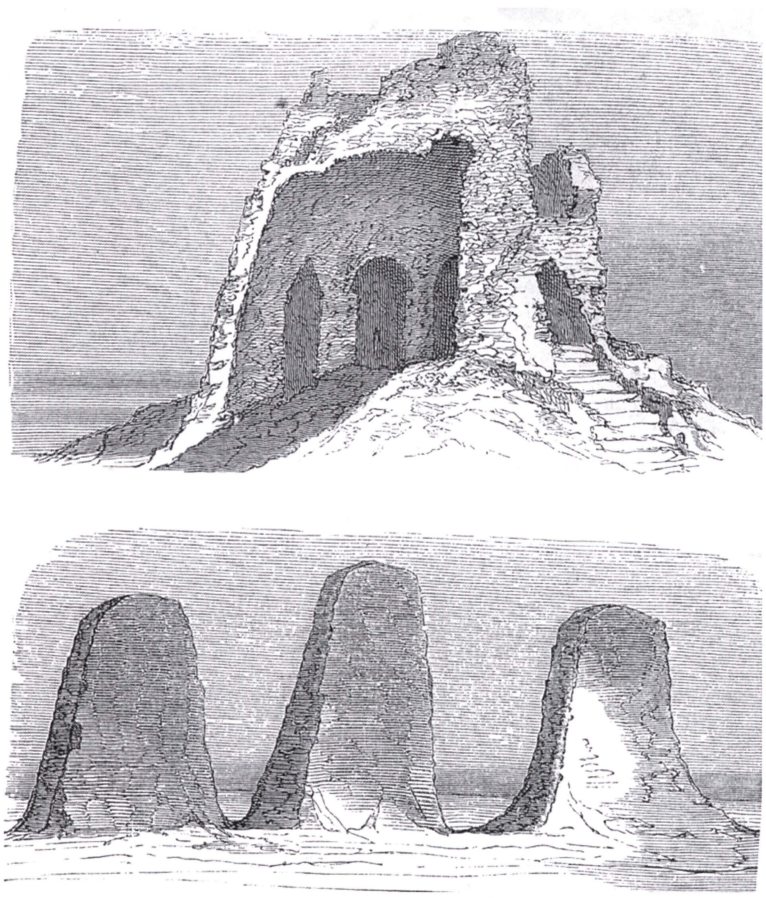

Fig. 1.9. Duveyrier's illustrations of a) Qaṣr Waṭwāt (GER 4); b) the al-Ḥaṭīya pyramids (ELH 2) (1864, 279).

provided a detailed and perceptive account of Murzuq and its people (1974, 72-102), of southern Fazzān (1974, 191-220), of the natural conditions in Fazzān (1974, 103-24), and of its climate and diseases (1974, 124-43). He was also the first traveller to explore the Tibesti region, inhabited by the fierce Tubu people (1974, 191-433; cf. also 1980, 453-80). Nachtigal was something of a polymath and altogether this is an impressive dossier of information. It is only to be regretted that in order to conserve his limited resources he did not travel more widely within Fazzān itself.

Whilst in Fazzān, Nachtigal encountered an intrepid female traveller, Alexine Tinné. She suffered the usual delays and illnesses at Murzuq, before visiting the western Wādī al-Ajāl and then being attacked and murdered by Tuareg in the Wādī Barjūj, while on her way to Ghāt (Gladstone 1970, 198-221). A compatriot of Nachtigal, Dr Gerhard Rohlfs, made a number of journeys of exploration in the Libya desert in the 1860s (Rohlfs 1874/1875, esp. vol 1, 136-42). He, too, passed through Murzuq where he obtained an important manuscript bearing on the region's history (el-Hesnawi 1990, 13).

In addition, a number of other 19th and early 20th travellers passed through Fazzān, recording brief observations. One of the most remarkable of these was Hanns Vischer, almost certainly the last explorer to travel from Tripoli to Niger on camel back (Vischer 1910). Other Saharan travellers who visited neighbouring territories to Fazzān provide valuable comparative data (for example, Pacho 1827).

Following the Italian defeat of the Ottoman Turks in 1911 and their subsequent invasion of Fazzān in 1913, the desert was opened up for motorised transport. However, the Italians were severely defeated by a major rebellion in Fazzān in 1914 (Petragnarni 1928 is the account of an officer held captive in Fazzān for several years, but contains a number of distortions or unverifiable statements). The Italians did not subsequently reoccupy the region until 1930, when the main phase of Italian geographical and archaeological research began.

PREVIOUS ARCHAEOLOGICAL AND GEOGRAPHICAL WORK

As noted in the previous section, the early travellers in the region had recorded a number of features of some antiquity. These included ruined castles (*qṣur*) and villages, still occupied towns and villages of evident antiquity, underground irrigation canals (foggaras), numerous tombs and burials (often associated by the modern Fazzānī population with 'Christians' or 'Rūm' (Romans). Barth saw the mausoleum at Jarma as "the southernmost relic of the Roman dominion" (1965, 145), whilst Duveyrier was the first to make an explicit connection between the remains around Jarma and the Garamantes, though his theory of a black Garamantian kingdom extending across a large part of the Algerian and south-western Libyan Sahara was highly speculative given the available evidence.

Knowledge of Fazzān was dramatically transformed by the Italian and French scientific expeditions of the 1930s and 1940s (Fig. 1.10). They were part of a wider pattern of scientific missions sent out by both colonial powers to the Sahara (Aroca 1942; Capot-Rey 1953; Charbonneau 1955; Desio 1935; 1942; Scarin 1937c). This was in reality an exercise in colonial power through knowledge (Atkinson 1996) – it entailed detailed survey of every aspect of life in Fazzān, from water sources, land and water rights, a population and ethnic census, and information on agricultural production (Sahara Italiano 1937; Siciliani *et al.* 1932; Lethielleux 1948). Alongside the geographical specialists, the Italian government sent a team of three archaeologists (Giacomo Caputo, Biagio Pace and Sergio Sergi), who in a brief visit of just over three months in the winter of 1933-34 conducted a ground-breaking survey and selective excavation in the Wādī al-Ajāl. Their itinerary can be reconstructed in some detail from the published accounts of the work (Pace *et al.* 1951, 154).

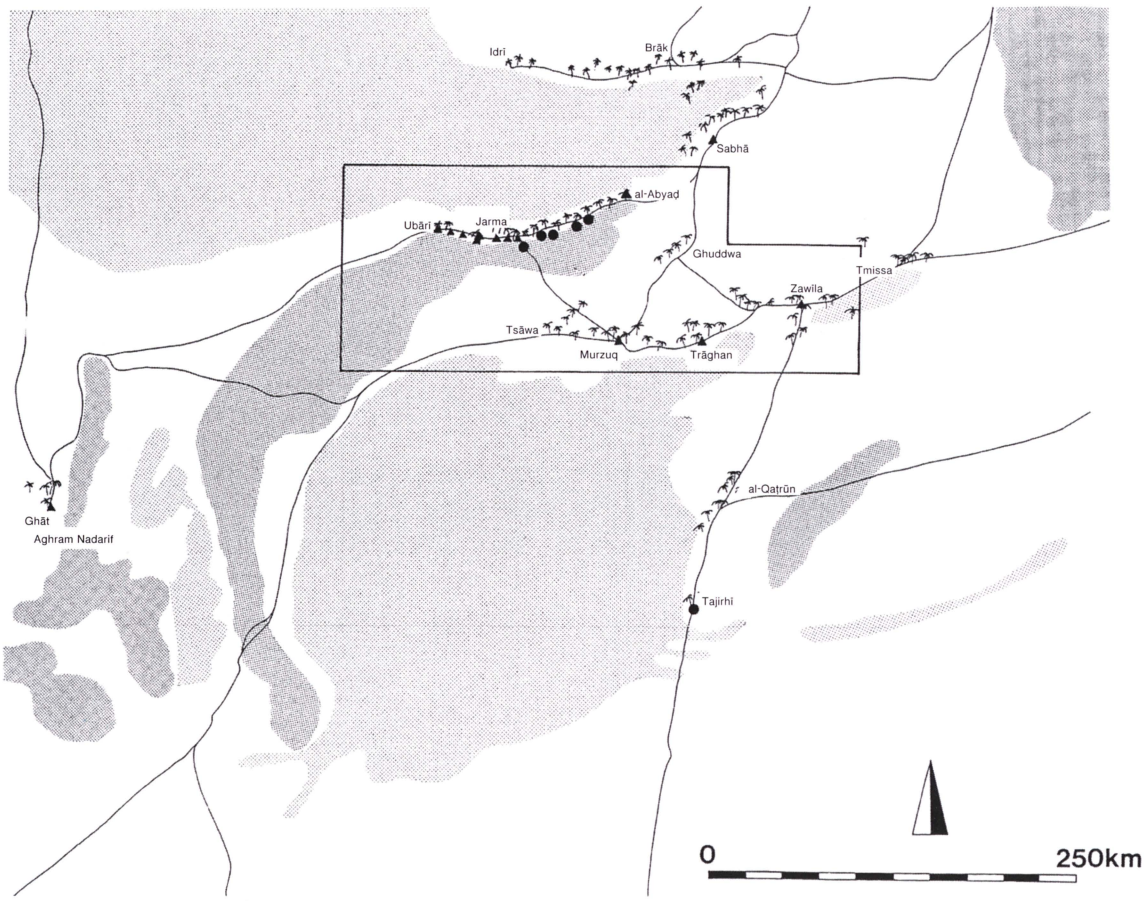

Fig. 1.10. Map of Fazzān, showing locations visited by Italian (triangles) and French (circles) colonial expeditions. The boxed area shows the main area of work of CMD and the FP.

Pace and Caputo arrived at Sabhā 10th October 1933, then made visits to Murzuq (11th October), Trāghan (12th October), Zuwīla (13th October), before returning to Sabhā (14th October). Since much of the day will have been spent travelling between these places, it is clear that the time available for detailed observation at each place was limited. They then travelled to Ubārī (15th October) and commenced excavations at Jarma and in its environs (16th October) and a survey of the entire Wādī al-Ajāl (second half of October, November and December 1933). Pace departed at the end of November, being replaced by the human anthropologist Sergi. Having excavated *c.*100 tombs in the al-Ajāl, Caputo and Sergi travelled to Ghāt on 2nd January 1934, where they excavated for 6 days), setting out on the return journey on 9th January, reaching Tripoli via Brāk and Mizda on 16th January 1934. One of the most remarkable aspects of the work was the 'census' of tombs along the Wādī al-Ajāl escarpment, made by the *mudīr* of the al-Ajāl (Assenben Amor Arab). This yielded the much-quoted figure of 60,000 tombs (Caputo 1951, 212), though even at the time there were doubts about the accuracy of the figures and parts of the survey were redone. Later work has suggested it was a serious underestimate (Daniels 1989, 49). Pace took responsibility for commentating on the historical sources, Caputo for the archaeological results of the campaign, and Sergi for the analysis of the skeletal remains and comment on the ethnic identity of the Garamantes. By the standards of the time, the results were published in a fair level of detail (Caputo 1937; 1949; 1951; Pace 1935; 1937; 1951; Sergi 1951).

Within the Wādī al-Ajāl, Caputo identified:

- 60,000 tombs, many believed by him to date to the Garamantian period of dominance within the wādī (Caputo 1951, 211-12);
- the remains of numerous abandoned subterranean irrigation canals (foggaras) (1951, 213-18);
- a possible ancient *qaṣr*, with stone footings, at Lārkū (1951, 218-220);

He also excavated:

- a stone-footed building of probable Garamantian date at Old Jarma, demonstrating the ancient origins of the mudbrick caravan city and leading to the forcible relocation of the last remaining inhabitants (1951, 240);
- a number of rectangular mudbrick buildings (his so-called 'villas') and an ashlar terrace wall on the southern side of Zinkekrā hill, where he recognised the existence of a Garamantian defended settlement (1951, 220-239);
- cemeteries around and near the Waṭwāt mausoleum (which the Italians reconstructed) and along the escarpment to the monumental cemeteries directly south of Jarma (1951, 252-360) ;
- burials in a series of cemeteries to the east of Jarma, including one at the extreme eastern end of the Wādī at al-Abyaḍ, and others close to al-Qrāya, Takarkība, al-Kharāʿiq, Tawīwa, and al-Fūgār (1951, 360-81);
- burials in cemeteries to the west of Jarma – Tāqallit and ad-Dīsa (1951, 381-84);
- burials in cemeteries near Tīn Abūndā in the Wādī Irāwan, to the south-west of Ubārī on the route to Ghāt (1951, 384-86);
- burials in the Quqamān cemetery near Ghāt (1951, 386-91)

The wider reconnaissance work included brief notes on the defences and stone tombs of Zuwīla (1951, 416-19).

The material culture of the Garamantes included numerous imports from the Mediterranean area (Caputo 1951). Combined with Pace's review of the ancient sources and Sergi's revelations about the racial mix suggested by the skeletal evidence, the Garamantes were for the first time delineated. Given the colonial context of the work, the interpretation of their significance was very much from a Roman perspective (Caputo 1937, 314 refers to the 'Sahara romanizzato'). However, the importance of all this work cannot be overstated and it was quickly seized on by other scholars (Camps 1955a; Dart 1952; Wheeler 1954; Weiss 1964).

In parallel with the work on the Garamantes, Graziosi had undertaken pioneering studies of the rock art during the 1930s, leading to a number of major studies (Graziosi 1937; 1942; 1962). But an equal impact was made by the great German pioneer of rock art studies, Frobenius, whose work remains one of the classic studies (1937).

In the latter stages of the Second World War, France took control of Fazzān and, like the Italians before them, sent scientific expeditions there to establish their credentials as potential post-war governors (Bellair *et al.* 1953; Capot-Rey 1947; Despois 1946; Lethieulleux 1948). From an archaeological perspective the results achieved added comparatively meagre details to the picture laid down by the Italians. Pauphillet (as part of Bellair's 1949 mission) excavated a number of tombs, both in the Wādī al-Ajāl and in the most southerly oasis of Fazzān at Tajirhī (Bellair *et al.* 1953, 71-98; Bellair and Pauphillet 1959). He also recorded one of the major complexes of rock art in the Wādī al-Ajāl in the Maknūsa corridor leading south towards Murzuq from the valley (Pauphillet 1953). However, the speculations of both Despois and Letheilleux concerning the possible date of the many ruined villages and fortifications in the Wādī al-Ajāl simply pointed up the need for further archaeological research (Despois 1946,

57-63; Lethielleux 1948, 13 (n. 28), 48-51). In other respects the work of Despois and Lethielleux far excelled the geographical studies carried out by the Italians and remain key studies of traditional agriculture and society in Fazzān. Both these scholars were Saharan specialists and their insights into the region, its people, its potential and its problems have lasting value. The geographical studies carried out by the Italians retain considerable value, especially for the statistical data that they collected, though it is clear that not all the personnel involved had prior experience of either North Africa in general or the Sahara in particular.

One of the first Controllers of Antiquities in Fazzān after Libya's independence in 1951 was the Sudanese archaeologist, Mohammed S. Ayoub. In 1961, encouraged by the British scholars Ian Richmond (who visited Fazzān in 1963 and 1965), and Charles Daniels (who made his first visit in 1958), he started a series of excavations on Garamantian sites in the Jarma area, targeting a series of important complexes:

- the cemetery to the south of Jarma with the largest tombs (which he referred to as the Royal Cemetery) – between 1961-63 he excavated eight tombs here (with the work being complemented by CMD's investigations in 1963 and 1965, see below) (Ayoub 1967a/b);
- the town of Old Jarma, where he conducted very extensive excavations between 1962-1967, first demolishing the standing buildings of the site's later phases (including the two major mosques). These were primarily clearance operations, involving up to 40 workmen, and they revealed a series of stone-footed buildings of Garamantian date, providing a hitherto unsuspected picture of the sophisticated urban character of the Garamantian capital (Ayoub 1962a/b; 1967a; no date);
- the oasis centre cemetery site of Sāniat bin Huwaydī, where he excavated a group of six rich burials in 1963 (1967a; 1968a/b/c);
- the site of Sāniat Jibrīl, where he suspected that he had found evidence of pottery production in a trial trench, though CMD's subsequent excavations proved this to be incorrect.
- a *qaṣr* near al-Ghrayf, where some trial trenches only were cut (1962a).

Ayoub's work is significant for a number of reasons, despite the fact that the excavations were not conducted to modern stratigraphic standards, were never fully published and leave many unanswered questions. In the first place, he was able to reveal something of the character of the Garamantian capital at Jarma. Although this was described in the Roman sources as a *metropolis*, the impressive character of the stone-footed buildings he uncovered came as a surprise to many observers (Fig. 1.11).

Fig. 1.11. View of ashlar building (GER 1.1) excavated by Ayoub in the centre of Old Jarma.

The incorporation of architectural motifs and masonry styles borrowed from the Mediterranean tradition (Ionic and Corinthian columns, engaged pilasters, ashlar-quality blockwork) is a noteworthy feature and makes the 'Roman' appearance of the mausoleum noted by the early travellers less of an anomaly (if the urban buildings were for the use of the Garamantes, why not the tomb also?). The finds within these buildings were also quite rich, including elements of statuary and fragments of gold and ivory. He was also lucky in his selection of tombs to excavate, unearthing several unrobbed tombs with rich assemblages of imported Roman goods from the Mediterranean (notably amphorae, Italian sigillata, glass and faience: Ayoub and Abdel-Salaam 1968; Ayoub and el-Kilani 1968a/b; el-Kilani 1968). Above all, Ayoub endeavoured to place the Garamantes in their historical context and to increase public awareness of the Garamantian heritage in the Wādī al-Ajāl (some of the notices erected on Garamantian sites during his period of office can still be seen). Working in conjunction with CMD (who helped secure dating evidence for some of his excavations), Ayoub was able to add significantly to the picture provided by the Italian work of the 1930s.

From the 1960s onwards, the German archaeologist Helmut Ziegert has been carrying out wide-ranging fieldwork in southern Libya, including survey and excavation at sites of many periods, from Palaeolithic to Islamic. Although much of his work remains unpublished, he did carry out a useful survey of rock art around Zinkekrā hill (Ziegert 1969) and excavations at the Islamic *qaṣr* of Būdrinna (1985). Most recently he has published preliminary accounts of his examination of ancient lake shorelines in the Jarma area (1995; 2000). He has also excavated a number of Garamantian burials near Būdrinna and at the Sāniat bin Huwaydī cemetery, cut some deep soundings at Old Jarma and in 1998 made some trial trenches at the suspected Garamantian settlement of Idrī (ancient Dedris) in the Wādī ash-Shāṭi.

Prehistoric research in Fazzān has been dominated by a series of Italian teams, who have recorded rock art and excavated shelter/cave sites in the Tadrart Akākūs (Barich 1987; Mori 1960; 1967; 1969; 1998). Mori's University of Rome mission has continued since his retirement, but has increasingly focused on broad settlement and environmental survey, complementing the earlier emphasis on rock-art (Azebi *et al.* 2000; Cremaschi and Di Lernia 1998a; Di Lernia 1999a; Di Lernia *et al.* 2001). Of particular note are their excavations in the shelters/caves of Wān Aṭābū, Wān Afūda, Wān Muhūjjāj and Wān Talīkīt, which now provide a well-dated regional cultural and palaeoeconomic sequence, spanning the transition to pastoralism and the final onset of arid conditions and desertification. The range of scientific analyses employed, the number of radiocarbon dates obtained and the overall scale and quality of the archaeological data obtained make their work the most significant contribution to our understanding of the Holocene sequence in southern Libya. As an adjunct to their work, Mario Liverani has explored an important series of Garamantian sites in the Ghāt area, notably the 'fort' of Aghram Nadarif where excavations have been carried out (Liverani 1999; 2000a/b/c/d).

The rock-art of Fazzān has continued since Graziosi's time to attract a great deal of interest, both of organised teams, as with Mori, or of solo researchers (some strictly amateur, others highly systematic). The key distinction to be made is the occurrence of both painted and engraved scenes in the Tadrart Akākūs (Mori 1998 for the most recent summary account), whilst the Massāk Mallat and Massāk Ṣaṭṭafat contain large numbers of engraved images (van Albada and van Albada 2000; Lutz and Lutz 1995a) (Figs 1.12-13). Le Quellec has carried out pioneering research in the Wādī ash-Shāṭi, indicating that that area contained a large number of engraved scenes similar to those of the two Massāks (1987; 1993). The rock-art literature is reviewed in Chapter 8, but it should be noted here that to date the research has too often been disassociated from

Fig. 1.12. Example of painted rock-art: hunting scene from In Ahad, Wādī Tishūnīt in the Tadrart Akākūs.

Fig. 1.13. Large engraved elephant from Wādi Matkhandūsh.

investigation of the archaeological and physical landscape in which it is set. It is also true that much attention has been directed at constructing a scheme of stylistic dating, though there is no consensus even now that this is a secure basis. The emphasis on style has been at the expense of content and there has been a lack of sophisticated analysis of the possible meaning of the images (or the contexts of its creation within the society). What is clear is that there has been a long tradition of carving images on the rocks of the desert, perhaps from as early as 9000 BP and certainly continuing up to quite recent times.

FIELDWORK OF C. M. DANIELS 1958-1977

Daniels introduced a systematic approach to recording sites in Fazzān, based on three-letter codes (derived from placenames) and numerals. Thus GER 1 is Old Jarma town and GER 2 is Sāniat Jibriīl. This system has been adopted and expanded in the work of the FP (in total, there are 29 separate sub-zones of the Wādī al-Ajāl and 10 additional areas linked to exploratory work elsewhere in Fazzān). Throughout these reports sites will be referred to by their unique site codes (see, for example, the table below). The general location and the expanded toponym for each three-letter code are shown on Figure 1.14. Gazetteer entries for each site appear in volume 2.

When Charles Daniels visited Fazzān for the first time in the company of Olwen Brogan and David Smith in the winter of 1958, it was the start of a long association with the area and with the Garamantes (Table 1.1). He made further reconnaissance visits in 1959 and 1963, before launching a larger scale research project in 1965. That

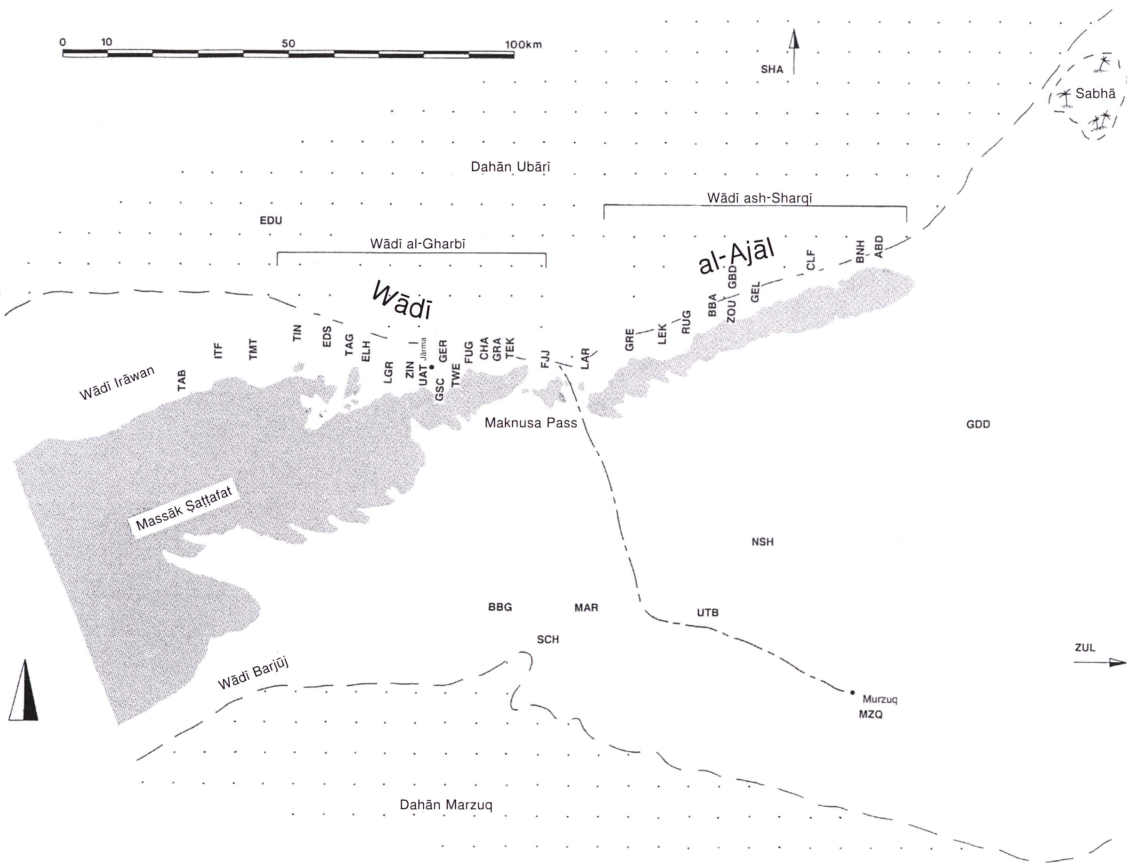

Fig. 1.14. Map of central Fazzān showing three-letter codes used in compiling the site gazetteer. Key:

ABD = al-Abyaḍ
BBA = Bintbaya
BBG = Biʾr Baqqārā
BNH = Bin Ḥārith
CHA = al-Kharāʿiq
CLF = Ikhlīf
EDS = ad-Dīsa
EDU = Dahān Ubārī
ELH = al-Ḥaṭīya
FJJ = al-Fjayj
FUG = al-Fūgār
GBD = Qaṣr bin Dughba
GDD = Ghuddwa
GEL = al-Qalʿat
GER = Jarma
GRA = Qarāqra
GRE = al-Qrāya
GSC = Jarma escarpment
ITF = In Ṭafarāt
LAR = Lārkū
LEK = al-Qṣīr
LGR = al-Ghrayf
MAR = Qaṣr Māra
MZQ = Murzuq
NSH = Wādī al-Nashwʿa
RUG = ar-Raqayba
SCH = Qaṣr ash-Sharrāba
SHA = Wādī ash-Shāṭī
TAB = Tīn Abūndā
TAG = Tāqallit
TEK = Takarkība
TIN = Tinda
TMT = Tāmalālat
TWE = Tuwash
UAT = Waṭwāt
UTB = Wādī ʿUtba
ZIN = Zinkekrā
ZOU = al-Zuwīya
ZUL = Zuwīla

Year	Nature of work	Location
1958	Reconnaissance survey with Olwen Brogan and David Smith	Wādī al-Ajāl
1959	Reconnaissance survey with Olwen Brogan and David Smith	Wādī al-Ajāl – Qaṣr Lārkū [LAR 1], al-Ḥaṭīya [ELH 1-2]
1962/ 1963	Reconnaissance survey with Ian Richmond	Wādī al-Ajāl, al-Ḥaṭīya [ELH 1-2] (S), Waṭwāt [UAT 1], Tuwash [TWE 1] and Fūgār mausolea [FUG 1] (S), Jarma [GER 1] (S), sites in eastern Wādī [GBD 1]
1965	Excavation and survey	Zinkekrā [ZIN 1-3] and Jarma [GER 1] (E&S), Sāniat Jibrīl (E), cemeteries near al-Fjayj [FJJ 2-7] (S) and Zinkekrā-Waṭwāt [ZIN – UAT area (S), Waṭwāt, [UAT 1], Tuwash [TWE 1] and Fūgār [FUG 1] mausolea (S&E), Tinda [TIN 1] (S), Ikhlīf [CLF 1-2] (S) and other sites in eastern Wādī (S)
1967	Excavation and survey	Zinkekrā [ZIN 1-3] (E&S), Waṭwāt-Royal Cemetery [UAT-GSC area] (S)
1968	Reconnaissance survey	Wādī Barjūj (Qaṣr Māra [MAR], Qaṣr ash-Sharrāba [SCH]), Wādī al-Nashwʿa (Ghuddwa [GDD]), Murzuq and Zuwīla (S)
1969	Excavation and survey	Jarma [GER 1] (E&S), Zinkekrā [ZIN 1-3] (E&S), Sāniat Jibrīl [GER 2] (S)
1971	Excavation and survey	Sāniat Jibrīl [GER 2] (E), Qaṣr Lārkū [LAR 1] (S), al-Qṣūr [LEK 001] (S), Tuwash [TWE 21] and Ikhlīf [CLF 10] (S)
1973	Excavation and survey	Sāniat Jibrīl [GER 2] (E&S), Sāniat bin Huwaydī [GER 11] (E), Ikhlīf [CLF 10] (E&S), Tinda [TIN 1] (E&S), al-Kharāʿiq [CHA 3-6] (E&S). sites in eastern Wādī [GBD 1, GEL 2, etc.]
1977	Excavation and survey	Sāniat bin Huwaydī [GER 11] (E), Sāniat Sulaymān Krayda [GER 27] (E&S)

Table 1.1. The archaeological work carried out by C.M. Daniels in Fazzān. The 3-letter codes and numbers in square brackets refer to gazetteer entries in Archaeology of Fazzān *2. E = Excavation; S = Survey.*

Fig. 1.15. General view of the Zinkekrā escarpment settlement (ZIN 1), looking north-east towards Jarma and the salt flats on the northern side of the Wādī al-Ajāl.

project completed seven seasons of fieldwork before it came to a close in 1977, yielding a mass of new data. In a short book and a series of important interim reports and summary articles, CMD established a new conception of the Garamantes (Daniels 1968, 1969, 1970a/b, 1971a/b, 1973, 1975, 1977, 1989). The main achievements of his work can be summarised briefly. The Italians had noted the Garamantian structures on the rocky promontory of Zinkekrā. It was CMD who conducted a detailed survey here, backed up by excavation, to show that the origins of the sites lay in a late Pastoral village (early 1st millennium BC) on the top, with progressive expansion of living areas down the precipitous slopes (Fig. 1.15). His excavations revealed that the peak period of the site was 900-500 BC, with some evidence for later habitations (mostly on the south side) and cemeteries. Similar hill forts or escarpment sites were located at other points in the Wādī al-Ajāl (indicating that the early Garamantes were widely distributed within the Wadi) (Fig. 1.16). What was less clear was where the later Garamantian

Fig. 1.16. CMD topographic survey of the Garamantian hillfort site of Ikhlīf (CLF 8-10).

Fig. 1.17. General view of Sāniat bin Huwaydī (1977).

settlements were located, though Ayoub's work had demonstrated that there was a large regional centre at Old Jarma. CMD was able to identify a few smaller oasis settlements (for example, Sāniat Jibrīl and Sāniat Sulaymān Krayda) and he predicted the existence of more. He was aware of the large numbers of mud-brick forts or *qṣur* (singular *qaṣr*) elsewhere in the region, but had not investigated these in any detail. He carried out important research on the numerous cemetery sites, undertaking survey in some sectors and selective excavation elsewhere, notably at Sāniat bin Huwaydī (Fig. 1.17).

This is an impressive tally, but it is clear from the unpublished archive that he left that he had the data to say much more than he did in his preliminary reports. This evidence is particularly clear in the gazetteer we have assembled. It has been a source of great regret that his untimely death in 1996, just before the FP began its work, has deprived us all of his final view of the Garamantes. Nonetheless, thanks to his detailed field notes, his is an important authorial voice throughout these volumes, and many maps, plans and photos are also drawn from his archive.

THE FAZZĀN PROJECT 1997-2001

The Fazzān Project (hereafter FP) was set up during 1996 as a joint collaboration between the Department of Antiquities and the Society for Libyan Studies, with Mohammed al-Mashai and David Mattingly being named as the respective co-directors. The aims of the project as set out at the commencement were:

- to study the settlement history of Fazzān in the last 12,000 years;
- to map in detail archaeological remains in the vicinity of Jarma;
- to carry out stratigraphic excavations at Old Jarma (ancient Garama);
- to evaluate the environment and climate of the past;
- to assess the hydraulic technology of oasis exploitation across time;
- to gain knowledge of the diet, health and nutrition of the inhabitants of Fazzān through the study of botanical remains, animal bones and human skeletal evidence;
- to study the economic contacts of the region through time;
- to enhance and bring to press unpublished work by Ayoub and Daniels (Mattingly 2000g).

The FP fieldwork was carried out over five years (1997-2001). The work has comprised a major excavation at Old Jarma (GER 1, sites G1-G4), fieldwalking and reconnaissance survey, topographic survey of standing structures, geomorphological and geographical studies. The archaeological survey component of the project was largely completed in 2000, with excavation continuing in 2001, alongside the geographical component of the project, and final finds study at Jarma in 2002 (for the methods and work carried out, see below 28-35). *The Archaeology of Fazzān* volumes will present in full detail the results of CMD's research, augmented by the significant advances made by the renewed fieldwork of the FP. Although methodologies differed between the two phases of work, we believe that it would have been unhelpful to publish the gazetteer data from each project separately. On the contrary, the integrated data from both projects add up to more than the sum of the parts and offer a more solid foundation for future studies to build on (see the 'Gazetteer' in *Archaeology of Fazzān* 2).

Chronological and spatial limits of the study

The work carried out by CMD had the Garamantes and their relationship with the Roman empire as its primary focus. Nevertheless, in the course of his work, CMD recorded a number of older and younger sites (gazetteer entries based on his records include, at opposite extremes, palaeolithic knapping debitage and Islamic town fortifications, as at Zuwīla). The FP set its timeframe as the Holocene, but in reality it proved impractical to ignore all the evidence of earlier prehistoric people, notably the abundant Pleistocene lithic-working sites. Furthermore, the geographical research into previously undated sediments, gypsum and duricrust deposits (relating to defunct spring lines and dried-up lake basins, etc.) has inevitably investigated deposits of widely differing ages (these terms are explained in Chapter 2). Thus, whilst the principal focus of all the research reported on here is the Holocene phase – broadly the last 12,000 years of human history – the archaeology and environment of earlier periods will be discussed wherever appropriate and lithic scatters relating to the pleistocene hunter-gatherer population of the region are included in the gazetteer wherever they were recorded. It should be stressed, however, that such material was not systematically sought in the current project and further work (especially on the plateau top of the Massāk Ṣaṭṭafat) would undoubtedly yield a much more complex picture.

The study of artefacts is in part dependent on the differing timetable of work on the various planned reports. For instance, the pottery type series is founded upon material from the excavations carried out by CMD at Zinkekrā, Tinda, Sāniat Jibrīl and Sāniat bin Huwaydī, supplemented to a limited extent by material from CMD's survey and the FP fieldwalking, and from medieval levels in the new excavations at Old Jarma. However, the eventual publication of the full report on the Jarma excavations will undoubtedly lead to an expansion of the medieval and early modern type series beyond what is presented in Volume 2. Whilst it is hoped that the type series will be a useful tool for other researchers in Fazzān it should be noted that it is fundamentally relevant to the periods 900 – 500 BC, 300 – 1 BC, AD 50 – 500. The mid-late Pastoral pottery recovered by the survey work is relatively meagre and the best regional discussion of early ceramics remains the more focused late prehistoric research of the Italian team working in the Tadrart Akākūs and Wādī Tanzzūft to the south-west (Cremaschi and Di Lernia 1998a, 183-200).

In combining the publication of both the work of the FP and that carried out by CMD in the 1960s-1970s, the *Archaeology of Fazzān* volumes will review a substantial area of south-west Libya, though in varying levels of detail (Fig. 1.10). As already noted, the main area of study for both projects has been the Wādī al-Ajāl, centred on

the Garamantian capital at Jarma (at 26°32.69/13°03.79). However, fieldwork has extended to Tīn Abūndā, over 40 km west of Ubārī (where the plain is known as Wādī Irāwan), and as far as al-Abyaḍ in the direction of Sabhā (al-Abyaḍ marks the eastern extremity of cultivation in the Wādī al-Ajāl). The total length of the al-Ajāl between al-Abyaḍ and Ubārī is *c.*130 km as the crow flies, and, when the zone beyond Ubārī as far west as Tīn Abūndā is included, the area of concentrated archaeological evidence comprises a corridor of approximately 160 km east-west by 10 km north-south (though the north-south width of the valley between the ḥamāda escarpment and the dunes of the Dahān Ubārī varies greatly). The 40-year period spanned by the two phases of work have seen major changes in the landscape and local economy (Figs 1.18*a-b*), and this affects the visibility of the archaeology today.

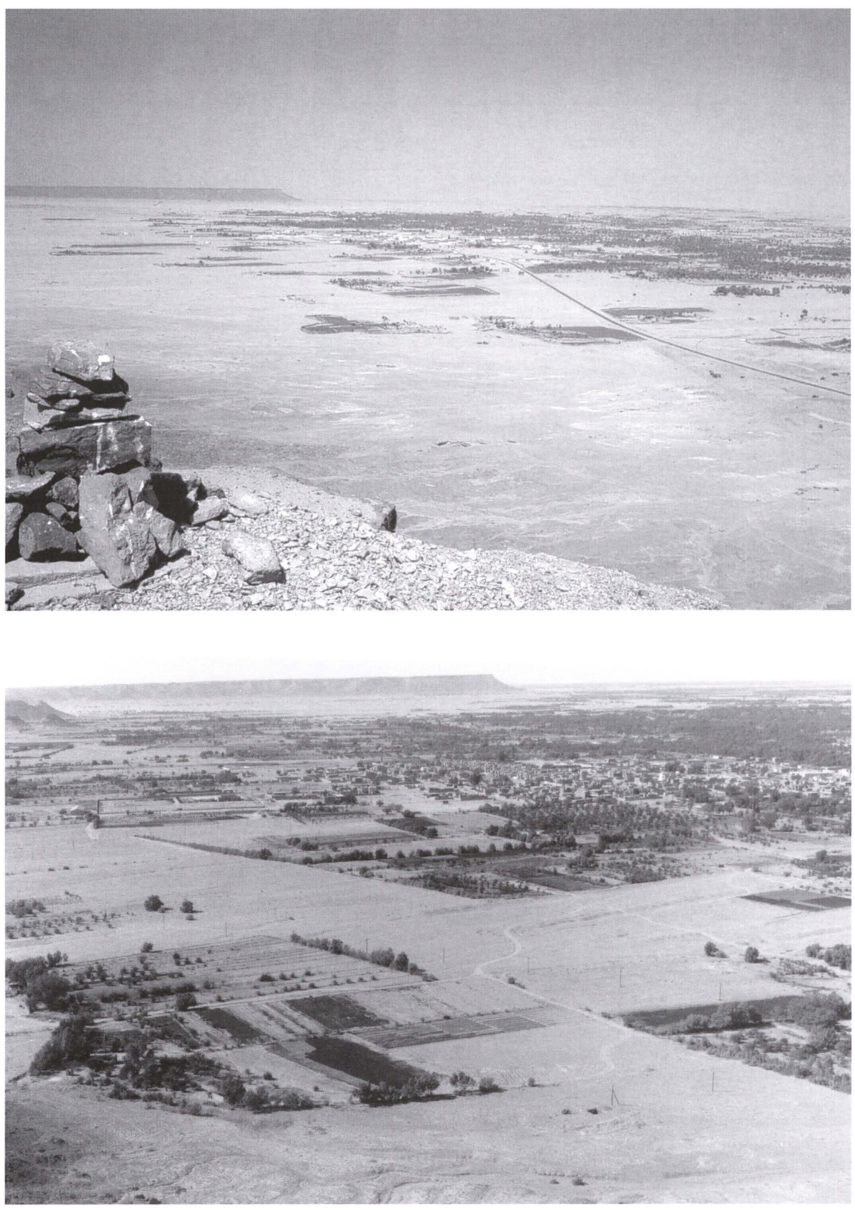

Fig. 1.18. Views of the al-Ghrayf area from the Zinkekrā plateau, Wādī al-Ajāl: a) 1958, looking north-north-west; b) 1998, looking north-west (the village is in the centre of both images).

In addition, both CMD and the FP have made reconnaissance trips to other parts of Fazzān and it is appropriate that the information gathered on these trips is integrated into this report, as it helps to set the Wādī al-Ajāl in its regional context. In 1968, CMD made a major expedition south and south-east of Jarma to the Wādī Barjūj, Wādī al-Nashwʿa and the Murzuq, Trāghan and Zuwīla areas. The FP team was able to revisit and survey important sites in the Wādī Barjūj and Dahān Murzuq area (1999-2001) and to make brief visits to Murzuq and Zuwīla (1998, 2001) and to the west and south-west to Sardalas, the Akākūs and Ghāt (2000, 2001). In addition, the project team has explored the southern fringes of the Dahān Ubārī, including the area of extant and long-dried up lakes (1997-2000), and the rock desert of the Massāk Ṣaṭṭafat to the south of the Wādī al-Ajāl (1998-2001). In 1999 and 2001, the project geographers made brief reconnaissance visits to the Wādī ash-Shāṭī to the north.

The first seven columns in Table 1.2 deal with locations presumed to be under Garamantian control, the final four columns with the wider contacts of the Garamantian kingdom on the Mediterranean coast, and to the south and south-west. The distances involved are considerable, especially when the nature of the intervening desert terrain is considered. But because of trans-Saharan trade these widely separated zones have been linked at certain times and understanding the archaeology of one area on its own is hazardous without consideration of what was happening at the same time in other sectors of the landscape.

Fazzān is separated by a broad tract of desert from the pre-desert zone to the north, which marks the Roman frontier, and the detailed work of the UNESCO Libyan Valleys has highlighted that this was culturally and economically very different to the Garamantian territory (Barker *et al.* 1996a/b; Mattingly 2000 b/c (for mapping); 2001 (for comparative study); Rebuffat 1975b; 1982; 1988; Reddé 1988).

	Ghāt and Aghram Nadarīf	Qaṣr ash-Sharrāba	Idrī (Wādī ash-Shāṭī)	Sabhā	Murzuq	Zuwīla	Tijirhī	Tripoli	Kāwār	Kānim	Timbuktū
Old Jarma	350-450	67-85	150	200	150	250	400	1,000	900+	1,300+	2,000+

Table 1.2. Approximate distances (in km) from Jarma to key locations. N.B. A camel can travel approximately 40km per day, a horse up to 50km.

Methodologies

The field methods of the CMD teams combined excavation, set-piece topographical survey of a small number of sites (Zinkekrā, Tinda, Ikhlīf, etc., UAT 13, GSC 30), with survey on foot of the escarpment base cemeteries within the Jarma embayment and at a limited number of other locations (e.g. Fjayj). The work was essentially non-systematic, but thorough, and the quality of the recording in notebooks from this phase of the work is generally good. CMD also made reconnaissance visits and carried out photographic recording of many other sites in the Wādī al-Ajāl. In addition, CMD initiated a mapping programme utilising a series of air photographs he obtained from Hunting Aerial Surveys. In the present project this work has been expanded and completed by David Edwards to include coverage of the area west of Ubārī and the Wādī Barjūj to Zuwīla sectors (Edwards 2001; Edwards *et al.* 1999). The major

excavations carried out at Zinkekrā, Sāniat Jibrīl and Sāniat bin Huwaydī, along with smaller-scale trial trenches at a number of other sites, provide a unique dossier of information on the Garamantes.

The five seasons (1997-2001) of archaeological field survey and surface collection undertaken by the Fazzān Project (FP) in the Jarma region of the Wādī al-Ajāl have been partially published in a series of preliminary reports (Mattingly *et al.*, 1997, 1998a/b, 1999, 2000a/b, 2001, forthcoming a). The methods adopted in the renewed fieldwork will be summarised here (Table 1.3), with the results of the FP fieldwalking presented in Chapter 4 and in the site Gazetteer.

The compilation of a gazetteer of known archaeological sites was a focus of considerable effort on behalf of both the CMD and FP projects. In the absence of printed maps of greater resolution than 1:250,000, CMD had commissioned some air-photographic coverage in the late 1950s and 1960s and had had a series of 9 maps drawn up from these at a scale of *c.*1:25,000 (Fig. 1.19). The FP took on these air-photographs and maps and through the use of satellite imagery, GIS and GPS technology was able to improve their geo-referencing. These form the basis of the maps included in the Gazetteer. Detailed scrutiny of the vertical air-photographs proved of great value for the identification of archaeological sites and for retrieval of information about those that had subsequently been obliterated (Edwards 2001).

Archaeological field survey and surface collection in the region of Jarma were viewed from the start of the FP as an essential complement both to CMD's earlier research and to our renewed archaeological excavations at the site of Old Jarma (ancient Garama) and geomorphological fieldwork in the Wādī al-Ajāl and surrounding areas. The archaeological excavations at Old Jarma have sought to increase the quantity and quality of data recovered by collecting ecological materials (for example, animal bones and botanical remains), whilst geomorphological studies have broadened exploration of the natural environment. The research strategy of the FP was interdisciplinary and intended to collect a complex array of cultural and natural variables to reflect the archaeological sequence, pre- and proto-historical subsistence and settlement patterns, and changing social systems of the Jarma region. The key site of Jarma was at all times the focus of the work (Fig. 1.20)

The FP work sought to build on the results of the earlier CMD project by focusing its survey efforts on parts of the landscape and site hierarchy that were underrepresented in previous work and by combining archaeological and geomorphological survey. CMD had concentrated to some extent on the most visible part of the archaeological landscape – the escarpment and its pediment – where the main cemeteries and early 'hill forts' of the Garamantes were concentrated. The FP aimed to sample across all parts of the landscape and to collect a range of data in a systematic manner to facilitate inter-site comparisons. Particular attention was paid to the evidence of Wādī-centre settlements (see Chapters 4-5), cemeteries and funerary structures (Chapter 6), irrigation systems (see Chapter 7) and rock-art and engravings (Chapter 8). The excavation at Jarma was conducted according to modern stratigraphic standards, with equal attention being paid to each phase of the site's occupational history (see Mattingly 1997, 15-18; 1998b, 122-29; 1999, 131-34; 2000b, 104-07, for methodological discussion). Numerous set-piece surveys were carried out using a Total Station or theodolite, covering a wide range of site types (ranging from contour survey of Old Jarma, to plans of individual houses and mosques of Islamic date, to fortified sites (escarpment hillforts and and mud-brick *qṣur*) or villages of Garamantian or more recent date, to cemeteries).

Systematic fieldwalking within the oasis zone was a key objective of the FP work, though the application of this method was limited in a number of ways. Several modern activities had an effect on field survey, most notably the continuing (and

Fig. 1.19. Example of CMD map, derived from air-photographic coverage, showing sites in the eastern Wādi al-Ajāl.

Fig. 1.20. Fazzān Project 1997-2001: a) excavations in progress at Jarma; b) excavation team 2000; c) workmen with the site locomotive; d) topographic survey in progress at Jarma.

partly shifting) pattern of oasis cultivation and the modern growth of once small villages into sprawling small towns. There is evidence of a locational 'shift' in the cultivated area, associated with new drilled wells and irrigation on the southern side of the traditional oasis zone. There are clear signs of a drop in the level of groundwater beneath the central part of the valley, with noticeable impacts on the stands of date palms that have traditionally been sustained by their roots tapping into the uppermost level of the water table. Signs of land abandonment (in the form of deserted settlements and garden plots) are unmistakable in some parts of the valley. Other activities that affected the field survey included the recent bulldozing of large areas of the gravel plain, either to prepare new areas for cultivation or for aggregate extraction. Some of the bulldozing was a threat to the archaeological heritage as was the widespread and indiscriminate dumping of household waste (Mattingly *et al.* 1998a, plates LXXVb, LXXVIa/b).

The above factors meant that some areas of the oasis zone were inaccessible. Reconnaissance survey and surface collections were made only where the ground surface was clearly visible. Long-term cultivation is thus likely in many places to conceal additional archaeological features and lithics and ceramic and other artefact scatters. Non-invasive techniques of examination of subsurface structure are limited in a desert environment. Conditions are far too arid for conventional resistivity survey (an unsuccessful attempt was made in Old Jarma in 1997, see Mattingly *et al.* 1997, 20). The surface dumping of household waste, especially in the form of tin cans, also means that magnetometry survey is not viable. In 2001, some trials of Ground Penetrating Radar (GPS) were made. There seems to be some potential with the

Season	Location	Topography	Method
1997	GER 1 Old Jarma	Oasis zone	Topographic survey, standing building survey, excavation
	GER 2 Sāniat Jibrīl	Oasis zone	50 x 50 m grid survey (29 grids)
	Jarma area	Oasis zone	Reconnaissance survey
	ZIN 1/ZIN 900 (Zinkekrā hillfort)	Projecting ḥamāda spur	Reconnaissance survey, topographic survey
	Zinkekrā to Jarma	Top of ḥamāda escarpment	Reconnaissance survey
	Zinkekrā /al-Ghrayf area	S side of oasis belt	Foggara survey
1998	TWE 21 (Tuwash hillfort)	Projecting ḥamāda spur	Reconnaissance survey, topographic survey
	Tuwash area	S side of oasis belt	Foggara survey
	GER 1 Old Jarma	Oasis zone	Topographic survey, standing building survey, excavation
	GER 3 Old Jarma area	Oasis and saltpan zones	50 x 50 m gridsurvey (216 grids)
	Jarma area	Oasis zone	Reconnaissance survey
	GER 16	Oasis zone (sandy)	50 x 50 m gridsurvey (20 grids)
	ELH 3, 5/6, 8 (al-Ḥaṭīya area)	Oasis zone (sandy)	50 x 50 m gridsurvey (151 grids), topographic survey (ELH 1, 2, 3, 5/6), foggara survey
	GSC 52-54 (Jarma Escarpment area [= HAMLS 1-3])	ḥamāda rock desert	5 m x 5 m box survey (2 boxes)
	ZIN 904-905 (Zinkekrā area [= ZINLS1-2])	Intermontane	5 m x 5 m box survey (2 boxes)
	al-Kharāʿiq and al-Fjayj areas	S side of oasis belt	Foggara survey
1999	GER 11, 15, 16, 18, 26, 27)	Oasis zone	50 x 50 m gridsurvey (104 grids)
	GER 1 Old Jarma	Oasis zone	Topographic survey, standing building survey, excavation
	TWE 26/27, 28	Oasis zone	50 x 50 m gridsurvey (13 grids)
	Tuwash area	Oasis zone	Reconnaissance survey, Topographic survey (TWE 25, 26) foggara survey and excavation (TWE 16)
	CHA 26/27 (al-Kharāʿiq)	Oasis zone	50 x 50 m gridsurvey (9 grids)
	al-Kharāʿiq area (F31)	Oasis zone	Topographic survey (CHA 1, 23), Reconnaissance survey, foggara survey and excavation
	FJJ 1 (al -Fjayj area = F29)	S side of oasis belt	Topographic survey (FJJ 1) and foggara survey/excavation
	GER 31-35	Sand plinth	5 m x 5 m box survey (72 boxes)
	GER 30, 36-37	Sand plinth	Reconnaissance survey
	Qaṣr bin Dughba – al-Qṣīr area (*qaṣr* survey)	Oasis zone	Reconnaissance survey
	MAR 1/SCH 20 (Qaṣr Māra, Qaṣr ash-Sharrāba)	Desert oasis	Reconnaissance survey
2000	GER 2 (Sāniat Jibrīl)	Oasis zone	25 m x 25 m grid survey (22 grids)
	GER 1 Old Jarma	Oasis zone	Topographic survey, standing building survey, Excavation
	Wādī al-Ajāl	Various	Line survey (7 lines)
	Qaṣr ash-Sharrāba (SCH 20-4)	Desert oasis	Reconnaissance survey Topographic survey (SCH 20)
	West of Ubārī	Various	Line survey (11 lines) and reconnaissance and foggara survey in Tīn Abūndā, In Ṭafarāt and Tāmalālat areas

Season	Location	Topography	Method
	GBD 1	Oasis zone	Reconnaissance survey, quadrant collection, topographic survey
	Wādī al-Ajāl	Oasis zone and escarpment slopes	Revisits to many sites recorded by CMD
	GBD 21-24	Sand plinth	Reconnaissance survey
	Takarkība area	Escarpment slope	Reconnaissance survey
	Jarma area	Pediment/ ḥamāda	Reconnaissance survey
	Dahān Ubārī (EDU area)	Sand sea	Reconnaissance survey
	Wādī al-Ajāl	Pediment and escarpment	Rock art survey
2001	GER 1 Old Jarma	Oasis zone	Topographic survey, GPR survey, Excavation
	GER 2	Oasis zone	Additional survey of industrial activity
	Dahān Ubārī (EDU area)	Sand sea	Reconnaissance survey and geo survey, GPR survey
	Wādī Barjūj/ Wādī ʿUtba	Oasis zone	Reconnaissance survey and geo survey
	TWE 44	Pediment of escarpment	Excavation of antenna tomb
	Zuwīla area	Oasis zone	Topographic survey of central area and revisits to sites in area
	Wādī al-Ajāl	Oasis and escarpment	Final revisits to check gazetteer data

Table 1.3. Summary of work carried out by the Fazzān Project 1997-2001.

method, which seemed capable of picking up buried mudbrick walls, but the process was quite cumbersome and only narrow transects were covered.

GPS technology was used in field survey in 1998 (and increasingly more in 1999 and 2000). A Garmin 12 GPS unit was used to record site locations, though the presumed accuracy of the readings (±50 m) meant that precise delimitation of the edges of lithics and potsherd scatters was not thought feasible. However, using the routing system provided with the Garmin 12, returning to sites in sometimes confusing terrain was made easy. During 2000, a GPS was used to orient long line surveys traversing the width of the Wādī, and for marking the location of artefacts and features and the changes in topography and environment along the lines. In autumn 2000 the accuracy of hand-held GPS units was enormously improved (to an accuracy of ±5m) and this has potentially far-reaching effects on archaeological survey methodology in the Sahara (though coming too late to impact markedly on our methodology).

From the beginning, one of the main objectives of the field survey was to locate settlement sites in the Jarma region. The lack of much previous evidence of settlement was thought to have been the result of poor site preservation and incomplete archaeological fieldwork within the oasis zone. Accordingly, the areas selected for survey during the 1997, 1998 and 1999 seasons were mainly close to Old Jarma or near to other archaeological features such as major cemeteries (for example, sites at or near Sāniat Jibrīl, Sāniat bin Huwaydī, al-Ḥaṭīya, Tuwash and al-Kharāʿiq).

There are no ploughed zones in the Jarma region of the Wādī al-Ajāl, and so traditional European sampling strategies and the mapping of artefact scatters in fields could not be adopted (cf. Schofield, 1991; Francovich *et al.* 2000). The intensively cultivated oasis gardens comprise only a small percentage of the total area of the oasis belt, with its palm groves and traces of abandoned gardens. It was clear that both in uncultivated areas and in the oasis belt itself localised scatters of artefacts could be located by careful searching. Earlier survey work in Libya – in rock, sand and gravel contexts – had adopted strategies suited to the nature of the terrain and the variety of

the archaeology (for example, Barker *et al.*, 1996a, 21-48; cf Barker *et al.* 1997; 1998; 1999; 2000 for a parallel example from the Jordanian desert). A key element of the early fieldwork was to test whether the observed artefact distributions could be shown to indicate the presence of underlying settlement sites. It was decided not to sample randomly large (> 1 km^2) blocks of the oasis. The vegetation was too dense and the personnel too few. There were no visibly distinct control points anywhere in the Jarma region, and without high resolution maps it was easy to become lost. Despite all these problems, grid-walking of substantial areas of the oasis belt was achieved. Squares of 50 × 50 m were laid out in less densely vegetated parts of the oasis, using either east-west or north-south baselines (in 1998, one baseline extended over 1 km).

For a variety of reasons fieldwalking was more productive either early in the morning or late in the afternoon. Bright sunlight reflecting off gravels and sand made the detection of artefacts difficult, and the impact was obviously more noticeable around midday. Both early and late in the day there was also a barely perceptible increase in air humidity at ground level, that had the effect of 'highlighting' remnant mud-brick structural features in the sand. The features appeared as ephemeral dark patches on the surface sometimes speckled with white or purple mineral deposits. As the ground dried out, the effect diminished.

On the ḥamāda along the southern edge of the Wādī al-Ajāl the distribution of Pleistocene lithics was impressive. The ḥamāda is a relatively inaccessible area: to climb to the top of the escarpment, where it is even possible, from the bare rock pediment took on average about thirty minutes. The ḥamāda surface is a relatively even sandstone pavement, though there are innumerable small silt-filled depressions and gullies within it. The area is otherwise mostly devoid of soils and vegetation, though there are significant outcrops of quartzite and fossil wood, both the focus of Pleistocene and Holocene lithic production activities. Only a limited survey was made on the ḥamāda, though numerous Pleistocene lithics were observed there. Several lithics production sites were surveyed using 5 × 5 m box grids (GSC 52-53, ZIN 903-904).

On the northern side of the Wādī is the sand plinth of the Dahān Ubārī. This is a generally flat area about 600 m wide with a gentle incline to the north and the area was relatively easy to survey. Numerous palaeolake beds are visible in the area as relatively dark, raised mineral (gypsum) deposits. In 1999, lithics survey was initiated on the sand plinth, almost directly north of Old Jarma. A number of Holocene lithic sites were observed in relation to a series of small palaeolakes marked by duricrust deposits (GER 30-35, 36-37) and five were subject to box survey recording and collection (GER 31-35). Subsequent reconnaissance survey has identified many more examples of this class of site within the fringes of the Dahān Ubārī.

In 2000, field survey was modified. A more detailed grid collection was made at the extraordinarly rich site of Sāniat Jibrīl, using a 25 × 25 m resolution grid. A further element was the walking of a series of linear transects across or along the valley, sampling the background occurrence of artefacts and sites, within their landscape framework. Importantly, the line survey was intended to incorporate the region's main ecotones and observe the distribution of raw material resources. To achieve these aims, seven 'Wādī-wide' line surveys were walked.

In all seasons of work, reconnaissance survey contributed much to the known distribution of sites. Most of the areas selected for more detailed gridded survey had been first identified as potential sites by reconnaissance work. The results of all the fieldwalking are described in Chapter 4.

There were various field-walking collection methods used by the FP. In 1997-1998, a grid survey method based on 50 × 50 m grid squares was employed. Five 1m-wid- transects were walked across each 50 × 50 m gridsquare at 10 m intervals, providing a 10 per cent surface sample. Within each grid square, a single transect (usually the

central one) was selected for the total collection of artefacts. Artefacts observed in the remaining four transects were recorded with 'clicker counters'. Diagnostic artefacts (rims, bases, handles, lithics tools, beads, etc.) in the 'clicker-counted' transects were collected as a 'grab' sample. In 1998, the investigation of lithics scatters on the ḥamāda required more detailed sampling and recording. This was based on 5 × 5 m box survey at locations where significantly higher density concentrations of lithics materials were identified as 'sites'. The integrity of a scatter was assessed by plotting the site (at a scale of 1:10 m) within a 5 × 5 m box. The background scatters of the boxes was examined by walking and counting material along 1 m wide corridors extending 30 m from each edge of the 5 × 5 m boxes. In 1999, the box-survey method was extended to the sand plinth lithics assemblages, where multiples of 5 × 5 m boxes were employed, typically combined to form 15 × 15m boxes (or larger blocks where the spread of materials was greater). Within the boxes, artefacts were recorded at a scale of 1:10 m before all pieces were collected. The method allowed the identification of activity areas and adequate site definition. In 2000, the 25 × 25 m grid survey involved 1m-wide transects being walked every 5m across each grid, increasing the surface sample to 20 per cent. For the line-walking exercise in 2000, each line was walked along its entire length by a team of two utilising a *c.*50 m wide corridor. A Garmin 12 GPS unit was used to guide survey walkers and to plot the location of observed artefacts and other noticeable features and changes in topography.

Approaches to typology and dating

The quality of information in the Gazetteer is inevitably somewhat uneven. Many sites were subject to only a brief reconnaissance visit, others have been identified solely on the air photographs and have yet to be located on the ground. Only a small number of the sites have been subject to careful excavation, while the quality of preservation of all sites is highly variable. It is clear that many sites have become significantly more degraded in the course of the last 30 years.

There is no previously established systematic typology of the sites encountered in the Wādī al-Ajāl, and the attempt to provide such a framework in this volume is only a tentative first step in this direction (Chapters 5-6). The typology proposed here needs further testing in the field and will undoubtedly require enlargement and revision as more data are accumulated. For many of our sites, the quality of data will not permit a secure attribution to sub-type. Nonetheless, we believe that it is important to establish a framework of classification, based on objective description, for use in future work.

Dating is a related problem, in that the majority of sites in the gazetteer have not yielded diagnostic artefacts (indeed many have never been sherded systematically). Even where diagnostics have been recovered, there is a strong bias towards periods when imports from outside Fazzān were most common (for instance, the Garamantian 'Roman' period). Until we can refine knowledge of the dating of the local coarseware production, the main period or full occupation/use span of many sites will remain uncertain. Whilst it has proved possible to postulate, with some degree of probability, the association of certain structural features with specific periods, this work is still only in its infancy. To give an example, the provision of finely worked 'hand' stele and offering tables can be dated with reasonable certainty to the classic Garamantian phase (broadly 1st-5th century AD). However, much greater uncertainty attends the dating of the numerous defensive mudbrick 'castles' or *qṣur*. These structures are in some cases associated with villages of early modern date and look of fairly recent construction, but other examples are known on sites yielding only Garamantian pottery. There are several different variants in architecture and scale, from fortified towers similar to the *qṣūr* reported on by the UNESCO Libyan Valleys survey (Barker *et al.* 1996a, 127-34),

to large fort-like structures with high walls and projecting towers. A first attempt at classification is advanced in Chapter 5.

However, dating remains the key problem with these sites, especially as many are thought to relate to the post-Garamantian period, for which we lack detailed knowledge of diagnostic cultural material (both Despois 1946, 57-61 and Lethielleux 1948, 48-49, recognised the significance of the *qṣur* but speculated wildly about their date). The ceramic type series is a first step towards widening the amount of material with diagnostic value and publication of the FP excavations at Jarma will enhance our knowledge of the material culture of the medieval and early modern periods. However, much of the ceramic data can be assigned a place only in a relative sequence, and absolute dates are needed to refine this sequence for the post-Garamantian periods. Accordingly, the FP initiated a programme of sampling a range of these structures for radiocarbon dating, generally extracting small quantities of organic matter from the temper used in their mudbricks for the more accurate AMS dating (Mattingly *et al.* 2002). The full list of dates is presented in Appendix 1 in Volume 2 and the importance of the dates is discussed in Chapter 5. What is clear is that the AMS method is highly suitable for this sort of work, as it enables high precision dates to be obtained on single seeds or small charcoal fragments (limiting the danger of anomalous dates from mixed samples). It is of course possible that older material may be incorporated in the temper of mudbricks, but the potential of that sort of error can be reduced by larger numbers of samples being processed. The suite of AMS dates obtained for historic period sites complements the even larger suite of dates the Italian team has established for Holocene sites in Fazzān (Cremaschi and Di Lernia 1998a, 273-74; Cremaschi 2001). Both sets of dates open up much greater possibilities for more accurate dating of sites in future.

In Chapter 7, we review the evidence for hydraulic works and irrigated farming in Fazzān and provide typological descriptions of the main types of features encountered. Changes in the irrigation system seem to equate with both the rise and ultimate decline of the Garamantes. Chapter 8 summarises information on rock-art and engraved inscriptions from the region. The discussion seeks to tie the discoveries from the FP work into regional and pan-Saharan typologies and dating frameworks. In Chapter 9, we offer an attempt to put all the data together as a tentative synthesis of human activity in Fazzān. We must acknowledge that the contents of this volume provide at best an overview of the current state of knowledge and we cannot claim to present a definitive account. In the final analysis, this is a summary of the current state of research and a platform on which we hope others will help us build in future. The data are as yet incomplete and many questions remain, but we are at the end of the beginning. The next phase of research will, it is hoped, fill some of the gaps identified and expand on the detail offered here of human adaptation over time in a remarkable desert landscape.