

THE ARCHAEOLOGY OF FAZZĀN

VOLUME 1, SYNTHESIS

Edited by David J. Mattingly

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D. J. Mattingly, C. M. Daniels, J. N. Dore, D. Edwards, J. Hawthorne

(with contributions by others)

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CONCORDANCE OF PLACE-NAMES

Place-names have been, as far as possible, transliterated following *Encyclopaedia of Islam (EI)* conventions. In some cases, orthography remains uncertain, while the transliteration of non-Arabic place-names also presents some problems. Some well-established forms have been sacrificed in the interests of internal consistency (for example, Germa for Jarma). The list is arranged in three parts: first the alphabetical listing of place-name forms used in these volumes, second the Arabic when it applies and third a listing of older or alternative forms, mainly using the Italian or French colonial transliteration schemes (these are given in italics). The editor would like to thank Dr Habib el-Hesnawi of the Libyan Studies Centre for his help with this list as well as Saad Saleh Abdulaziz, Dr Elizabeth Savage and Dr David Edwards.

AF Form	Arabic	Variants	AF Form	Arabic	Variants
al-Abyaḍ	الأبيض	<i>el-Abiad. el-Abiod</i>	Bintbaya	بنت بيه	<i>Bentbaya. Gasr Bendbeia. Bintbayab.</i>
Aghadīs	اغاديس، اقديز	<i>Agadez. Agades</i>			
Agīf	اجيف	<i>Agif. Ageef</i>	Bīr Baqqārā	بير / بئر بقارا ؟	<i>Bir Bagbira</i>
Aghram Nadarīf	اغرم ندراف	<i>Ighram Nadāref</i>	Birgin	برغن	<i>Berghin. Berghen</i>
Air	اير	<i>Air. Abīr</i>	al-Birkat	البركت، البركات	<i>al-Birkūt. el-Barkat</i>
An Amīnān	ان امينان	<i>Agemennan. Agbmenān</i>	Brāk	براك	<i>Brayk. Brak. Brach</i>
Aqār	أقار، آقار	<i>Aqār. Aggar</i>	Būdrinna	بودرنة	<i>Budrina</i>
‘Arq Zūmā	عرق زوما	<i>Egbei Zuma. Ergei Zumma</i>	Bū Nijīm	بونجيم	<i>Bu Ngem. Bu Njem. Bunjaym</i>
‘Arq Wān Kāsā	عرق وان كازا	<i>Erg Un Kasa. Erg Wan Kassa</i>	Dahān Murzuq	دهان مرزق	<i>Edeyen Murzuq. Edeien. Edeiyen Mourzouk</i>
Awdaghūst	اودغست	<i>Awdughast. Awdaghushl</i>			
Awjila	اوجله	<i>Augila</i>	Dahān Ubārī	ديان اوباري	<i>Edeyen Ubārī. Edeien. Edeiyen Ubari</i>
Bāb al-Maknūsa		<i>see Maknusa</i>			
al-Baḥarīya	البحرية	<i>Babariyya</i>	ad-Dākhla	الداخلة	<i>Dakleb</i>
Bājirmī	باجرمي	<i>Bagirmi</i>	Dārfūr	دار فور	<i>Dar Fur. Darfur</i>
al-Bakhī	البخي	<i>el-Bakbkhī. el-Bakbī. el-Bachi</i>	ad-Dīsa	الديسه	<i>ad-Dīsab. ed-Dīsa</i>
al-Bawānis	البوانيس	<i>el-Bouanis</i>	ad-Idlīm	ادلیم	<i>Dlaym. Idlīm. al-Dlēm. Dūlaym</i>
al-Bdayir	البدير	<i>el-Bdayr</i>			
Bilmā	بلما	<i>Bilma</i>	Dūjāl	دو حال	<i>Dujjal. Doujal</i>
Bin Ḥārith	بن حارث	<i>Ben Herath. Ben Haret</i>			

AF Form	Arabic	Variants	AF Form	Arabic	Variants
al-Fakhfākha	الفخفاخة	<i>Fakfaka</i>	In Ṭafarāt	ان تفرات	<i>I-n-Taфарat</i>
al-Farafāra	الفرافره	<i>Farafra</i>	al-Jabal al-Akḥḍar	الجلب الأخضر	<i>Gebel el-Akdar</i>
Fazzān	فزان	<i>Fezzan</i>	Jabal 'Awaynāt	جبل العوينات	<i>Gebel Uweinat</i>
al-Fjayj	الفجيج	<i>Fjej, el-Fejej</i>	Jabal al-Ḥasāwana	جبل الحساونه	<i>Jebel el-Hassaouna</i>
al-Fūgār	فقار	see <i>Fugar, al-Foug, Fougar</i>	Jabal as-Sūda	جبل السوده	<i>Jebel es Souda, Gebel es-Soda</i>
al-Fuqhā	الفقها	<i>el-Fogaba, el-Fougaba, el-Fogar</i>	Jabal bin Ghanīma	جبل بن غنيمه	<i>Gebel Ben Gbnema</i>
Gabr 'Awn	قبر عون	<i>Gabr On, Gabr Oun</i>	Jabal Nafūsa	جبل نفوسه	<i>Gebel Nefusa</i>
Gāo	قادأو، قاو	<i>Gaw</i>	al-Jadīd	الجدید	<i>el-Gedid</i>
Ghadāmis	غدامس	<i>Gadames, Ghadāmes</i>	Jādū	جادو	<i>Jado, Giado</i>
Gharyān	غريان	<i>Gharian, Garian</i>	al-Jaghbūb	الجغبوب	<i>Jiarabub, Giarabub, Jaghboub</i>
Ghāt	غات	<i>Ghat, Gat</i>	Jālū	جالو	<i>Jalu, Gialo</i>
al-Ghrayf	الغريف	<i>el-Greif, el-Gberefa, el Graifa, al-Qraifa</i>	Jānit	جانت	<i>Jianet, Gianet, Djanet</i>
Ghuddwa	غدوة	<i>Goddua, Gbedoua, Ghuddurva</i>	Jarma	جرمه	<i>Germa, Jerma Djerma</i>
Hajāra	حجارة	<i>el-Hajara, Hagiara</i>	Jīra	جير، قيره؟	<i>Jirah, Jeerah</i>
al-Ḥamāda al-Ḥamrā'	الحمادة الحمراء	<i>Hamada el-Hamra</i>	Jirba	جر به	<i>Gerba, Djerba</i>
al-Ḥamrā'	الحمراء	<i>el-Hamra</i>	al-Jufra	الجفرة	<i>Giofra, Jofra</i>
al-Ḥarūj al-Abyaḍ	المروج الأبيض	<i>Haurudj el-Abiad</i>	Jurāra	جراره؟	<i>Gburāra, Gourara</i>
al-Ḥarūj al-Aswad	المروج الأسود	<i>Haurudj el-Aswad</i>	Kānim	كائم	<i>Kānem, Kanim</i>
al-Ḥaṭīya	الخطية	<i>el-Hatiya, el-Hatia, el-Hatir</i>	Kāno	كانو	<i>Kano</i>
al-Hausā	الهوسا	<i>Hausab</i>	Kāwār	كاوار	<i>Kaouar, Kuwār</i>
al-Ḥufra	الحفرة	<i>Hofra</i>	al-Kharā'iq	الخرائق	<i>el-Charaig, al-Kbaraiq</i>
Hūn	هون	<i>Hun, Hon</i>	al-Khārja	الخارجه	<i>Kharga</i>
Ibrayk	براك، ابريك	<i>Brech, Brek</i>	Knīr	كنير	<i>Knyr, Kneer</i>
Idrī	ادري	<i>Edri, Idri</i>	Kukaman	كو كمن	<i>Quqamān, Cocaman</i>
ikhlif	اخليف	<i>Ikhlayf, Chlef, Kbelef</i>	al-Kufra	الكفرة	<i>Koufra, Cufra</i>
			Lārkū	لاركو	<i>Larcū, Laroccu, Larokou</i>
			Māfū	مافو	<i>Maafu, Mafou</i>

AF Form	Arabic	Variants	AF Form	Arabic	Variants
Madrūsa	مدروسه	<i>Madrousa, Medrousa</i>	al-Qurayyāt al-Gharbiya	القریات الغربية	<i>Gberiat el-Garbia</i>
Maḥrūga	محروقة	<i>el-Mabaruga, Mabarouga</i>	al-Qurḍa	القرضة	<i>el-Gorda</i>
al-Maknūsa	مكنوسه، المكنوسه	<i>Macnusa, Bab el-Macnusa</i>	ar-Raqayba	الرقبية	<i>er-Rgheba, Rugheba, Rugheba, Reguiba</i>
Mandara	مندره	<i>Mandarab</i>	Sabhā	سبها	<i>Sabha, Sebba</i>
Marāda	مراده	<i>Maradeb</i>	Sāniat bin Huwaydī	سانية بن هويدي	<i>Saniat Ben Houedi</i>
Matkhandūsh	متخندوش	<i>Mattendūsh, Mattendoush, Mathendusc</i>	Sāniat Jibrīl	سانية جبريل	<i>Saniat Gebril</i>
Massāk Mallat	مساك ملت	<i>Mesak Mellet, Amsach, Msak Mallat</i>	Sāniat Sulaymān Krayda	سانية سليمان كريده	<i>Saniat Suleiman Craida</i>
Massāk Ṣaṭṭafat	مساك صطفت	<i>Mesak Settafet, Msak Sittafat</i>	Sardalas		<i>Serdeles, see al-'Uwaynat</i>
Misqwiṅ	مستقوين	<i>Messegokn, Mesequin</i>	ash-Sharqiyāt	الشرقيات	<i>Sharqiyyat, ech-Cherguiya</i>
Miṣurāta	مصراته	<i>Misrata</i>	Sidi 'Alī	سيدي علي	<i>Sidi Ali</i>
Murzuq	مرزق	<i>Murzuch, Mouzouk</i>	Sidi Dāwud	سيدي داود	<i>Sidi Daouad</i>
al-Qal'at	القلعه	<i>al-Qalaab, Gelab</i>	Sijilmāsa	سحلماسه	<i>Sidjilmasa</i>
Qaṣr ash-Sharrāba	قصر الشرايه	<i>Qasr ash-Sharaba, esc-Sceraba, Gasr esc-Sceraba</i>	Surt	سرت	<i>Sirte, Şurt</i>
Qaṣr bin Dughba	قصر بن دغبه	<i>Qasr ben Dougba</i>	Sīwa	سيوه	<i>Siwab</i>
Qaṣr Lārkū	قصر لاركو	<i>Larcū, Larocco, Larocco</i>	Sūkna	سوكنة	<i>Socna, Suknab</i>
Qaṣr Māra	قصر ماره	<i>Gasr Mara</i>	Tāballbala	تابلبله	<i>Tabalbala, Tabalbalet</i>
Qaṣr Waṭwāt	قصر وطوات	<i>Gasr Uatuat</i>	Tadrart Akākūs	جبال اكاكوس	<i>Jabāl Acacus, Akakous</i>
al-Qaṭrūn	القطرون	<i>el-Gatrun</i>	Tāhart	تاهرت	<i>Tabert, Tabirt</i>
al-Qayrawān	القيروان	<i>Kairouan</i>	Takarkiba	تكر كيبه	<i>Tekerkiba, Techertiba</i>
Qarāqra	قراقره	<i>Qrāqrah, Gragra</i>	Tajirhī	تجره هي	<i>Tajarbi, Tejerbi</i>
al-Qrāya	القرايه	<i>el-Gheraia, Greia, el-Graiya</i>	Tāmalālat	تاماللات	<i>ad Tamellat</i>
al-Qṣīr	القصير	<i>Leksair, el-Gser</i>	Tānzāwa	تامزاوه	<i>Tāmezāwa, Tamzaua</i>
			at-Tanāḥma	التناحمة	<i>At-Tanahmah, et-Tanahma</i>
			Tāqallit	تاقللت	<i>Taglit, Taglilt</i>
			Tarhūna	ترهونه	<i>Tarbuna</i>
			Tāssili Azjar	تاسيلي ازجر	<i>Tassili n'Ajjer</i>

AF Form	Arabic	Variants	AF Form	Arabic	Variants
aṭ-Ṭawīla	الطويلة	<i>Touila</i>	Umm al-Māʾ	أم الماء	<i>Umm al-Maa,</i> <i>Oum el-Ma</i>
Tuwīwa	تويوه	<i>Towiwa,</i> <i>Tuiua,</i> <i>Touioua</i>	al-Uwaynāt	العوينات	<i>el-Uweinat,</i> <i>el-Aweinat,</i> <i>el-Auenat</i> (see Serdeles)
Tāwurgħaʿ	تاورغاء	<i>Tauorgħa</i>			
Tigrūtīn	تيكروطين، تيفروطين	<i>Teggrutin</i>	Wādāi	وادي	<i>Wadai</i>
Tilimsān	تلمسان	<i>Tilimisan</i>	Waddān	ودان	<i>Waddan,</i> <i>Uaddan</i>
Timbuktū	تمبكتو	<i>Timbuctu</i>	Wādī	وادي	<i>Ouadi, Oued</i>
Timinhint	تمنھنت	<i>Temenbind</i>	al-Wādī al-Ajal	وادي الآجال	<i>Wadi el-Agial,</i> <i>el-Ajal</i>
Tīn Abūndā	تن ابوندا	<i>Tin Abunda,</i> <i>Tinabonda</i>	Wādī Barjūj	وادي برجوج	<i>Wadi Bergiug,</i> <i>Berjuj</i>
Tīnda	تندی	<i>Tindā</i>	Wādī Būznā	وادي بوزنه	<i>Wadi Bouzna</i>
Tīn Missʿaūda	تن مسعوده	<i>Tin Misaou, Ti-</i> <i>m Missaou</i>	al-Wādī al-Gharbī	الوادي الغربي	<i>Wadi el-</i> <i>Gharbi</i>
Tīrbū	تربو	<i>Tirbu, Terbu</i>	Wādī al-Ḥayāt	وادي الحياة	<i>Wadi el-Hayat</i>
Tmākrūt	تمكروت	<i>Tmakrout</i>	Wādī Ḥikma	وادي حكمة	<i>Wadi Hikma</i>
Tmissa	تمسه	<i>Tmissa,</i> <i>Tmessa</i>	Wādī Irāwan	وادي ايراون	<i>Irauen,</i> <i>Iraouen,</i> <i>Irouen</i>
Tmissān	تمسان	<i>Tmassan</i>	Wādī al-Khurmān	وادي الخرمان	<i>Wadi</i> <i>el-Khorman</i>
Trāghān	تراغن	<i>Traghen</i>	Wādī al-Nashwʿa	وادي النشوع	<i>Wadi en-</i> <i>Nashuaʿ, Wadi</i> <i>en-Nesciu</i>
Ṭripoli	طرابلس	<i>Tarabulus</i>	al-Wādī ash-Sharqī	وادي الشرقي	<i>Wadi</i> <i>esc-Scerghi,</i> <i>ech Chergui</i>
aṭ-Ṭrūna	الطرونه	<i>Trouna,</i> <i>Babrat et-</i> <i>Truna</i>	Wādī ash-Shāṭī	وادي الشاطيء	<i>Wadi</i> <i>esc-Schatti,</i> <i>ech Chati</i>
Tsāwa	تساوه	<i>Tessoua,</i> <i>Tsawab,</i> <i>Tesaua</i>	Wādī Tanzzūft	وادي تزوفت	<i>Tanezzūft,</i> <i>Tanessuft,</i> <i>Tanezzrouft</i>
Tubū	تبو	<i>Tubu, Toubu</i>	Wādī Tillizāghān	وادي تليزاغن	<i>Tilizaghen,</i> <i>Tilizabren,</i> <i>Telisaghe</i>
Tūshka	توشه	<i>Tosca, Tosbka</i>	Wādī Tishūnīt	وادي تيشونيت	<i>Tesbuinat</i>
Tuwash	توش	<i>Tuesb, Tuasc,</i> <i>Touach</i>	Wādī ʿUtba	وادي عتبه	<i>Wadi ʿUtba,</i> <i>ʿAtba, Etba</i>
Tuwāt	توات	<i>Tuat</i>	Wādī Zallāf	وادي زلاف	<i>Wadi Zallaf,</i> <i>Zellaf</i>
ʿĪbārī	أوباري	<i>Ubari, Oubari,</i> <i>Aubari</i>			
Umm al-ʿAbīd	أم العبيد	<i>Umm el-Abid,</i> <i>Om la Beed</i>			
Umm al-Arānīb	أم الأرناب	<i>Umm el-Araneb,</i> <i>Oum el-Araneb</i>			
Umm al-Iḥammām	أم الحمام	<i>Oum el-</i> <i>Hamam</i>			

AF Form	Arabic	Variants
Wān Afūda	وان افوده	<i>Uān Afūda.</i> <i>Wan Afouda</i>
Wān Aḡābū	وان اتابو	<i>Uān Tabu.</i> <i>Wan</i> <i>Tabu</i>
Wān Muhūjjā	وان مهوجاج	<i>Uān Mubaggiag.</i> <i>Wan</i> <i>Mubuggiag</i>
Wān Talikī	وان تليكي	<i>Uān Telocat.</i> <i>Wan Telocat</i>
Waṭwāt cf. Qaṣr Waṭwāt	وتوات ؟	<i>Uatwat.</i> <i>Gasr</i> <i>Utawat</i>
Wāw al-Kabīr	واو الكبير	<i>Uau el-Chebir</i>
Wāw an-Nāmūs	واو الناموس	<i>Uau en-Namus</i>
Zāla	زاله	<i>Zālla, Zella</i>
Zinkekrā	زنككرا	<i>Zinbecra</i>
al-Zirghan	الزيرغن	<i>es-Zighen</i>
Zizāw	زيزاو	<i>Zizaw, Zizau</i>
al-Zuwiya	الزوية	<i>Zūwaya.</i> <i>Zouayya.</i> <i>Zuaya.</i> <i>Zueia</i>
Zuwīla	زويلة	<i>Zuila. Zawila.</i> <i>Zouila.</i> <i>Zuwaylab</i>

FOREWORD

Shell companies have a long and successful association with the countries of the Middle East, stretching back many decades. Building partnerships has always been important to Shell in the Middle East, where we have long-standing joint ventures in Egypt, Iran, Oman, Saudi Arabia, Syria and the United Arab Emirates. Here in Libya, Europe's gateway to Africa, we are working to establish our business relationships and look forward to playing a key role in the development of Libya's energy resources in partnership with local stakeholders.

As a world leader in the energy business, employing some 96,000 staff in more than 120 countries, Shell works hard to ensure that in meeting the energy needs of today it pays attention to the needs of future generations – the principles of sustainable development.

But we also recognise that we need to respect and understand the past.

It is because of this that we are delighted to lend our support to the Libyan Department of Antiquities and the Society for Libyan Studies by sponsoring this prestigious book, the first of four volumes, charting the results of some early and more recent archaeological fieldwork in Fazzān in south-western Libya.

Expertly compiled by David Mattingly, Professor of Roman Archaeology at the University of Leicester, this major series, of which Volume 1 is the synthesis, combines his own extensive recent fieldwork and elements of an earlier project executed by Mr. C. M. Daniels between 1958-1977. This work is sure to have a major impact not only within Libya itself, but also more widely amongst those engaged in Saharan studies.

Professor Mattingly's research has resulted in the identification of the first 'Libyan state' – a Saharan kingdom known as the Garamantes that flourished around 1000 BC–AD 500. His work reveals that the Garamantes played a crucial role in the spread of a series of social developments in Saharan – and perhaps also sub-Saharan zones – in important areas such as state formation, urbanisation, writing, irrigated oasis agriculture, the use of the horse and camel and wheeled transport. This project has also managed to place the contributions of the Garamantes in a longer time frame of successive human adaptations to desert conditions, covering the entire Holocene period – broadly the last 10,000 years.

We hope that publication of this important work will not only form a baseline study which will have relevance for many years to come, but will also help to create a better understanding of the history and heritage of Libya and its place in the course of human development.

Peter Osborne
General Manager,
Shell Libya Petroleum Development B.V.

PREFACE AND ACKNOWLEDGEMENTS

Charles Manser Daniels [hereafter CMD] conducted 10 seasons of fieldwork in Fazzān, south-west Libya, between 1958 and 1977, compiling a remarkable dossier of information on one of the most exotic of ancient peoples of the Sahara, the Garamantes. Much of this data had only appeared in preliminary form at the time of his tragically early death in 1996, just as renewed Anglo-Libyan work was about to commence in the region (see *Libyan Studies* 27 [1996] for his obituary). The new expeditions of the Fazzān Project [hereafter FP], directed by David Mattingly (1997-2001), have added significant new information, but have also provided a context for bringing to press the earlier work. Major support was sought and obtained from the Leverhulme Trust, the British Academy and the Society for Libyan Studies and work on the Daniels archive was carried out by two post-doctoral research fellows: Dr David Edwards working under the direction of David Mattingly at the University of Leicester and Dr John Hawthorne supervised by John Dore at the University of Newcastle.

It is planned to disseminate the previously unpublished results of CMD's field campaigns and the work of the FP as a series of four volumes entitled *The Archaeology of Fazzān*. These will be joint publications between the Libyan Department of Antiquities and the Society for Libyan Studies. This first volume offers a preliminary updated work of synthesis on the archaeology of the region and presents the principal discoveries of CMD and the FP. The full gazetteer of sites, with accompanying maps, the pottery type series and a range of other primary data form the content of Volume 2. Volume 3 comprises a series of excavation reports on the main sites where CMD conducted excavations, with the exception of Old Jarma itself. Those excavations will be amalgamated with the results of the FP survey and the 1997-2001 excavations at Old Jarma in volume 4, which will be dedicated to that key site. The first three of these volumes have been prepared as a result of substantial support from the Leverhulme Trust, the British Academy and the Society for Libyan Studies. A major AHRB grant and further support from the Society for Libyan Studies has been awarded towards the post-excavation costs related to the fourth volume.

The work of Charles Daniels (CMD)

The Daniels expeditions were funded by a variety of sources, including the British Academy, the Society for Libyan Studies, the University of Newcastle, the Pilgrim Trust, the Royal Geographical Society, the Lawrence Bequest, the Seven Pillars of Wisdom Trust, the Russell Trust, the Craven Committee Oxford, the Universities of Edinburgh and Cambridge. Grateful thanks to all of these funding bodies are recorded here.

The work was carried out in collaboration with the Libyan Department of Antiquities. A particular debt of gratitude is owed to the successive Under Secretaries, later Presidents, of the Department of Antiquities, for their support for the work. The creation of a southern Controllership of Fazzān in the 1960s was a vital step towards creating the conditions for CMD's project and he worked closely with the first Controller, Mohammed S. Ayoub, (1960-1969). A. M. Kilani, Dr Ali Abdusalem, Dr Giuma Anag and Dr Faraj al-Rashedy were other Libyan colleagues who participated in or assisted CMD's work.

Although, CMD's work focussed primarily on the Jarma region of the Wādi al-Ajāl, in 1968 his mission accompanied a British army expedition to the Murzuq area, thanks to the good offices of Major P. G. Boxhall.

Known personnel of the CMD missions are as follows: Charles Daniels; P. J. Arthur; Eric Balley; (Dr) David Bird; (Professor) Tony Birley; (Dr) David Breeze; Olwen Brogan; David Browne; P.J. Carmody; Hugh Chapman; Miriam Daniels; John Gillam; Andy Gilson; (Professor) Bill Hanson; (Dr) Mark Hassall; (Dr) John Hayes; (Professor) Barri Jones; (Dr) John Little; Tina McGeorge; S. A. Medd; Professor Ian Richmond; Peter Scott; J. Tait; Tim Tatton-Brown; (Major General) Scott-Elliot; Humphrey Welfare; Fran West (with several others now unidentifiable from initials or first name references).

The Fazzān Project (FP)

The FP was initiated at the behest of the Department of Antiquities as a joint venture with the Society for Libyan Studies in 1996, following a visit to Tripoli and Fazzān by Professor Barker with David Mattingly and John Dore. It was a flagship project of the Society for Libyan Studies in the late 1990s and its success owes much to the officers and council who guided and advised. The external advisors of the Society's Fieldwork Committee (Professor Mike Fulford and Dr Tim Potter - the latter replaced after his tragic death in 2000 by Professor Roger Wilson) also kindly agreed to serve on the steering committee managing the Leverhulme project on the Daniels archive. Much of the work of the FP was carried out during the period that David Mattingly served as Chairman of the Society for Libyan Studies (1996-2001), but particular thanks are due to his two predecessors, Dr Susan Walker and Professor Graeme Barker, to his successor, Paul Bennett and to the Society's Head of Mission John Dore, who have been instrumental in the setting up and following up the project. In addition, special mention is due to the Society's General Secretary Shirley Strong MBE and its Honorary Treasurer, Tim Taylor FSA, who uncomplainingly shouldered the extra work that this large project brought their way.

Field seasons took place as follows: January 1997; February to March 1998; January to February 1999; January to early March 2000; January to early March 2001; with a Study Season in January 2002. A further field visit by the project geographers and rock-art specialist took place in April 2002, but the results of that are only partially incorporated here. A separate project was organised in October to November 2000 by David Mattingly and John Dore on behalf of the Department of Antiquities and LASMO oil company to survey the course of a pipeline to the west and south-west of Jarma. This work has not been formally incorporated with that of CMD or the FP in this synthesis, though our views on the archaeology of the Massāk and of the plain west of Ubārī have been informed by its results.

Financial support for the work of the FP was provided by the following bodies: for archaeological fieldwork (Society for Libyan Studies 1997-2001, through its block grant from the British Academy; the Universities of Leicester and Newcastle upon Tyne), for geographical fieldwork (Society for Libyan Studies; Universities of Leicester and Reading), for Post-excavation work (Leverhulme Trust separate institutional grants relating to work of Daniels and for remote sensing work; British Academy Research Readership 1999-2001 for David Mattingly; Society for Libyan Studies for 2002 finds study work in Libya and for scientific dating (AMS and Uranium Thorium); AHRB for initial Palaeobotanical study and a larger grant towards the final write up of the Jarma excavations; NERC for Palaeobotanical study and AMS dates, LASMO GML for AMS dates). LASMO GML also made donations in kind to the project, contributing DGPS data, supplying a computer and printer and providing assistance with vehicles at various points. Shell Exploration and Production International have generously sponsored this volume, making possible the inclusion of many colour images.

In Libya, many colleagues in the Department of Antiquities worked in support of the FP. We wish to thank the following in particular from the Tripoli office: Ali Emhemmed al-Khadouri, President of the Department of Antiquities, together with Giuma Anag, Mohammed Shakshuki, Mohammed Turjiman, Giuma Garsa, Abdullah Mahmoudi, Ibrahim Azabi and other colleagues in Tripoli. Acknowledgement is also due to Mabruk Zenati and Shitewe Muhammed and their staff, who kindly accommodated us at Sabratha and Lepcis Magna respectively on several occasions in transit to or from the south. Successive Controllers of the Department's office in Fazzān, Mohammed al-Mashai, al-Mahdi Mohammed al-Azrak and Dr Ali Abdusalem, gave material and intellectual support to the project, as did Mohammed Arreda and Abdulkhader Sherif also of the Sabha office. At Jarma, the Department's main representative, Saad Saleh Abdelaziz, was indispensable to the well-being of the team and the smooth running of the project, along with other staff based at Jarma, notably el-Arabi Abdullah Ahmed. Dr Habib el-Hesnawi offered helpful advice on many historical matters.

Our Libyan colleagues in the field were as follows: Mohammed al-Mashai (Libyan co-director, Islamic specialist, expert in archaeology of Fazzān) 1997-2000; Abdulkader S. Abdelgader (archaeologist) 1997; Hamza Aburgheba (archaeologist) 1997-1998; Salem Ben-Hamel (conservator) 2000; Youssef Ben Nasif (archaeologist) 1997; Mohammed Ghanoun (archaeologist) 1997; Saad Saleh Abdelaziz (Representative of the Department in Jarma) 1997-2002. Much is owed also to our cooks, to other museum staff and night watchmen and to the many workmen who worked with us. Finally a special word of thanks for Faraj Massoud, the amazing mechanic who fixed the burned-out clutch of a stranded Landrover sufficiently for his friend Mohammed Jebreel, a noted desert guide, to rescue the vehicle from the Dahān Ubāri!

From 2001, we benefited from the reinstatement of a British Embassy and the British Council to Tripoli. Richard Dalton, the Ambassador, and his wife Elizabeth took a deep interest in the project and facilitated our work in many ways, not least throwing open their Residence for several public lectures. The strong support has continued under their successors Anthony and Josephine Layden. We also acknowledge the help we received from other Embassy and British Interests Section staff, notably Dr Noel Guckian, Neil Hammond and Bridget Brind. The Director of the British Council, Tony Jones, has also been a strong supporter of our work, along with his delightful staff. We also wish to acknowledge the help and material support of numerous staff at the LASMO Grand Maghreb oil company office in Tripoli: notably its then manager Mike Buck and Field Officer Mike Keane. We also enjoyed on numerous occasions the support, comradeship and advice of the Italian mission working in the Akākūs and Tazzūft, notably Professor Mauro Cremaschi, Professor Mario Liverani and Dr Savino Di Lernia.

The personnel of the FP were as follows (with indication of years in which they participated in fieldwork and specialist roles): Professor David Mattingly (Director of the Fazzān Project 1997-2002 and Chairman, Society for Libyan Studies 1996-2001); Philip Balcombe (field survey specialist) 1997-2001; Dr Tertia Barnett (archaeologist and rock-art specialist) 2000, 2002; Mathilda Britten (archaeozoologist) 2002; Dr Nicholas Brooks (Leverhulme Research Fellow, Remote Sensing studies) 2000-2001; Simon Chapman (human osteologist) 1997; Hugh Coddington (archaeologist/surveyor) 1997, 1998; Franca Cole (conservator, small finds specialist) 1999-2002; Jim Davison (surveyor) 1997; John Dore (ceramic specialist and Head of Mission, Society for Libyan Studies) 2000-2002; Dr Nick Drake (physical geographer, arid zone specialist) 1999-2001; John Duncan (surveyor, soil micromorphology) 1999; Edward Eastaugh (surveyor) 1998;

Dr David Edwards (Leverhulme Research Fellow, Daniels' site gazetteer) 2000 ; Dr Mark Gillings (field survey specialist) 1998; Malcolm Gould (surveyor) 2000; Dr John Hawthorne (Leverhulme Research Fellow, Daniels' excavations and ceramic specialist) 2000; Sophie Hay (archaeologist/surveyor) 1999, 2001; Richard Helm (archaeologist/supervisor) 2000; Dr Birgitta Hoffman (glass specialist) 2002; David Hopkins (illustrator) 2002; Jason Jeffrey (archaeologist) 2000; Tracey Jenkins (archaeologist) 2000; Elanor Johnson (ceramic specialist) 1999; David Kenyon (surveyor) 1997; Dr Stephanie Knight (archaeozoologist) 1999; Dr Anna Leone (ceramic specialist) 1998, 2000-2002; Dr Sue McLaren (physical geographer, desert landforms specialist) 1998-2001; Dr Paul Newson (archaeologist) 2001; Jon Orchard (archaeologist) 2000-2001; Peter Owen (surveyor) 1998; Holly Parton (finds specialist/stone artefacts) 2001-2002; Ruth Pelling (archaeobotanist) 1998-2001; Simon Pressey (illustrator) 1999; James Preston (surveyor, standing buildings specialist) 1999-2001; Dr Tim Reynolds (lithics specialist) 1998-2001; Toby Savage (photographer) 1998-2002; Dr Irene Schrüfer-Kolb (archaeometallurgical specialist) 1999, 2001; Dr Lea Stirling (archaeologist/supervisor) 1998; Matthew Sutherland (archaeologist) 2000; David Thomas (excavation assistant director) 1998-1999, 2001-2002; Adrian Tindall (archaeologist/supervisor) 1998, 2001; Dr Andrew Townsend (archaeologist/supervisor) 2000-2002; Derek Watson (archaeozoologist) 1998; Dr Kevin White (physical geographer, remote sensing specialist) 1998-2002; Dr Andrew Wilson (ancient hydraulic specialist) 1997-2000; Dr Robert Witcher (field survey specialist) 1997. This volume is a tribute to all of them.

Illustrators involved in producing final figures used in the various publications on the project include Lucy Farr, Mike Hawkes, Cain Hegarty, David Hopkins, Deborah Miles-Williams, Paul Newson, Peter Owen, Simon Pressey, Jamie Preston, Rosie Wheeler. Satellite imagery is the work of Nick Brooks and Kevin White. Photographs in the report are mainly the work of the project photographer Toby Savage, to whom special thanks are due for his many and varied contributions to the project. Some images were also taken by other team members, notably Tertia Barnett, David Edwards, David Mattingly, David Thomas, Andrew Wilson.

A particular debt is owed to Professors Mike Fulford and Roger Wilson who undertook to act as external readers of the finished text of this book and who have saved us from innumerable errors and infelicities, going far beyond the call of duty in their detailed comments and helpful suggestions. This is a far better book as a result, but remaining errors are, of course, the responsibility of the editor and authors. Dr Elizabeth Savage carried out the final work of copy-editing, indexing and typesetting this book, and, as always, brought the added value to the task of her profound knowledge of Libyan history and archaeology. Finally, we are very grateful to Mustapha Turjman of the Department of Antiquities for translating the Arabic abstract with his customary care.

David Mattingly

Leicester, July 2002

CHAPTER 1 BACKGROUND TO THE ARCHAEOLOGY OF FAZZĀN

By David Mattingly,
with John Dore, David Edwards, John Hawthorne

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 km² (*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; Troussset 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

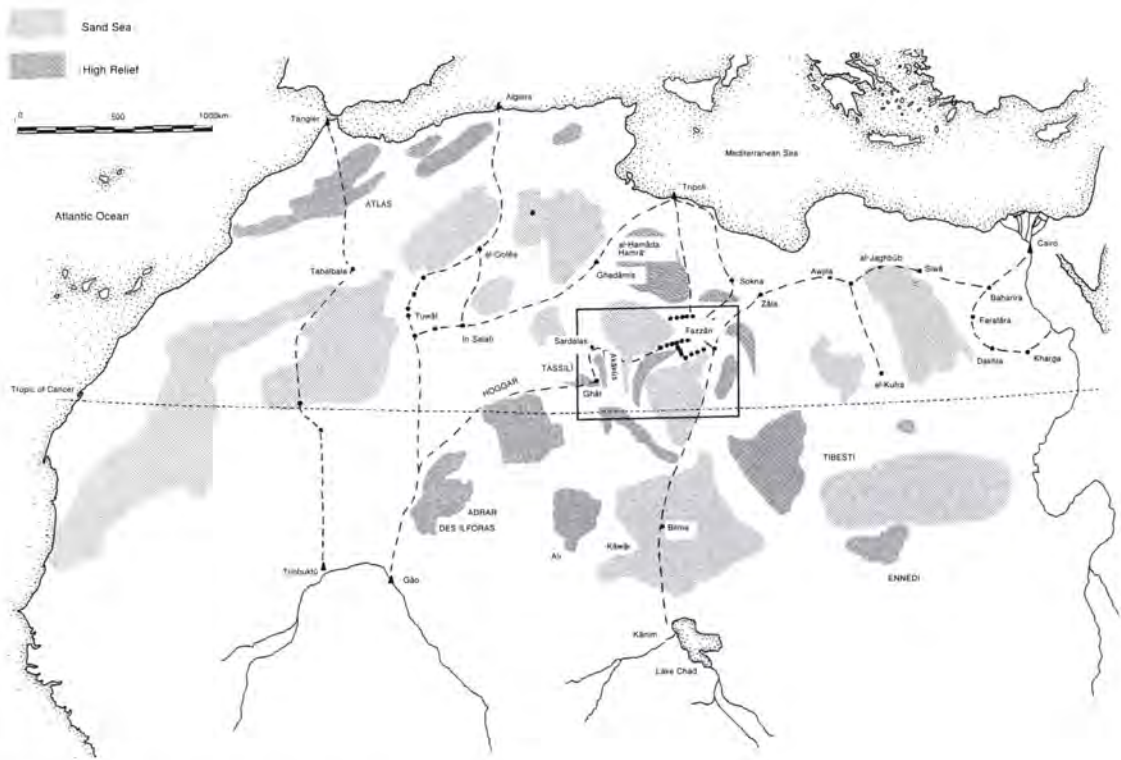


Fig. 1.1. *Fazzân in its Sabaran context.*

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 Fazzân 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 Fazzân concerns the shifting pattern of power between a succession of oases. The oases of Fazzân 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 km²). 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 Fazzân was 79,000 (Knapp 1977, 176: a density of one person every 8 km²). 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 Fazzân covers a far larger zone than was ever the case in the past. Prior to the 19th century, Fazzân 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 Fazzân' approach links forward to

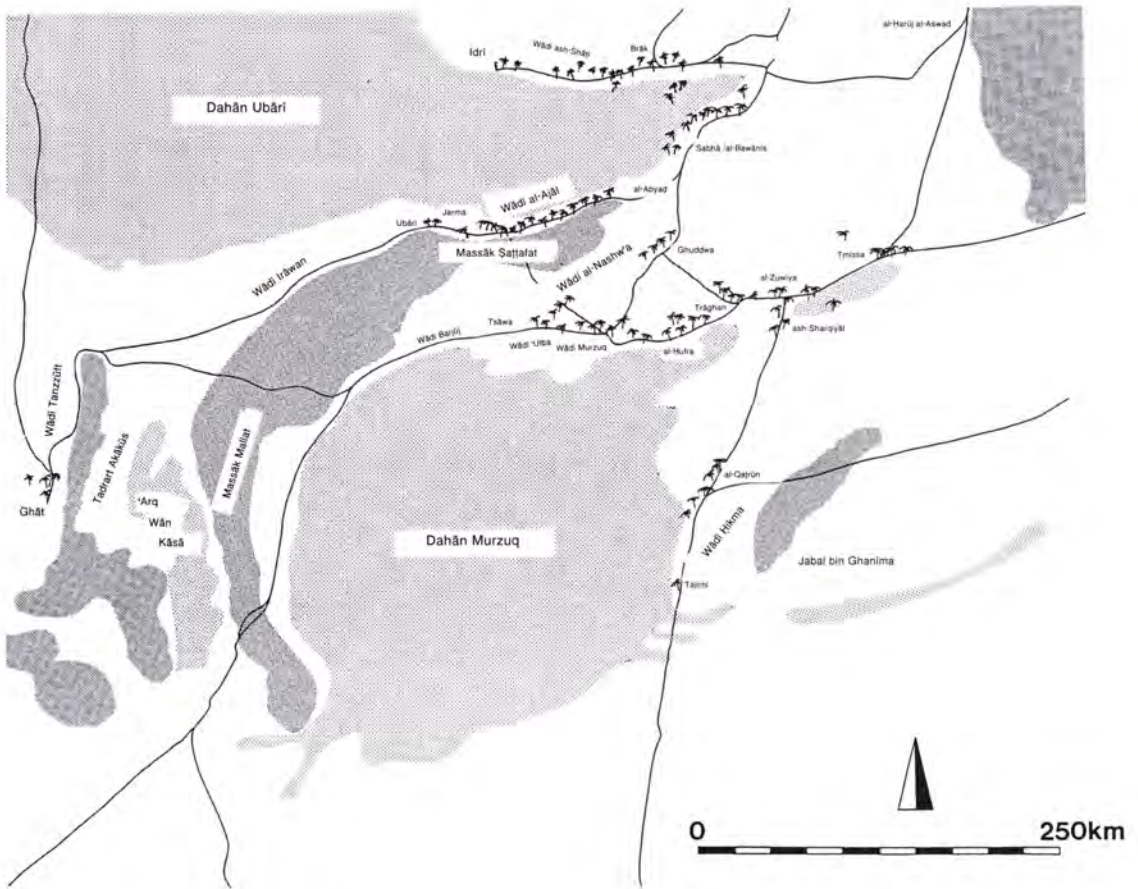


Fig. 1.2. The region of Fazzān.

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-Shāṭī 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 'Utba and the Murzuq/al-Ḥufra and ash-Sharqiyāt 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-Shāṭī and Ṣabḥā/al-Bawānis formed the northern boundary, with the Wādī Barjūj, Wādī 'Utba, Murzuq, al-Ḥufra and ash-Sharqiyāt 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-Fuḥḥā, 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 km²) and the Edeyen or Dahān Murzuq (58,000 km²) (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 Tāssilī 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 (*serīr*) 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-Shāṭī, 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-Shāṭī 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 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 (Scarīn 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 Idri (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; Scarīn 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; Scarīn 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; Scarīn 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; Scarīn 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 Hikma 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

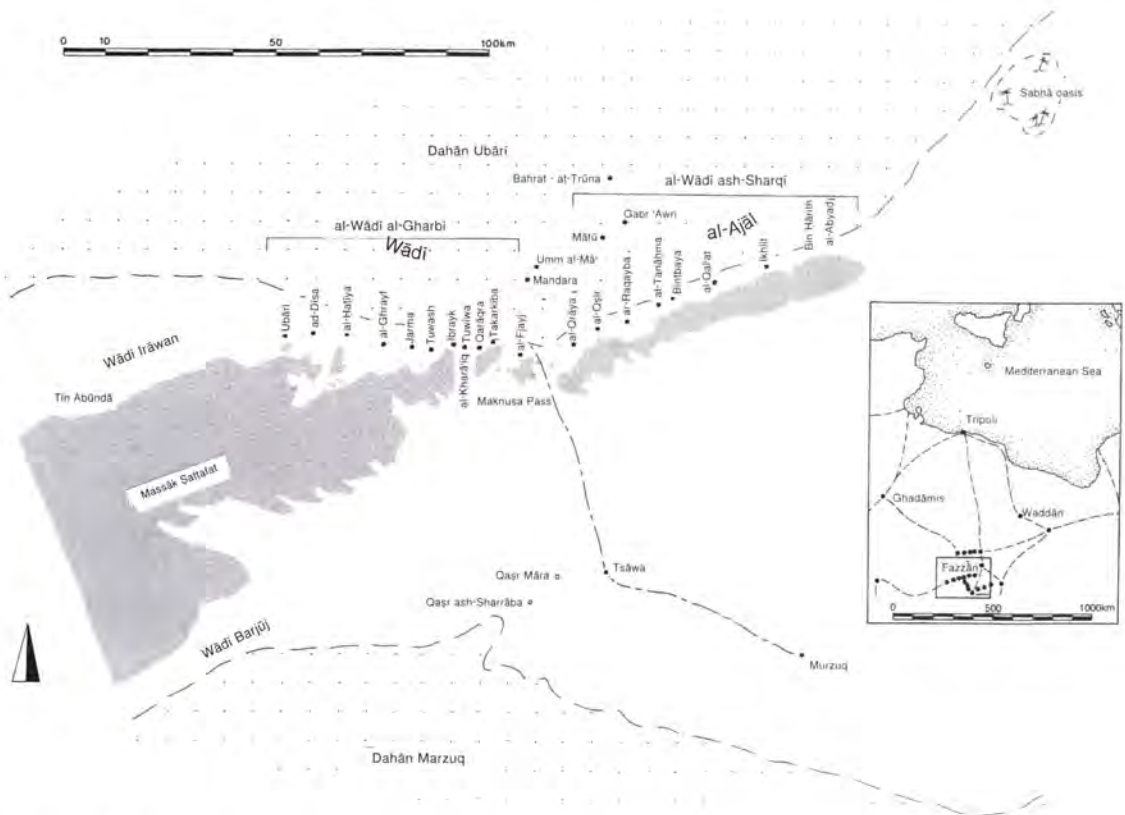
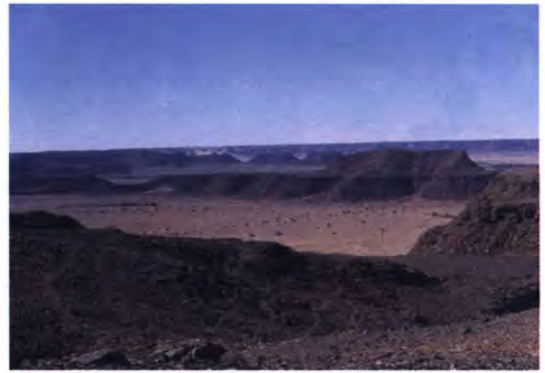


Fig. 1.4. The Wādī al-Ajāl and its principal villages.



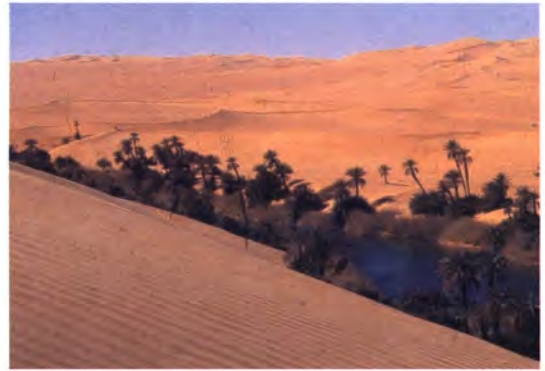
a)



b)



c)



d)



e)

Fig. 1.5. Landscapes of Fazzān: a) Wādī al-Ajāl and Dabān 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 Dabān Ubārī; d) Lake Umm al-Maa in the Dabān Ubārī; e) the Wādī asb-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-Shāfī 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; Chappelle 1982; Cline 1950; Lewicki 1988 for the historical depth; Nachtigal 1974).

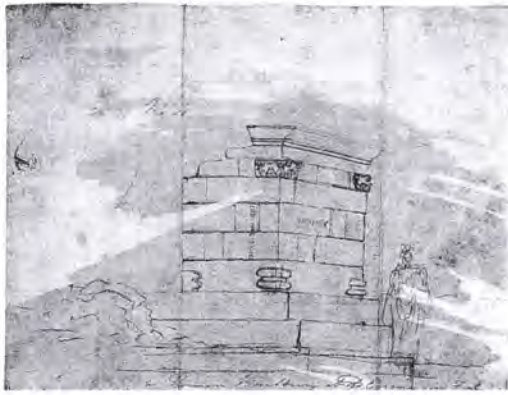
EARLY TRAVELLERS

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.

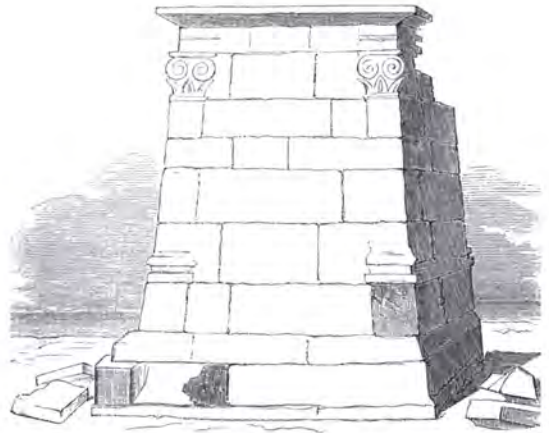
The first European to penetrate the Libyan desert was Frederick Hornemann, who arrived at Murzuq in 1798, having travelled along the old caravan route west from Egypt (Bovill 1964, esp. 92-111). After a prolonged stay at Murzuq and a visit north to Tripoli, he set out for the south and disappeared. His surviving accounts of Zuwila 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 Zuwila 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, Zuwila, Trāghan and Idri 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



a)



c)



b)

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-Sharqiyāt areas – around the ancient capitals of Trāghan and Zuwila respectively (Bruce-Lockhart and Wright 2000, 49-65) and to the west in the al-Wādī al-Gharbī, the Dahān Ubārī, Idri 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-indestructibility 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 embankment 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 Idri, 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 Ghât, 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-Kharā'iq is CHA 1 (the al-Kharā'iq 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

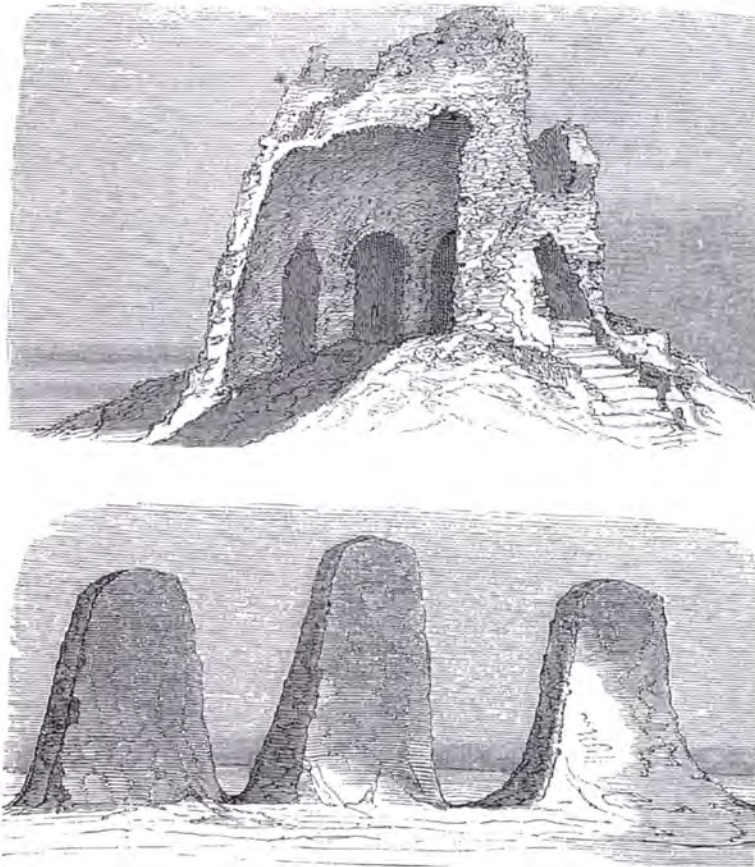


Fig. 1.9. Duveyrier's illustrations of a) *Qaṣr Waṭwāt* (GER 4); b) the *al-Ḥaṭīya* pyramids (ELH 2) (1864, 279).

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 (Petragarni 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 (*qṣūr*) 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), Zuwila (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 Ubarī (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 commenting 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-Kharā‘īq, 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 Zuwila (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 Lethieulleux 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 Jibril, 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 *qasr* 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 *qasr* 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 Idri (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 Talikīt, 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 Abad, Wādī Tisbūnūt in the Tadrart Akākūs.



Fig. 1.13. Large engraved elephant from Wādī Matkbandūsh.

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 Jibriil. 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

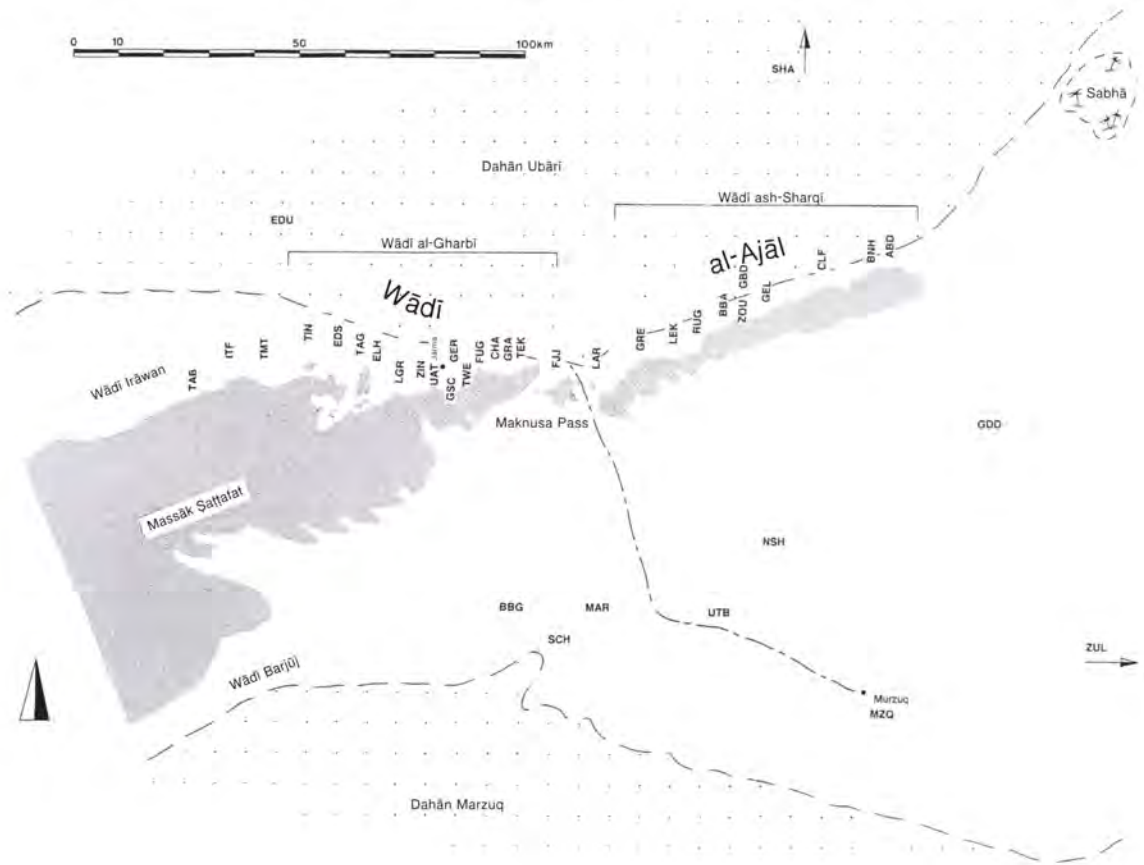


Fig. 1.14. Map of central Fazzān showing three-letter codes used in compiling the site gazetteer. Key:

ABD = al-Abyaḍ	GEL = al-Qal'at	SCH = Qaṣr ash-Sharrāba
BBA = Bintbaya	GER = Jarma	SHA = Wādī ash-Shāṭī
BBG = Bi'r Baqqārā	GRA = Qarāqra	TAB = Tin Abūndā
BNH = Bin Ḥārith	GRE = al-Qrāya	TAG = Tāqallit
CHA = al-Kharā'iq	GSC = Jarma escarpment	TEK = Takarkība
CLF = Ikhlif	ITF = In Ṭafarāt	TIN = Tinda
EDS = ad-Dīsa	LAR = Lārkū	TMT = Tāmalālat
EDU = Dahān Ubārī	LEK = al-Qṣīr	TWE = Tuwash
ELH = al-Ḥaṭīya	LGR = al-Ghrayf	UAT = Waṭwāt
FJJ = al-Fjayj	MAR = Qaṣr Māra	UTB = Wādī 'Utba
FUG = al-Fūgār	MZQ = Murzuq	ZIN = Zinkekrā
GBD = Qaṣr bin Dughba	NSH = Wādī al-Nashw'a	ZOU = al-Zuwiya
GDD = Ghuddwa	RUG = ar-Raqayba	ZUL = Zuwila

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 Fūḡār 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 Fūḡār [FUG 1] mausolea (S&E), Tinda [TIN 1] (S), Ikhliḥ [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-Nashwā (Ghuddwa [GDD]), Murzuq and Zuwila (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 Ikhliḥ [CLF 10] (S)
1973	Excavation and survey	Sāniat Jibrīl [GER 2] (E&S), Sāniat bin Huwaydī [GER 11] (E), Ikhliḥ [CLF 10] (E&S), Tinda [TIN 1] (E&S), al-Kharā'iq [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 Zinkekrâ. 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 Ikhlif (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 Jibril and Sāniat Sulaymān Krayda) and he predicted the existence of more. He was aware of the large numbers of mud-brick forts or *qsur* (singular *qasr*) 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 $26^{\circ}32.69/13^{\circ}03.79$). 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 ≈ 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 1.18a-b), and this affects the visibility of the archaeology today.



Fig. 1.18. Views of the al-Ghbayf 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-Nashw'a 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 Naḍarīf	Qaṣr ash-Sharrāba	Idrī (Wādī ash-Shāṭī)	Sabhā	Murzuq	Zuwīla	Tijirhī	Tripoli	Kawār	Kānīn	Timbuktu
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 Jibril 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 \approx 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 under-represented 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 mud-brick *qsur*) 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

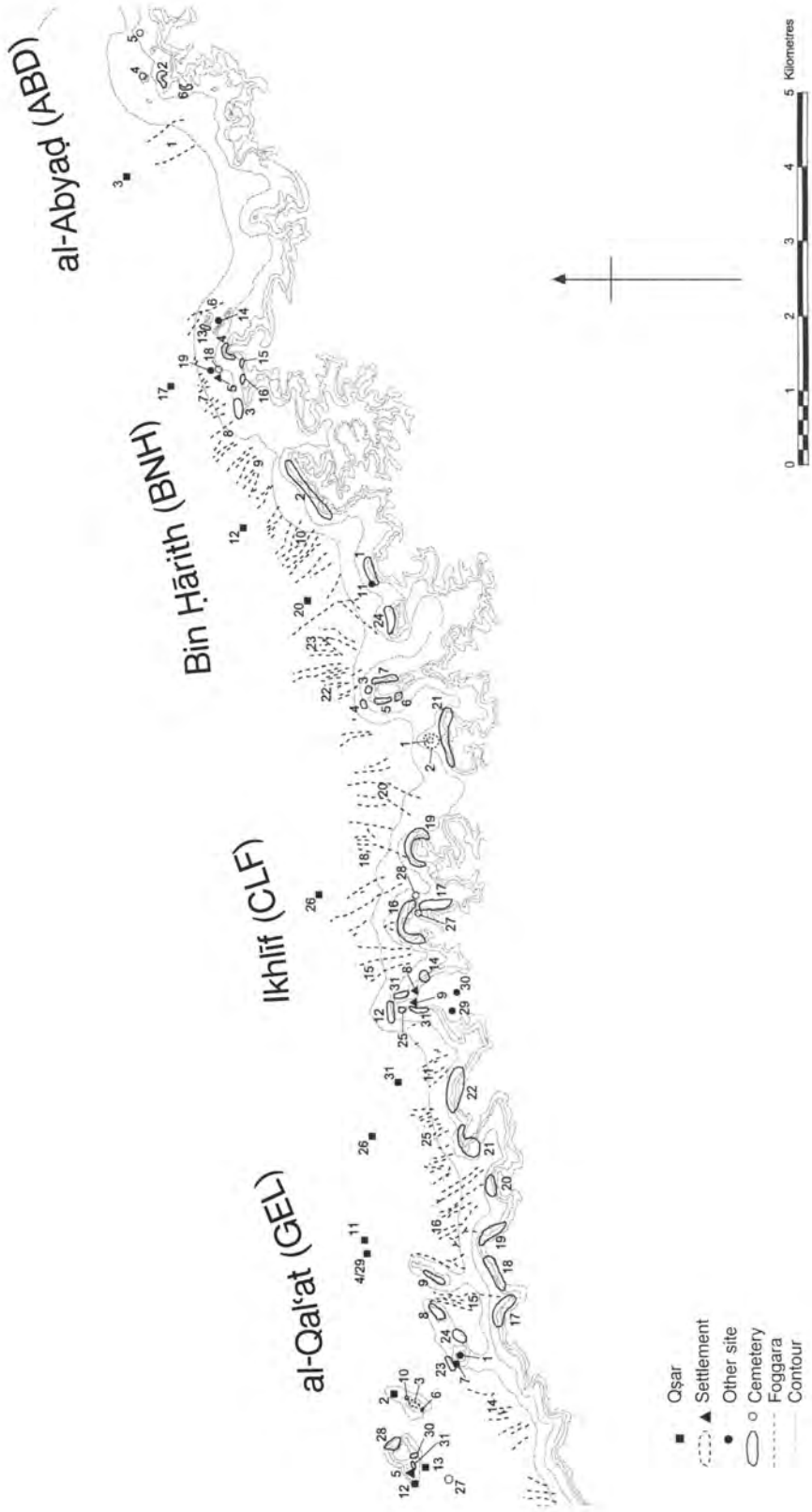


Fig. 1.19. Example of CMD map, derived from air-photographic coverage, showing sites in the eastern Wādī al-Ajāl.



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 [= HAML5 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-Kharā'iq 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-Kharā'iq)	Oasis zone	50 x 50 m gridsurvey (9 grids)
	al-Kharā'iq 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 Jibril)	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 Tin Abūndā. In Ṭafarāt and Tāmālalat 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 'Utba	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 ± 5 m) 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-Kharā'iq).

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 ($> 1 \text{ km}^2$) 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 $50 \times 50 \text{ m}$ 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 $5 \times 5 \text{ m}$ 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 extraordinarily rich site of Sāniat Jibrīl, using a $25 \times 25 \text{ m}$ 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 $50 \times 50 \text{ m}$ grid squares was employed. Five 1m-wid-transects were walked across each $50 \times 50 \text{ m}$ 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 15×15 m 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 ≈ 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 *qsūr*. 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 *qsūr* 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 *qsur* 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 Fazzân (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 Fazzân 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 Fazzân. 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.

CHAPTER 2

STUDIES IN GEOGRAPHY, GEOMORPHOLOGY, ENVIRONMENT AND CLIMATE

By Nick Brooks, Nick Drake, Sue McLaren and Kevin White

CHANGING ENVIRONMENTS OF THE LIBYAN SAHARA

The two major aims of the geographical and geomorphological work carried out under the auspices of the Fazzān Project are (i) to further our understanding of climatic and environmental change, and the relationship between them, in the Sahara in general and in Fazzān in particular; (ii) to provide a palaeoenvironmental framework within which the archaeological record may be interpreted. From the point of view of understanding contemporary climatic and environmental change, information relating to changes occurring on century to millennial timescales in the recent geological past is particularly pertinent. In archaeological terms, the period of interest spans several hundred thousand years with the archaeological record of the FP study area including lithic remains representing the Acheulean to the Late Neolithic periods. For these reasons, the period of greatest interest in terms of palaeoenvironmental reconstruction is the Late Quaternary, here defined as representing approximately the past 300 thousand years and including the late Pleistocene and the Holocene (the latter describing the last 12000 years).

Present day rainfall in Fazzān is less than 20 mm per year on average, and exhibits high interannual variability (Pallas 1978). However, both archaeological remains and geomorphological evidence in Fazzān indicate that this currently hyper-arid region experienced wetter phases in the past. Rock carvings and other archaeological remains attest to the existence of a more benign environment during the early to middle Holocene, when humans and large humid-climate fauna existed in currently inhospitable areas (Cremaschi and Di Lernia 1998a). Lake sediments and various geochemical crusts demonstrate the existence of open water bodies and a higher groundwater table during several phases of the Late Quaternary (Cremaschi 1998a; White *et al.* 1999). Successive arid and humid phases in the Sahara over this period are well documented (Fontes and Gasse 1989; Gasse *et al.* 1990; Szabo *et al.* 1995). These were generally associated with episodes of northern hemisphere glacial advance and retreat respectively (Nicholson and Flohn 1980; Causse *et al.* 1989; Clark *et al.* 1999), but were not necessarily synchronous throughout the Sahara (Gasse *et al.* 1990). New information from data-sparse areas such as Fazzān is, therefore, particularly welcome. Evidence of wetter past environments in the Sahara is summarised briefly in this chapter, with the emphasis placed on records of lake high-stands in regions near to the FP study area. The mechanisms behind the associated changes in climate are also discussed, and the implications of existing palaeoenvironmental data for Fazzān, and the relationship between these data and new data from the FP, are addressed.

In the following discussion of past Saharan environmental change and its relationship to the archaeology of Fazzān, emphasis is placed on the Holocene for several reasons. Largely as a result of its proximity in time to the present day, environmental change during the Holocene has been more intensively studied than that during previous epochs (Maley 1977; Ritchie and Haynes 1987; Lezine 1989). The Holocene represents the most dynamic period of human development in the Sahara and the Near East, including the development of pastoralism and sedentary agriculture and the rise of urban centres (see below Chapter 9). Saharan cattle-herding cultures emerged during the mid-Holocene, and it is likely that these groups influenced the evolution of many African societies, including those of pre- and early-Dynastic Egypt (Malvill *et al.* 1998). In Fazzān, they represent the precursors of the Garamantian civilisation, whose

widespread remains are densely distributed throughout the FP study area (Mattingly *et al.* 1998a; this volume). Both the Egyptian Dynastic culture and the urban culture of the Garamantes in Fazzān thrived in the millennia following the onset of Saharan desiccation around 5000 BP, and it is likely that changes in the physical environment played a significant role in the development of these societies (Malvill *et al.* 1998).

The rise of the pastoral cultures of Fazzān and the transition from these societies to the Garamantian culture may be interpreted in terms of human responses to increased aridity during the middle and late Holocene. Whereas the period from about 10000 to 8000 BP was characterised by abundant year-round rainfall throughout the Sahara, an arid episode lasting for some centuries around 8000 BP was followed by the establishment of a seasonal rainfall regime (Nicholson and Flohn 1980). These pre- and post-8000 BP phases are associated with the repopulation of parts of Fazzān by hunter-gathers by about 9700 BP (after the cessation of Late Pleistocene aridity), and the introduction of cattle domestication in the “Early Pastoral” phase respectively (Di Lernia 1998). The “Late Pastoral” phase represents the period following the end of regular rainfall after 4500-5000 BP (Di Lernia 1998; Claussen 1999) and prior to the start of the Garamantian period around 3000-2500 BP (Chapter 9, below). Crucially, surface water remained available in certain parts of Fazzān during this period (Cremaschi 1998a; 2001; this chapter, below), a manifestation of the lagged environmental response to climatic change in this region. Thus human populations could be sustained in Fazzān provided that exploitation of the environment concentrated on those areas where water was available at or near the surface. By 2500 BP it is likely that surface water was generally unavailable. The Garamantian civilisation of the Wādī al-Ajāl arose in a locality where sophisticated gravity-fed irrigation technology made possible the extraction of groundwater in an otherwise hyper-arid environment (Chapter 7, below); this society is therefore likely to represent the final phase of human adaptation to the regional desiccation before the modern period. The reasons for the decline of the Garamantian culture are unclear, but one possibility is that groundwater levels eventually fell to such an extent that irrigation agriculture became unsustainable.

The above issues are discussed in more detail below. First, however, the present-day environment of Fazzān is described in terms of landscape, landforms and geomorphological indicators of past environments. The detection of such indicators via satellite remote-sensing methods is discussed. Certain geomorphological features tend to be associated with archaeological artefacts and other materials suitable for dating. These indicators are generally associated with the presence in the past of surface water or near-surface groundwater, and include a variety of geochemical crusts and palaeolake sediments, as well as the remains of various species of mollusc. Many of these materials have been dated; the dating methods are detailed and the results of dating analysis are presented and interpreted within the context of existing palaeoenvironmental data.

LANDFORMS AND COMMUNICATIONS

Landforms

In common with many other dryland regions, the landforms of Fazzān preserve a record, albeit much erased and modified, of past environments. Given the contemporary hyper-aridity of the region, it is easy to imagine a fossilised landscape that has changed little over the Quaternary Period (defined here as the last 1.8 million years). However, during this time, the Earth has experienced major climate changes, manifested at higher latitudes by several advances and retreats of ice cover and at lower latitudes by changes in precipitation regime. The landscape of Fazzān has evolved against a background of environmental changes, but subsequent modification

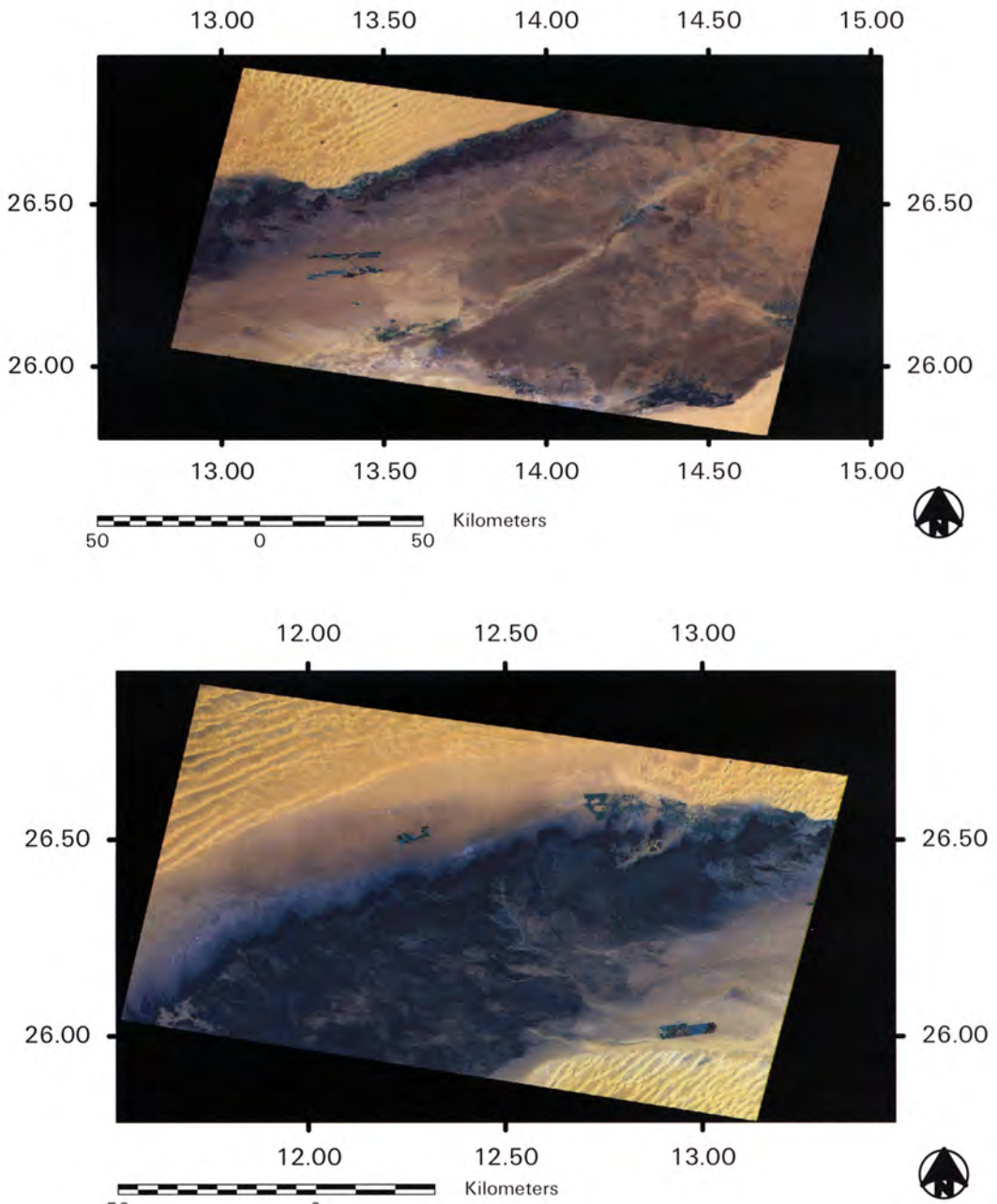


Fig. 2.1. a) and b) Landsat Thematic Mapper imagery of the study area, showing the general geomorphology. Figures represent northernmost regions covered by row 042 and paths 187 (east, top) and 188 (west, bottom). Bands used are 7, 4 and 1, with green representing vegetation.

since the onset and intensification of recent aridity means that palaeoenvironmental reconstruction must be undertaken with great care.

The starting point for reconstructing past environments is assessment of the contemporary geomorphology, the distribution of landforms and sediment transport processes pertaining at the present day. In the Wādī al-Ajāl study area, this is relatively simple, and is evident in remotely sensed imagery from the Landsat Thematic Mapper (Fig. 2.1). To the south lies the Murzuq Ḥamāda (Massāk Ṣaṭṭafat), a plateau of Nubian Sandstone (the Murzuq Formation) underlain by marls (Jarma or Germa Beds)

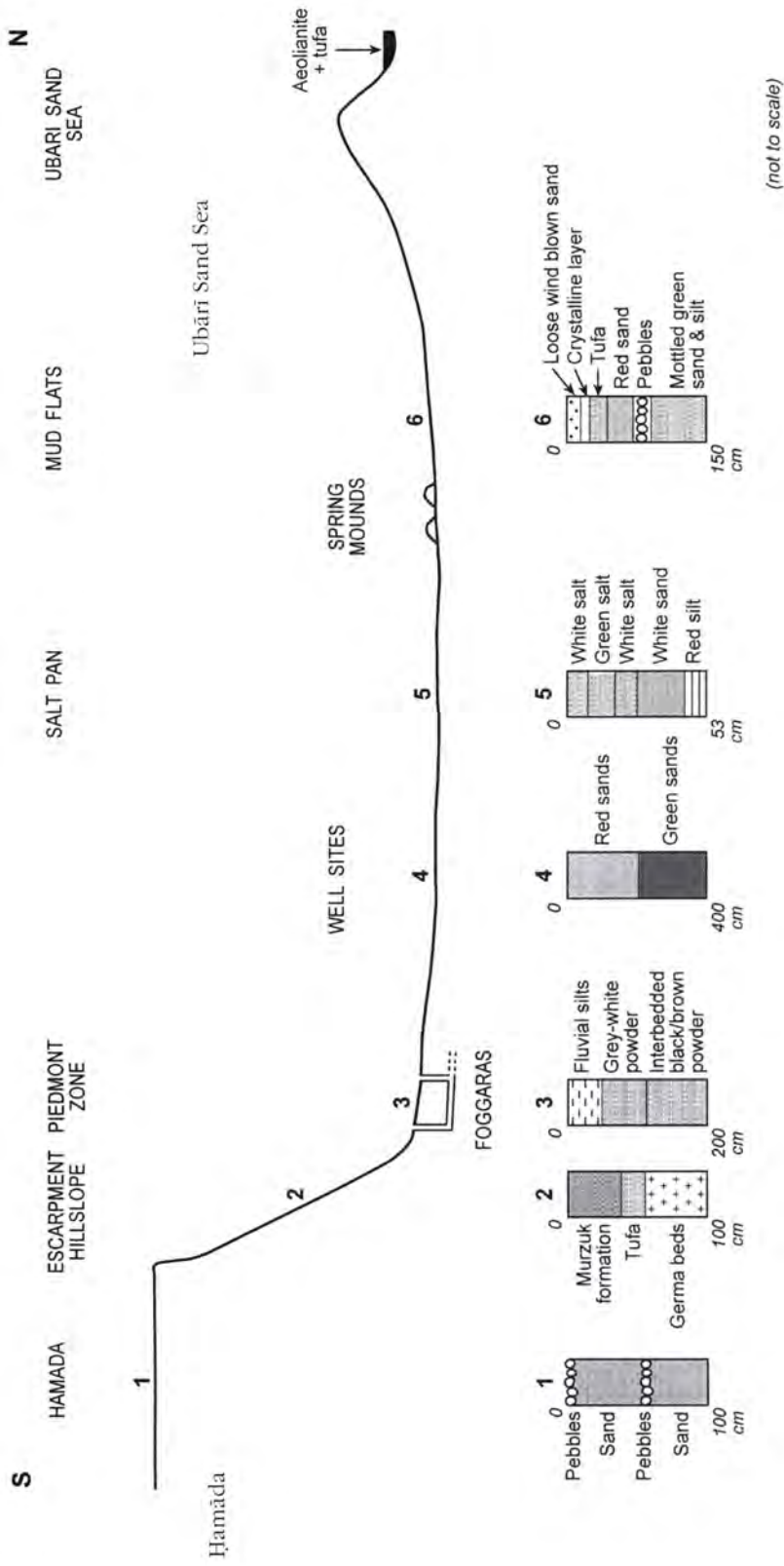


Fig. 2.2. Schematic cross-section of the study area, showing the general geomorphology.

dipping gently to the south. A well-developed (though relict) dip slope drainage system terminates in the Wādī Barjūj, with extensive evidence of palaeolake deposits banked up against the Murzuq Sand Sea further south. The northern edge of the Massāk Ṣaṭṭafat terminates in a steep escarpment, exceeding 100 m in height in places, overlooking the Wādī al-Ajāl and deeply incised by scarp slope drainage. At the base of the scarp slope, the piedmont consists of an erosional pediment, thinly veneered (generally 1-2 m thick) with coarse angular alluvium. At major re-entrants where large channels debouch onto the piedmont, low-angle alluvial fans form thicker alluvial deposits, but nowhere in the study area do these achieve great thickness, attesting to the limited amount of fluvial deposition over the time of their formation. The base of the Wādī consists of a linear groundwater-fed oasis zone, with a chain of ephemeral lakes, or playas, of varying salinity. The Wādī al-Ajāl is bounded to the north by the Ubārī Sand Sea (Fig. 2.2).

These landform units are linked by sediment transport pathways. The source of most clastic sediment is the Mesozoic sandstones and marls of the Murzuq Formation and the underlying Jarma Beds (Klitzsch and Baird 1969, 67-71). The sandstones generate fine sand, silt and clay material. These sediments are liberated by chemical, physical and biotic weathering processes characteristic of hot desert environments, in which evaporitic salts play a key part (Smith 1994). Once liberated, the sediment is transported from the ḥamāda and escarpment hillslopes by processes driven by gravity, wind and very infrequent fluvial activity. The sediment may be stored temporarily within the hillslope or piedmont units. However, storage in these units is limited under contemporary climatic conditions; only a thin veneer of alluvial or colluvial cover can be found around the escarpment and adjoining piedmont, rarely more than a metre or so thick. The piedmont surfaces can thus be classified as pediments, with a thin, poorly sorted alluvial cover (Doehring 1970).

As is common in dryland environments, the base of the hillslope is the location for preferential availability of groundwater, resulting in oasis vegetation and associated human development (Beaumont 1989). To the north of the oases, extensive mudflats (Fig. 2.3) associated with ephemeral lakes form another sediment store, beyond which



Fig. 2.3. Field photograph of Jarma Playa mudflats, taken shortly after rainfall which resulted in the formation of an ephemeral halite crust.



Fig. 2.4. Field photograph of qaa surface on the Massāk Şaṭṭafat.

the Ubārī sand sea receives wind-blown sediment derived mainly from the aforementioned sediment stores.

The different landform units of the study area will now be considered in more detail:

The Ḥamāda (Massāk Şaṭṭafat):

The surface of the ḥamāda is dominated by stone pavement (McFadden *et al.* 1987) consisting of a lag surface of sub-angular to sub-rounded cobbles and boulders, including many weathered-out sections of petrified trees and lithic artefacts. These surface clasts are generally coated with black desert varnish, a surface coating of clays, manganese oxide and iron oxides (Oberlander 1994). The stone pavement overlies a skeletal entisol (poorly developed soil with little horizonisation). The ḥamāda surface is dotted with light-coloured areas where coarse debris (cobbles and boulders) are absent from the surface (Fig. 2.4), exposing finer substrate (sands, silts, clays and gravels); some examples can be seen in the vicinity of 26.47417N, 13.08583E. These areas are often approximately circular and occupy depressions from which there are no obvious inflows or outflows. Similar features in the Middle East are called *qaa* (al-Homoud *et al.* 1995). The fine-grained material, interpreted as reworked loess (aeolian sediment, brought in by the wind and washed into the basins by run-off) often exceeds 30-50 cm thickness towards the centre of the depression before a stony layer is encountered, thinning towards the edges. The stony layer is thought to represent a palaeosurface above which the fine material has accumulated. *Qaa* are interpreted, therefore, as areas of sediment accumulation derived from slope wash from the surrounding area. *Qaa* surfaces are protected from aeolian erosion by formation of a thin soil crust (Mah *et al.* 1992). The light coloured sediment infilling these qaa is sometimes underlain by strongly rubified loess, indicative of a wetter climate. Pleistocene lithics are stratified within the *qaa* infill, whilst Holocene materials often lie



Fig. 2.5. Field photograph of escarpment face west of the town of Ubārī, showing sections of relict hillslope or 'flatirons'. Note the dark colour of the rock due to the formation of desert varnish.

on the surface. With more rainfall than at present they could have supported stands of vegetation. Grooved 'trapping stones' used in Pastoral hunting activities are often located on and immediately round these silty depressions, suggesting that these were quite well-vegetated in the early Holocene and that animals used them as a grazing resource (see below, Chapter 9, and Figs 9.8-9.9).

Hillslopes:

The steep hillslopes of the escarpment carry only a thin colluvial cover, with gravity-driven movement of sediment concentrated along rock-chutes (shallow incised features separated by hillslope bluffs, which channel debris down into talus cones). These talus cones consist of coarse angular sediments, indicating that surface run-off has been of only minor significance in their deposition. The resistant overlying sandstones of the Murzuq Formation form the steepest slope segments, often with free faces in excess of 45° . The less resistant Jarma Beds form less steep segments towards the base of the escarpment, resulting in concave-upward slope profiles. A few flatirons (relict hillslopes left behind by slope retreat) can be seen along the mountain front just west of Ubārī (Fig. 2.5).

At the contact between the Jarma Beds (shales, siltstones and thin interbedded sandstones) and the overlying Murzuq Formation (Nubian sandstone), discontinuous tufas (calcareous or gypsiferous deposits) have been emplaced by evaporating groundwater. In places, large crystals of gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) are found in cracks between blocks of sandstone and marl. Good examples can be seen adjacent to the village of Tuwash (26.534N, 13.10817E). This is indicative of post-depositional emplacement by mineral-rich groundwater. In places high surface temperatures have driven off the water of crystallisation, turning the gypsum to anhydrite (CaSO_4). These tufas provide



Fig. 2.6. Field photograph of piedmont at base of escarpment west of the town of Ubārī.

evidence of a previously active springline, with groundwater moving along the junction between the impervious Jarma Beds and the porous overlying Murzuq Formation. The tufa deposits are mostly covered by recent colluvium, and are only exposed in shallow wādī sections. Allowing for this, the tufas are not found in equal abundance along the whole mountain front, suggesting that pathways of preferential flow occurred.

The Piedmont:

The area between the escarpment and the oases consists of a gently dipping piedmont surface with a thin alluvial/colluvial cover of coarse, angular debris (Fig. 2.6). The desert piedmont has always attracted a lot of attention from geomorphologists.

“The desert piedmont links an upland of predominant erosion with a lowland in which surfaces are transportational or depositional in the main. It intervenes between the close, connected systems of upland drainage channels, and the plains sectors with diminished numbers of channels where local run-off is increasingly dispersed.” (Mabbutt 1977: p81).

The piedmont is, therefore, a sensitive indicator of changes in erosion and deposition resulting from climate change (Dorn 1994; White 1991). However, in the study area, the low level of piedmont erosion and deposition suggests that fluvial activity has been limited over the timescales on which the piedmonts have formed. The low angle alluvial fans that have formed where major channels debouch from the ḥamāda have short fanhead trenches (incised channel reaches at the fan apex) and show no evidence of the telescopic segmentation (formation of younger, lower-angle alluvial surfaces inset within steeper, older surfaces), which provides evidence of fluvial response to climate change elsewhere in the northern Sahara (White 1991).



Fig. 2.7. Field photograph of phreatophytic mound, Wādī al-Ajāl.

Oases and Playas:

The aerodynamic roughness caused by the vegetation in the Wādī al-Ajāl, coupled with vigorous aeolian sediment transport, has formed numerous phreatophytic mounds (sometimes described as ‘spring mounds’) (Fig. 2.7), some of which attain great size (up to 8-10 m high in places such as al-Ḥaṭīya 26.5515N, 12.96517E). Typically these are formed over and around tamarisk trees or other vegetation tapping into shallow groundwater, so their location can indicate points where water is closer to the surface (Cremaschi 2001, 23-25, with fig. 20). Excavation of a relatively small example at Sāniat Jibrīl (26.54517N, 13.06917E) showed that it had formed on top of a Garamantian ground surface, dated by Roman sherds. This suggests that such mounds can form very rapidly and are unlikely to be of significance in long-term landscape evolution. Their duration in the landscape is probably controlled by the life-span of the vegetation which gave rise to them.

A string of small ephemeral lakes, known as playas, forms a discontinuous barrier between the oases to the south and the sand sea to the north. These are of varying salinity, some dominated by clays and silts with some gypsum, and others showing extreme haloturbation (surface disruption caused by growth of crystals: an example can be seen at 26.71391N, 13.81127E, Fig. 2.8). Playas are often prone to aeolian erosion, due to the fine-grained sediment and lack of vegetation cover. However, the development of a thick, hard salt crust in this hyper-arid environment probably serves to decrease the impact of wind erosion in this area. At 26.5798N, 13.0794E, a patch of vegetation can be seen in the middle of Jarma Playa, attesting to the presence of relatively fresh groundwater within range of phreatophyte roots. There is some archaeological evidence to suggest ancient exploitation of these salt-rich areas for salt extraction (Chapter 9, below).

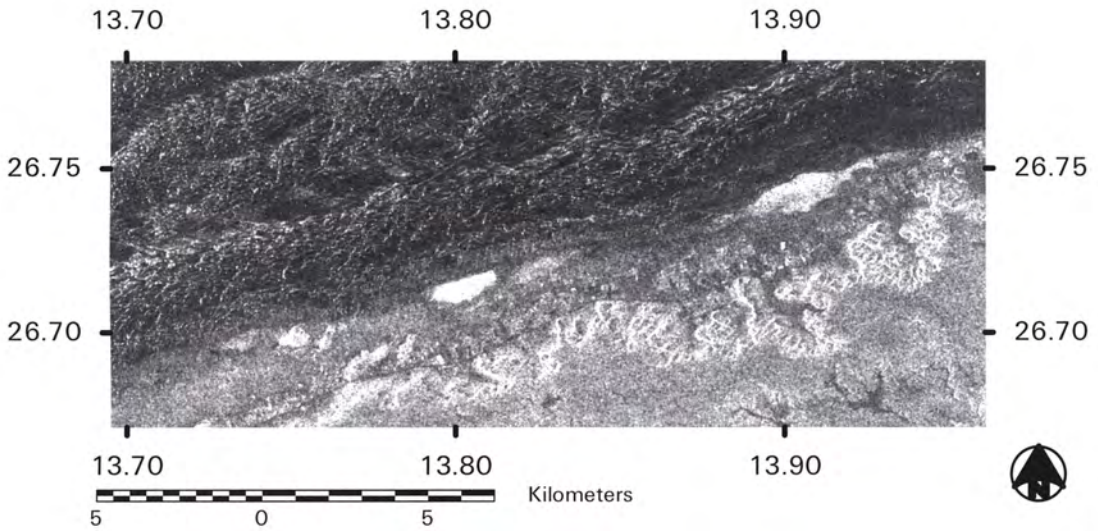


Fig. 2.8. a) ERS Synthetic Aperture Radar imagery of Wādī al-Ajāl showing high backscatter from the haloturbated playa surfaces in the northeast part of the Wādī (bright targets); b) Field photograph of haloturbated playa surface at 13.80° E.

Ubārī sand sea:

Dune forms in the Ubārī Sand Sea are variable, but dominated by linear dune ridges oriented east-north-east to west-south-west (Fig. 2.1; see also Fig. 2.10). North of al-Ghrayf the dune ridges disappear and are replaced by an undulating surface of coarse sand. The dune ridges grow in height either side of this plain. The sand sea also contains some seasonal and perennial lakes in interdune corridors, attesting to a high water table in places. The other significant geomorphological features in the Ubārī sand sea are duricrust deposits, calcium carbonate crusts with greater or lesser amounts of silica, with abundant root casts attesting to the intimate association with vegetation. Elsewhere, outcrops of very friable aeolianite (weakly cemented sand dunes) can be found: a good example is at 26.7085N, 13.31983E. The lack of well-developed calcium carbonate cement in these deposits suggests formation in an arid climate with less groundwater input, possibly in the late Holocene. Outcrops of duricrust are often also the loci of abundant lithic artefacts, suggesting that these areas have been important for humans at some stage in their development. Duricrusts will be considered in more detail below as they formed a major element of the work of the FP 1997-2001.

Communications

The geomorphology of the study area, detailed above, has important implications for the geography of communications. Currently the oasis zone at the base of the Wādī al-Ajāl provides the major line of communication, and this was also the case when early European travellers were passing through the region. For example, when Hugh Clapperton passed through prior to the Bornu Mission, the valley was referred to as al-Wādī al-Gharbī and was part of the route from Sabhā to Ghāt (Bruce-Lockhart and Wright 2000), a function that it still performs.

The importance of desert piedmonts as communications routes has been noted previously (White 1994). This is because the going is generally much easier along the base of mountains compared with the adjacent uplands and lowland sedimentary basins (salt lakes and sand seas), between which the piedmont zone is juxtaposed.

However, the extensive and incontrovertible evidence for significant Late Quaternary environmental change in the area, touched on above and examined in detail later in this chapter, implies that other communications routes may well have been important during periods of less intense aridity. Direct routes north from the Wādī al-Ajāl to the Wādī ash-Shāṭi across the Ubārī sand sea will have been simpler if there were open water bodies, now preserved as palaeolake deposits, along their course. Similarly, although the dune front along the Wādī al-Ajāl appears unbroken and difficult to traverse, behind this barrier many of the dunes between the two depressions are so aligned as to form long continuous corridors running south-south-west to north-north-east. Movement across the sand sea is thus not as difficult as sometimes assumed and the large amount of lithics and other artefacts would seem to indicate a significant amount of human movement through this area, particularly as this material would have to be carried into the sand sea from the ḥamāda. Currently routes across the Ubārī Sand Sea link existing lakes (Mandara, Māfū, Umm al-Māʿ, Gabr ʿAwn, Baḥr aṭ-Ṭrūna, etc.) to create a route through to Wādī ash-Shāṭi. It seems highly probable that many more routes may have existed when there were more surface water bodies in the sand sea than at present.

At times of climatic amelioration, it is likely that routes into and across the ḥamāda were also more readily undertaken, due to water flow or pooling in the dip-slope wādīs. This is attested by large amounts of rock-art in some of these valleys, such as at Wādī Matkhandūsh (25.76342N, 12.16982E), where petroglyphs illustrate aquatic fauna such as crocodiles among the more common giraffes, ostriches, etc.. The top of

the ḥamāda reveals numerous worn tracks where animals or people have passed with some regularity, showing that its forbidding aspect today belies a greater level of use in the past.

The Wādī al-Ajāl was linked to the slave routes across the Sahara via the important staging posts of Murzuq to the south and Ghāt to the south-west. Communications were facilitated along the relatively easy going offered by the piedmont zones along the Wādīs Irāwan, Barjūj, Tanzzūft and Ḥikma. In addition to these links, it is highly probable that other routes were possible during periods of wetter climate in the past.

REMOTE SENSING

Satellite imagery was used extensively in the geographical and geomorphological elements of the FP. Both optical and radar images were employed in the identification of sites of geoarchaeological interest, represented by geomorphological indicators of past environments, and sites likely to be particularly rich in archaeological material. Remote sensing was therefore an invaluable tool for mapping the distribution of sites of interest and in reconstructing the palaeoenvironments of Fazzān, particularly when employed in conjunction with field studies and the collection of materials for dating. Satellite images were also invaluable in planning vehicle journeys into the Ubārī Sand Sea and at the fringe of the Murzuq Sand Sea. The optical and radar data are described separately below, after which the results of the remote sensing studies are summarised for the three major regions under investigation (Ubārī Sand Sea or Dahān Ubārī, Wādī al-Ajāl/Irāwan and the Massāk Ṣaṭṭafat).

Optical imagery

Optical imagery consisted of Landsat Thematic Mapper (TM) images from 1987, and Enhanced Thematic Mapper images from 1999 and 2000. The term TM will be used to denote both types of Landsat imagery hereafter. A pair of images representing each of these years was obtained, consisting of an eastern image (Path 187; Track 042) and a western image (Path 188; Track 042). The eastern images (Fig. 2.1*a*) cover the Wādī al-Ajāl, Wādī Barjūj, the northern section of the Murzuq Sand Sea and the southeastern part of the Ubārī Sand Sea. The western images (Fig. 2.1*b*) cover the Wādī Irāwan (the western continuation of the Wādī al-Ajāl), the Massāk Ṣaṭṭafat, the north-western part of the Murzuq Sand Sea and the south-central part of the Ubārī Sand Sea. These images are multispectral, consisting of 6 bands representing visible to short wavelength infrared radiation (Bands 1-5 and 7) at 30 m nominal resolution (pixel size), one low-resolution thermal infra-red band, and one 15 m band comprising a broad range of visible and near infra-red wavelengths. The thermal infra-red bands were not used in this study, while the 15 m band was used chiefly for navigation purposes (except on the Massāk Ṣaṭṭafat), principally to plot routes through the Ubārī Sand Sea along interdune corridors. Fig. 2.1 shows the northernmost areas covered by the 2000 images, containing the study area. The bands used to create the images are Bands 7, 4 and 1.

The intensity of a pixel in a single-band image is determined by how strongly the ground surface in the area covered by that pixel reflects the wavelength of light represented by that particular band. Three bands are combined to form a false colour composite image, and different combinations are used to detect different features and different types of mineralogy. For example, gypsum and calcrete crusts are relatively reflective towards the blue end of the visible part of the electromagnetic spectrum; they are therefore prominent in Band 1 (0.45–0.53 microns wavelength), which represents visible blue light. The distribution of palaeolakes, which are typically associated with these surface crusts, is therefore assessed using images representing either Band 1 only (Fig. 2.9*a*), or a combination of Bands 7, 4 and 1. Mineralogical analyses may also be carried out using mixture modelling, a procedure in which the ‘purest’

pixels, that is those representing the highest proportions of a given type of surface, are identified via statistical methods. A fixed number of surface types is set; each pixel in an image may then be described in terms of the proportion of each surface type occurring within it, based on the values representing these surfaces corresponding to the purest pixels. In this way, satellite images may be converted to proportional surface cover maps; such a procedure was employed to map proportions of gypsum in the study area, which is indicative of wetter conditions in the past.

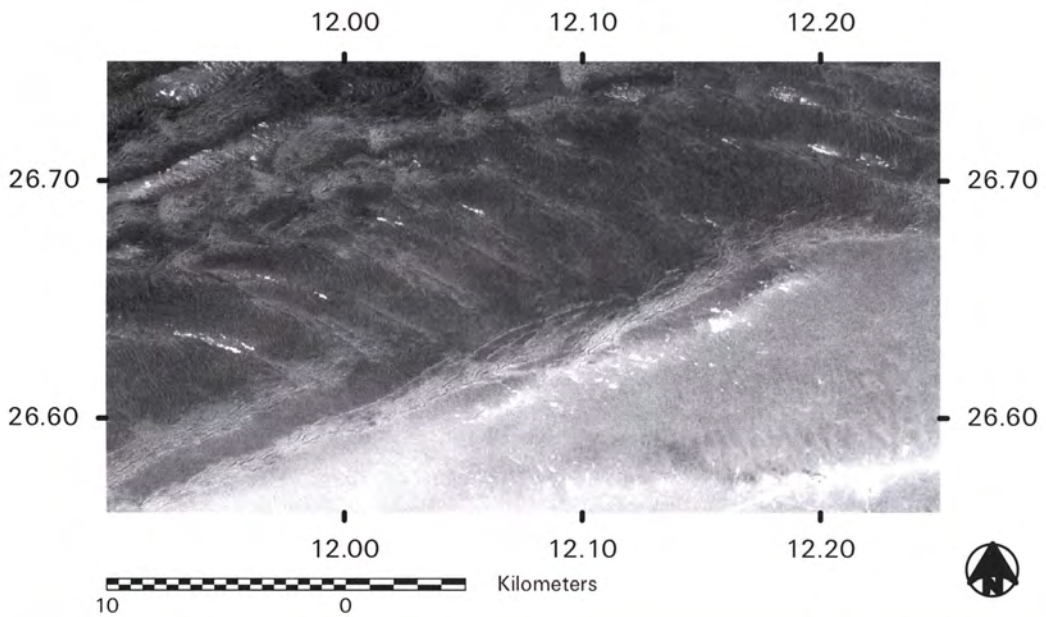


Fig. 2.9. a) Thematic Mapper Band 1 imagery of an area of the Dabān Ubārī west of the town of Ubārī. Bright areas indicate palaeolake deposits, except in the south-east corner of the image, where they represent an oil refinery and associated roads; b) Field photograph of palaeolake deposits from area shown in Band 1 imagery.

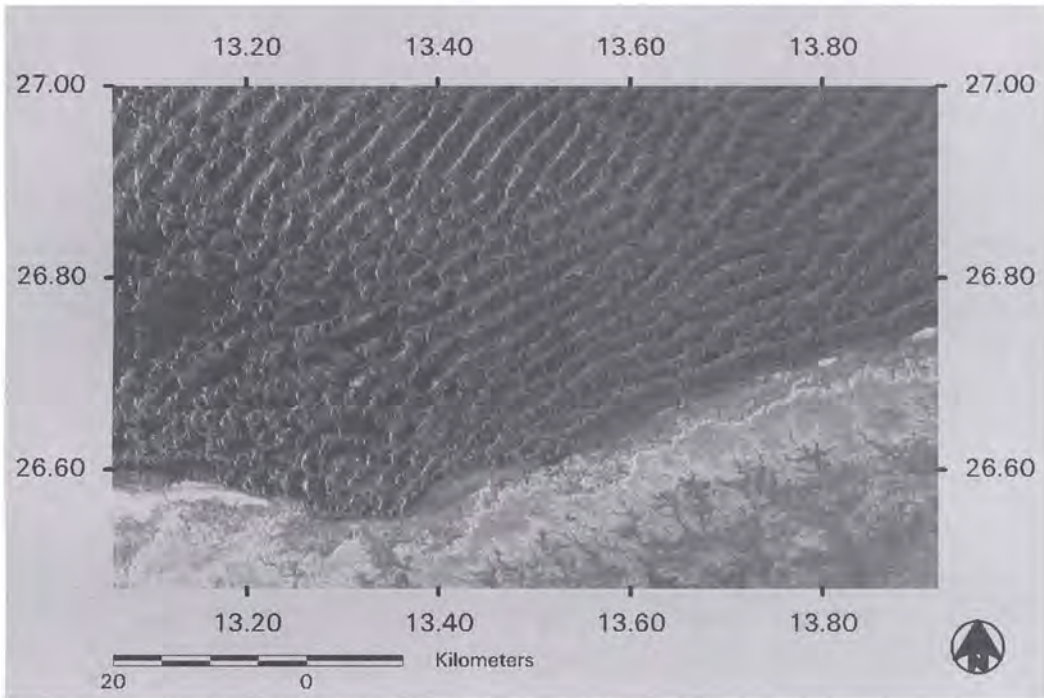


Fig. 2.10. Synthetic aperture radar image from the second European Remote Sensing satellite (ERS-2), showing part of the Ubārī Sand Sea, the Wādī al-Ajāl east of Jarma, and a section of the escarpment edge.

Radar imagery

Synthetic aperture radar imagery acquired by two different satellites was employed in the geographical study. Data from the second European Remote Sensing Satellite (ERS-2), acquired at a wavelength of 5.6 cm, were purchased for the region extending north and east of Jarma, including much of the Wādī al-Ajāl and parts of the Ubārī Sand Sea (Fig. 2.10). Two images from the first Japanese Earth Resources Satellite (JERS-1) acquired at a wavelength of 23 cm, were also purchased; one of these images covers approximately the same area as the ERS image, while the other represents the region to the west, including the Wādī al-Ajāl west of Jarma and extending past the town of Ubārī for ≈ 10 km into the Wādī Irāwan (Fig. 2.11). Both of the JERS images extend over the Ubārī Sand Sea. The nominal pixel sizes of the ERS and JERS data are 17 m and 13 m respectively.

Optical satellite imagery essentially measures the colour, and by extension the mineralogical composition, of a surface. Radar, due to its much longer wavelengths, measures the roughness, or textural variation, of a surface. The strongest reflections of a radar pulse will occur at surfaces whose topography varies on scales similar to the radar wavelength; shorter radar wavelengths are therefore capable of discerning features on a smaller scale than longer wavelengths. ERS imagery reveals structure within the Ubārī Sand Sea due to the interaction of the radar with the micro-topography of the dunes. In contrast, JERS imagery only reveals the dune structure in certain locations, while most of the sand sea appears as a largely featureless region. However, JERS imagery proved especially useful in detecting areas of enhanced roughness corresponding to certain types of duricrust which are not visible in the optical imagery, and therefore played a useful role in detecting evidence of past environments.

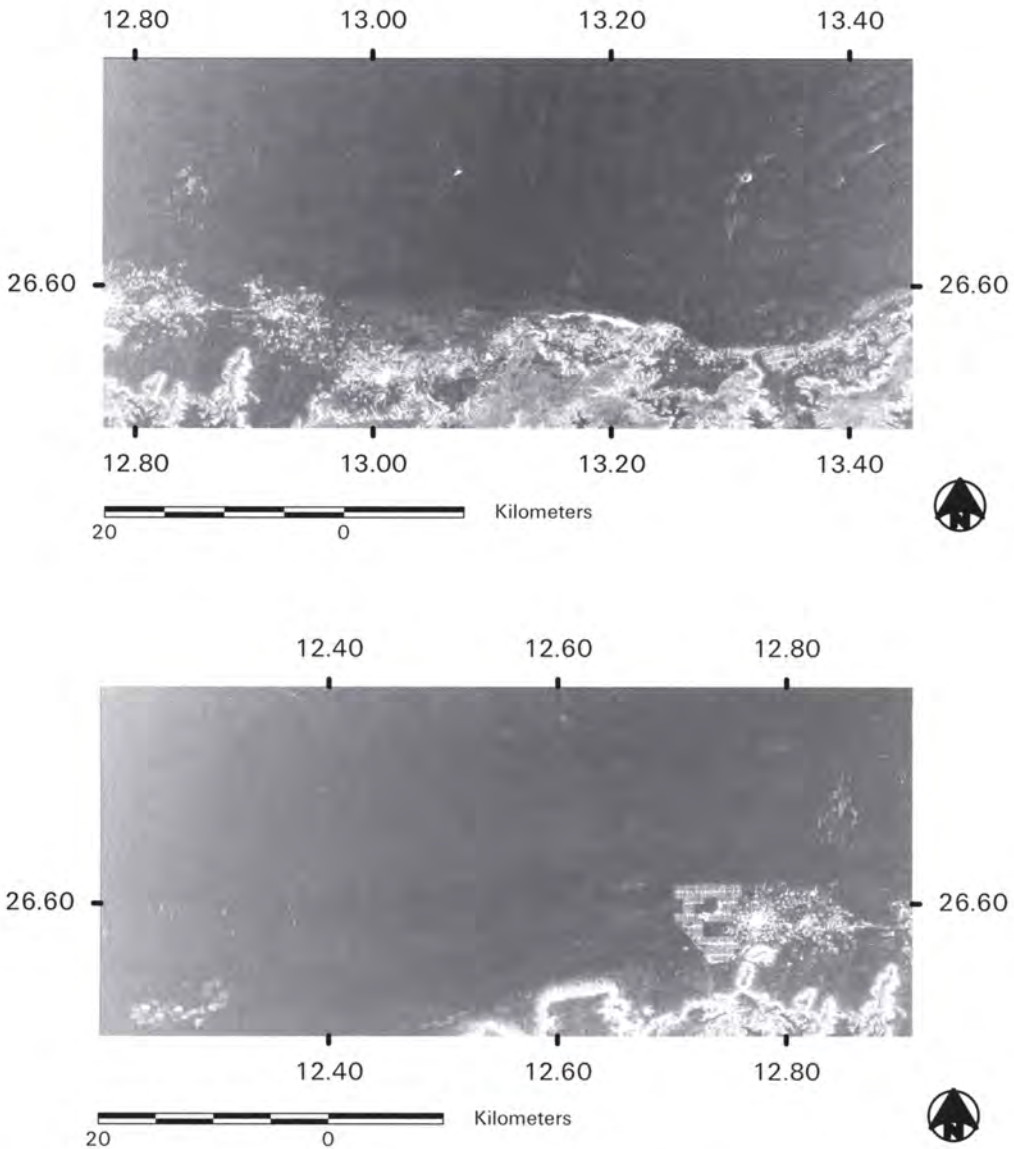


Fig. 2.11. Synthetic aperture radar images from the first Japanese Earth Resources Satellite (JERS-1). a) Eastern image (row 256, path 292); b) Western image (row 256, path 293). Note lack of structure over Ubārī Sand Sea (top sections of images) due to absorption of the long-wavelength radar employed by JERS.

Ubārī Sand Sea

As mentioned above, optical TM imagery proved particularly useful in identifying palaeolake deposits in the interdune regions of the Ubārī Sand Sea. These deposits are typically fairly linear, oriented along the axis of the interdune corridors, several hundred metres to several kilometres long, and several hundred metres wide. They are typically composed of calcrete, which results in their light colour and consequent prominence in Band 1 of the TM data. The calcrete crusts often cap lake sediments exhibiting varying degrees of darkening due to the presence of organic material. Gypsum crusts are also present at some sites; gypsum is similarly visible in the satellite imagery. Lake sediments and the associated crusts are discussed in more detail later in this chapter.

The palaeolake deposits are concentrated in the southern regions of the Ubārī Sand Sea, and are most common west of the town of Ubārī. The distribution of palaeolakes is related to surface elevation, with most deposits occurring below 530 m above mean sea level (amsl). A string of palaeolake deposits is also visible immediately to the south of, and abutting the edge of, the sand sea in the TM imagery. These included the highest elevation palaeolake sediments in the Wādī al-Ajāl, at around 560 m amsl at 26.03745N, 13.30949E, which probably represent a localised level controlled by the surrounding sand dunes rather than a situation typical of the Wādī Irāwan (see further, below). To the north and west of the area of concentrated deposits the elevation increases to over 600 m amsl; here the sand sea is characterised by very wide (of the order of kilometres) interdune regions in which sandstone bedrock is exposed. This bedrock is highly weathered, and appears dark in colour in multispectral imagery utilising bands 7, 4 and 1, in which palaeolake deposits appear blue. Whereas the palaeolake surfaces and their immediate environs are associated with abundant lithic remains, pottery, grinding stones and ostrich eggshell fragments, the bedrock interdune areas visited are largely devoid of evidence of human activity, and support much lower densities of vegetation than those characterised by lake deposits.

While many of the palaeolake surfaces are apparent in the radar imagery, optical imagery proved much more appropriate for their identification. However, some areas are characterised by bright signals in the JERS imagery which are not mirrored by features in the TM images. The largest such area, located some 10 km north-east of Ubārī town, consists of a complex of bright reflectors extending for several kilometres in both north-south and east-west directions (Fig. 2.12). A prominent radar-bright

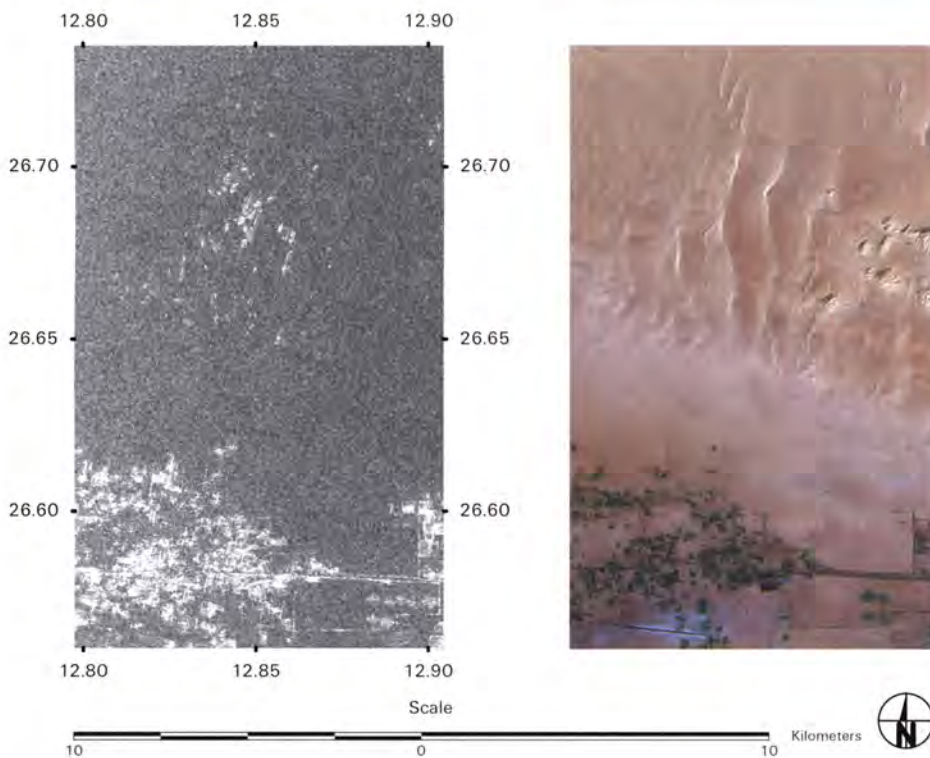


Fig. 2.12. JERS and Thematic Mapper imagery of the same area of the Ubārī Sand Sea and Wādī al-Ajāl just east of the town of Ubārī, showing bright reflectors in the former which are not apparent in the latter, indicating regions of high surface roughness but of similar mineralogy to the surrounding surface.

region is located at EDU 23 (26.68096N, 12.84330E). Field surveys revealed this set of features to be associated with extensive duricrust deposits consisting of aeolianite and numerous root casts, many of which extend vertically upwards. A few patches of calcrete were observed, but these are too limited in extent to be apparent in the TM data. The features detected in the JERS imagery therefore correspond to surfaces that are much rougher than, but similar in colour to, the surrounding sand dunes. These surfaces interact strongly with the JERS radar beam, resulting in high reflectance and a bright signal in the final image. The presence of aeolianite and root casts without lake sediments indicates a water table near or at (but not significantly above) the surface at some time in the past, associated with abundant vegetation. This region may therefore be characterised as a swamp, indicating that the combined use of optical and radar data provides a means of identifying different types of palaeoenvironment.

Wādī al-Ajāl and Wādī Irāwan

Between the Ubārī Sand Sea and the Massāk Ṣaṭṭafat, remote sensing reveals changes in the nature of the landscapes of the Wādī al-Ajāl and the Wādī Irāwan. The escarpment edge is sharply delineated in the optical imagery, which proved useful for general orientation purposes, as a large number of archaeological sites are situated along the foot of the escarpment. The limits of the piedmont zone are also visible. The extent of vegetation is readily apparent in the optical data, as are features associated with human settlement such as towns, roads and agricultural projects.

From the point of view of palaeoenvironmental studies, remote sensing was particularly fruitful in the Wādī Irāwan. Here, large areas characterised by a gypsum surface crust are readily identified in Band 1 of the TM data; the most prominent of these extends either side of the Ubārī-Ghāt road for some 20 km between 26.497N; 12.468E and 26.469N; 12.388E, with the largest gypsum field located west of 26.483N; 12.429E (Fig. 2.13). Along this 20 km stretch, a sharp boundary between the light areas associated with gypsum and darker regions corresponding to the piedmont sandstone extends along the base of the escarpment some 5 km from the road. This boundary is likely to be associated with the shoreline of a large palaeolake; although the boundary proved difficult to discern on the ground, it appears that it occurs around 530 m amsl (based on GPS measurements made with a handheld unit). Other possible shoreline features along the northern edge of the Jarma Playa, at the foot of the Ubārī Sand Sea, are apparent in the ERS imagery. These take the form of duricrusts around the level of the 500 m amsl contour. The significance of these features, and the existence of large lakes in the Wādī al-Ajāl and Wādī Irāwan, is discussed later in this chapter.

Large palaeochannels in the Wādī Irāwan are also apparent in the TM data; on the ground these are delineated by gravel banks, as at 26.37313N; 11.60196E. These gravel ridges probably represent the channel network of a relict braided river system, the channels now forming inverted relief as the fluvial gravels resist the aeolian erosion which is deflating the surrounding finer grained sediments. This channel network indicates a palaeo-flow to the east, coming from the direction of Dār al-ʿUwaynāt, and may at one time have linked up with fluvial systems draining the ʿArq Wān Kāsā (Cremaschi 2001).

Within the wadi-floor regions, ERS imagery proved successful at identifying playa surfaces in the central parts of the Wādī al-Ajāl. The brightest features in the ERS image for this region correspond to playas with particularly rough and chaotic surfaces, and different in character to the Jarma Playa, which has a relatively smooth surface characterised by quasi-regular polygons arising from the formation of desiccation cracks. ERS imagery may therefore be employed to distinguish between different types

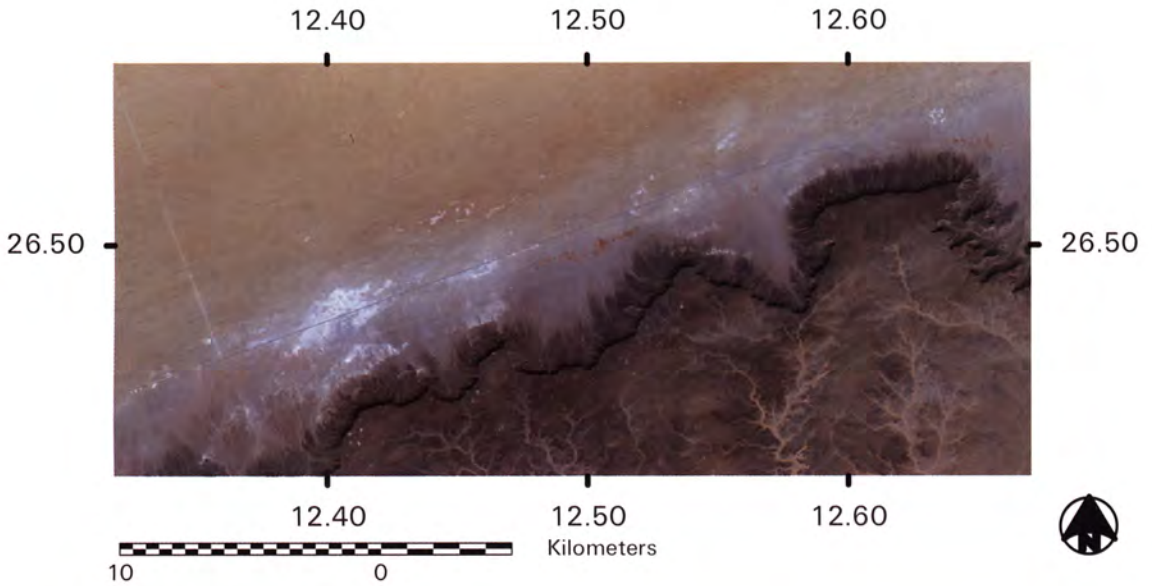


Fig. 2.13. a) Thematic Mapper imagery of the Wādī Irāwan and escarpment edge west of Ubārī. Bright areas indicate surface gypsum deposits, associated in many locations with palaeolake sediments. b) Field photograph of gypsum-capped duricrusts described above, near base of escarpment on south side of Ubārī - Gbāt road.

of playa surface and to infer information concerning the geomorphological processes occurring at or near the surface of playa features.

Massāk Şaţţafat

TM data also proved useful in identifying potential archaeological sites on the plateau of the Massāk Şaţţafat. While lithics and stone structures are found all over the plateau, trapping stones associated with Pastoral Phase hunting activity (see below Chapters

8-9) are almost invariably associated with the clear sub-circular silty areas (*qaa*) characterised by desiccation cracks. These features are prominent in the 15 m pixel size panchromatic TM band, which is the most appropriate band to use for the detection of such features due to their size range: from several metres to over 100 m, with most *qaa* being several tens of metres in diameter. The panchromatic band is also useful as it reveals the structure of the Wadi systems, which often contain large quantities of rock art. Finally, from the point of view of orientation on the Massāk Ṣaṭṭafat, the panchromatic TM data reveal the extensive network of seismic lines which, despite their adverse aesthetic effects on the landscape and potential impact on the local ecology, provide access to sites of interest and are useful in locating oneself in the landscape.

DURICRUSTS

Duricrusts are hardened crusts that are a product of various geochemical processes and are invaluable in piecing together evidence of past environmental change in arid regions such as Fazzān, as they yield information concerning the availability and composition of groundwater, as well as being associated with deposits yielding organic material for dating. At various times surface water was more abundant in the study area than at present, and the landscape would have been much richer biologically than it is today. Evidence of palaeolakes is preserved in the form of duricrusts and organic-rich sediments containing molluscs (for comparative data from the 'Arq Wān Kāsā, see Cremaschi and di Lernia 1998a, 37-43, 73-88).

One of the intriguing aspects of Fazzān duricrusts is their wide variety. Calcrete, gypcrete and cal-silcrete occur in the study area and sometimes all are present at the same location. Furthermore, some of these duricrusts appear to cap organic-rich lake sediments. However, a thorough understanding of the processes involved in duricrust formation is necessary if we are to use them as palaeoenvironmental evidence.

Duricrusts are hardened crusts that are a product of various geochemical processes resulting in the dissolution, mobilisation and precipitation of a variety of minerals present within the vadose (subaerial) zone. Such processes are cumulatively known as diagenesis. They may be preserved as surface crusts or be found at various depths below the surface down to the ground water table.

Duricrusts are commonly found in low-latitude regions from arid through to tropical environments. They form in a wide range of geomorphological settings as a result of a number of different controlling processes. For example, indurated crusts can form in lake or ephemeral lake (pan) settings, in river channels or on weathering surfaces. Water, containing minerals in solution, moves vertically and laterally through deposits by processes of drainage and evapotranspiration as a result of capillary rise. Over time the concentration of vadose waters with respect to elements such as calcium and silica leads to supersaturation and eventually to precipitation of crystals. Different geochemical processes occur in different locations in the landscape and at varying rates, and this will affect their preservation potential.

In Fazzān, calcretes and gypcretes are the most common duricrusts; cal-silcretes and silcretes are present but are relatively rare.

Calcretes

Calcretes are cemented by calcium carbonate (CaCO_3), and tend to form where moisture is deficient (Goudie 1983). Most calcretes form where rainfall is between 400 and 600 mm p.a. but in some areas it may be higher (although evapotranspiration rates are high in such environments). Phreatic calcretes (associated with the groundwater table) tend to form in more arid conditions and pedogenic (soil-related) ones in slightly wetter environments.

Mechanisms involved in inducing precipitation include decreasing the partial pressure of carbon dioxide; increasing the pH to above pH 9.0; evaporation; biological activity including evapotranspiration; and the common ion effect (Wright and Tucker 1991). The sources of carbonates for the cement can be quite variable. Dissolution of bedrock or sediment, aerosols, rainfall, groundwater, river or lake water, shells, plants and sea spray (in coastal locations) are some of the more common sources (Gardner and McLaren 1994).

Calcretes are abundant in the Wādī al-Ajāl and in both the southern part of the Ubārī Sand Sea and the northern part of the Murzuq Sand Sea. These sand sea calcretes are predominantly found in the interdune areas (see Fig. 2.9a/b), which are likely to have been damper than dune crests as they are closer to the groundwater table. West of Jarma, and particularly west of Ubārī, calcrete surfaces are easily identified due to the lack of disturbance of the surface by human activity, and are often partially covered by thin sheets of drifting sand or low dunes. Extensive fields of highly indurated calcrete fragments, ranging from pebble to boulder size, are common to the south of the Ubārī – Ghāt road west of Ubārī, close to the escarpment edge. Indurated calcrete in spoil heaps next to an Islamic *qaṣr* east of al-Fjayj suggests that sub-surface calcrete layers may be widespread throughout the Wādī al-Ajāl. The size and appearance of these fragments resemble those of calcretes found near the base of the escarpment west of Ubārī.

Although anthropogenic activity and surface sediment transport processes have resulted in the obliteration of most palaeoenvironmental features within the Wādī al-Ajāl, calcretes can be found in sections in some of the wells in the wādī area (e.g. at 26.57517N, 12.94617E). The duricrusts in the wells are highly indurated with displaced floating clasts, minimal porosity and replacement of grains. There are no laminations in the well calcretes and a lack of evidence of biological features such as rhizoliths (mineralised plant roots) and needle fibre cement. This suggests a groundwater origin — in the zone of intense evaporation and capillary rise directly above the water table.

Silcretes and cal-silcretes

Siliceous crusts may develop in highly alkaline evaporitic basins and in association with micro-organisms. Silcretes are found in a variety of geomorphological settings, of which the most common are in association with remnants of palaeosurfaces, pan margins and in palaeodrainage systems. There is a great deal of debate as to whether silcretes are a result of weathering, hydrological processes or pedogenesis (Watson and Nash 1998).

The most commonly cited source of silica is as a result of chemical weathering of silicate minerals. Other sources are from aerosols, silica-rich plants and micro-organisms such as diatoms. Transportation of silica-rich solutions is mainly in the form of vertical and/or lateral movements of groundwater, pore water and surface water. Apart from the quartz sands of the Ubārī and Murzuq sand seas, the Murzuq Sandstone Formation is also rich in quartz, so there is no shortage of surficial quartz from which the silica cement could have been derived.

Analysis of the micromorphology of the cal-silcretes and silcretes in the Murzuq Sand Sea reveals evidence of cement replacement, suggesting that they were originally calcretes that have had the carbonate cement replaced or partially replaced by silica. This may be as a result of changes in the pH of the pore waters.

Gypsum crusts

Gypsum crusts, or gypcretes, are only preserved in very arid areas, as their calcium sulphate cement ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) is more soluble than calcium carbonate or silica. In Fazzān they are present as surface crusts above calcretes, generally as a massive or

powdery deposit that often forms an erosion-resistant horizon at the land surface. Water pumped from wells in Fazzān is rich in both calcium and sulphate (Table 2.1), suggesting that groundwater may be the source of the gypsiferous cement.

Element	Tuwash well	Jarma well	al-Ghrayf well
Ca	94	12	296
Mg	13	5	45
Na	36	7	177
K	8	7	6
Cl	61	na	na
S	220	na	na

Table 2.1. Water chemistry data (ppm) for three wells in the Wādī al-Ajāl study area, determined by ICP-MS. Note the considerable variation in salinity. Depth of wells uncertain.

Apart from the cement in gypcretes, gypsum is found in a variety of crystal forms throughout Fazzān. Desert roses are large intergrowths of lenticular gypsum crystals and are found within sands and silts of the Wādī al-Ajāl. Desert roses form by displacive crystallisation in the host sediment under arid conditions, and are indicative of a fluctuating groundwater table. Large amounts of gypsum and anhydrite (gypsum with the water of crystallisation driven off) are found in the form of old springlines along the base of the escarpment.

PALAEOLAKE SEDIMENTS OF THE WĀDĪ AL-AJĀL

Large expanses of palaeolake sediments are found along the mountain front at the base of the escarpment around and to the west of Jarma. The duricrusts associated with these sediments are clearly distinguished as bright areas in Band 1 of the TM imagery, and this enables remote sensing to be used to map their extent. They are found on either side of the road to Ghāt up to 140 km west of Ubārī (Fig. 2.13). A good example can be found at 26.46422N 12.41461E. Here, a full sequence of palaeolake sediments is evident in section, with a basal mottled yellow layer overlain by red silts with root casts, interpreted as lacustrine sediments. This, in turn, is overlain by grey organic lacustrine silts with numerous mollusc shells. These deposits are usually capped by duricrusts, predominantly calcretes and cal-silcretes overlain by a thin capping of gypsum crust in places. This juxtaposition of sediments and duricrusts could be explained by the gradual desiccation of a large lake, which culminated in gypsum precipitation and was followed by weathering, duricrust formation and extensive deflation so that now only remnants of the lake shorelines are left in favourable positions protected from erosion.

Under the scanning electron microscope (SEM) there is evidence of an organic control on the formation of these calcrete duricrusts, with abundant calcified tubules and filaments of soil micro-organisms present (Fig. 2.14). It is clear that these crusts are derived from lake sediments, as in thin section a number of small shell fragments are present within the calcrete. Shells within the duricrust are too poorly preserved for dating; however, mollusc shells found in the grey organic silts beneath them are well preserved. At all sites where shells have been found, *Melanoides tuberculata* has been the dominant species, but *Bulinus truncatus* is also common at some locations. Both *M. tuberculata* and *B. truncatus* have been found in Holocene lacustrine deposits in Wādī ash-Shāṭī by Petit-Maire *et al.* (1980) and in the 'Arq Wān Kāsā and the Murzuq Sand Sea by Girod (1998), who describes these species as being widespread throughout the

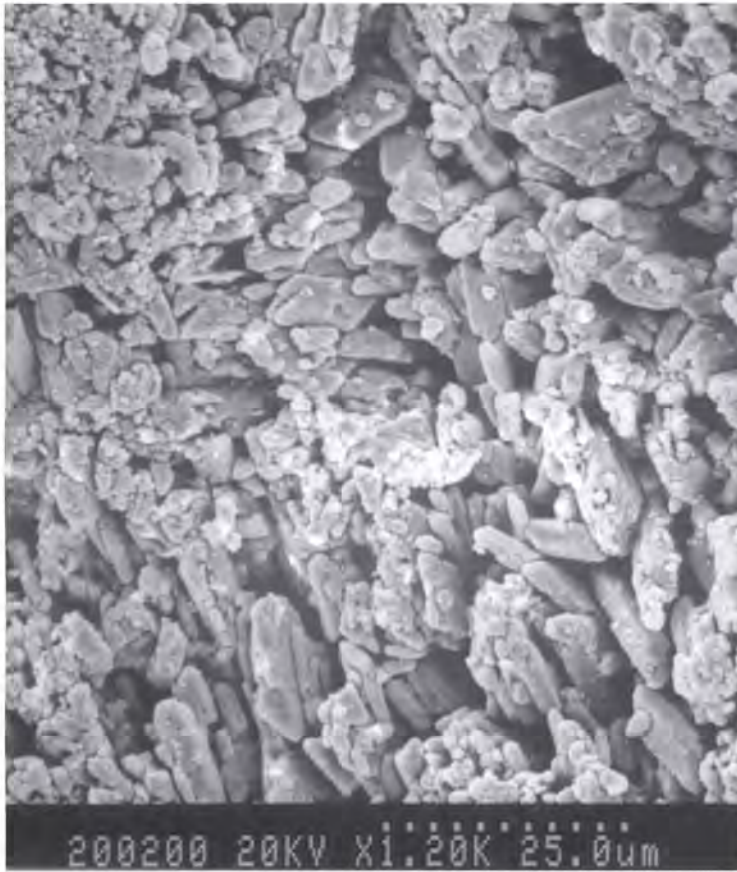


Fig. 2.14. Scanning electron micrograph showing abundant calcified tubules and filaments of soil microorganisms, evidence of organic control on the formation of calcretes in the Fazzān.

Mediterranean, Middle East and Africa. He identifies the following species: *Valvata nilotica*, *Heleobia aponensis duveyrieri*, *Melanoides tuberculata*, *Lymnaea natalensis*, *Afrogyrus oasiensis*, *Segmentorbis angustus*, *Biomphalaria pfeifferi* and *Bulinus truncatus*. Girod (1998) describes an absence of typically tropical species, with Fazzān species being part of the paleoarctic-Mediterranean group. *Melanoides tuberculata* can exist at a range of salinities in diverse environments, but is absent from locations subject to periodic aridity, indicating that Fazzān environments in question must have been characterised by perennial water bodies, whose salinity is likely to have fluctuated over time.

The sediments and duricrusts at the base of the escarpment define the southern limit of the postulated palaeolake. In a few locations they terminate just below deposits containing numerous rounded pebbles, interpreted as beach deposits. These pebbles are most evident at a site south of Jarma, where they are associated with what appears to be a wave-cut platform etched into a promontory of the escarpment (26.510267N; 13.08636E). It would take a lake a considerable amount of time to form a topographic feature like this in solid bedrock, suggesting that the lake level was at this height for a considerable amount of time. The height of this lake shoreline feature was measured using Differential GPS (Table 2.2) in order to estimate the height of the palaeolake surface. On the opposite side of the Wādī al-Ajāl depression, location of the northern shoreline was more difficult; the fringing dunes of the Ubārī sand sea will not retain topographic evidence of a shoreline in the same way as the bedrock escarpment to the south. The height of the highest outcrops of organic rich lake sediments containing mollusc remains were measured instead (sites 5 and 6).

Point	Latitude	Longitude	Elevation (metres above mean sea level)
1. S shoreline, Jarma	26.510267	13.08636	497.34
2. S shoreline, Jarma	26.508577	13.08532	497.89
3. S shoreline Jarma	26.507161	13.08136	498.78
4. S shoreline al-Ghrayf	26.507161	13.08136	509.58
5. N shoreline, duricrust deposit	26.599113	13.08031	464.41
6. N shoreline duricrust deposit	26.560403	13.07078	458.02

Table 2.2. Locations and heights of probable palaeolake shorelines (DGPS co-ordinates in decimal degrees).

These results indicate a lake surface approximately 500 m above mean sea level. Variability around this height may be caused by errors in our location of beaches, or by slight tectonic movement that may have occurred since the desiccation of the lake, and ground settlement due to abstraction of groundwater. Sites 5 and 6 are potentially more error-prone as they are characterised by a deflation surface and are therefore probably somewhat lower than the original shoreline position. Alternatively the different beach heights could represent separate high stands of the lake, the lower levels being slightly later.

The Differential GPS results have two implications for further research. Firstly, we might expect to find more lake deposits in the vicinity of the 500 m amsl contour, in regions away from the escarpment, where lake shorelines are much harder to find and define, presumably due to erosion. To date we have found a number of duricrust outcrops along the northern shoreline of the Jarma Playa using remote sensing data. They show up clearly in the ERS imagery, due to their greater surface roughness compared with the surrounding sand surfaces. These duricrusts, situated between the Wādī al-Ajāl and the Ubārī Sand Sea, extend from east to west over a distance of some 150 km, and are preserved as a series of patches, often characterised by inverted relief due to their greater resistance to aeolian erosion (Fig. 2.15). Their surfaces are covered in calcrete gravel; topographically higher patches are rich in roots and were probably sites at the edge of the water body. Calcreted roots often pointing skyward, have become exposed as a result of the erosion of loose sands; examples can be found at 26.52455N, 12.58105E; 26.51901N, 12.58170E; and 26.48197N, 12.42327E. In many areas *Melanoïdes tuberculata* shells can be found on the surface, though their preservation is poor and we have not yet found any that could be dated. At one location in this region (TWE 43: 26.598179N 13.1036E) we have also found 12 individuals of *Corbicula africana*. At GER 36 (26.59994N, 13.07950E) the duricrusts are underlain by dark, organic sediments similar to lake deposits identified adjacent to the escarpment. Thus, the duricrusts appear to be predominantly calcified lake sediments with abundant root casts, associated with sediments containing freshwater gastropod and bivalve shells. On these duricrust surfaces are numerous scatters of lithic artefacts, indicating significant human activity around the edge of the lake. We cannot yet determine if the southern beaches and northern shoreline duricrusts are contemporaneous; however, elevation data obtained using Differential GPS provide evidence that the northern and southern shoreline features are related, and represent shorelines of a large palaeolake with a surface height of around 500 m amsl, bounded by the escarpment in the south and by the sand sea in the north.

The Differential GPS results enable us to determine the area of the palaeolake. The GTOPO30 digital elevation model (DEM) produced by U.S. Geological Survey provides elevation estimates at 30-arc seconds intervals (approximately 830 m by 830 m at these latitudes), but large strips of this DEM are grossly in error, with the



Fig. 2.15. Field photograph of duricrust outcrops on the southern edge of the Dabān Ubārī. These are interpreted as marking the northern shoreline of the Wādī al-Ajāl palaeolake, but their elevation is likely to have been lowered by aeolian erosion. Small rucksack for scale.

escarpment and Ubārī Sand Sea being smoothed out in the area east of Jarma. Nevertheless, these results do enable a first attempt at estimating the size (76,250 km²) and perimeter (2,500 km) of the palaeolake. Because of the serious errors in the DEM, this should be regarded as a preliminary estimate. However, in general terms it appears that the lake had one arm in the Wādī al-Ajāl that went from Sabhā, terminating to the west of Ubārī. Other arms of this lake would have stretched from Sabhā along Wādī ash-Shāṭi and Wādī Barjūj (Fig. 2.16).

Currently we have only dated a few gastropod shells found at al-Ghrayf; thus the timing of this postulated lake is not fully elucidated. Uranium/Thorium dates of the *Melanooides tuberculata* shells give ages of 61000 ± 12000 BP, 69000 ± 3000 BP, 71000 ± 6000 BP, 82000 ± 3000 BP and 84500 ± 4600 BP (White *et al.* 2000). These dates are consistent with Saharan palaeohydrology. Dating of palaeolake deposits and associated material suggest the existence of large water bodies in western Egypt from 90000 to 65000 BP (Szabo *et al.* 1995), southern Tunisia at about 150000 and 90000 BP (Causse *et al.* 1989), southern Algeria from 90000 to 75000 BP (Fontes and Gasse 1991), and for



Fig. 2.16. Fazzān palaeolake estimated from Differential GPS heights of known shorelines and GTOPO30 digital elevation model. See text for discussion.

the Wādī ash-Shāṭi in the Libyan Fazzān, to the north of the study area at 163000 +20000/-15000 BP and 90000 ± 2000 BP (Petit-Maire *et al.* 1980). However, it is interesting to note that though there has recently been extensive dating and archaeological studies of palaeolake deposits in the higher elevation regions between Ghāt and the Murzuq Sand Sea (Cremaschi 1998a), none of these lakes appear to be older than 10000 BP.

This apparent agreement in dates between our study in the Wādī al-Ajāl and that of Petit-Maire *et al.*, (1980) in Wādī ash-Shāṭi is complicated by developments in Uranium/Thorium dating techniques in recent years. As a comparison between the two projects, we collected *Cardium* (*Cerastoderma glaucum*) shells from Wādī ash-Shāṭi and dated them at 43000 ± 5000 BP and 47000 ± 5000 BP using recent Uranium/Thorium correction techniques. If these samples are dated using the uncorrected method of Petit-Maire *et al.* (1980) they provide dates similar to those they report (100000-90000 BP). Thus, the lake present in the Wādī al-Ajāl, sometime between 60000 and 85000 BP, appears to be earlier than the lake in Wādī ash-Shāṭi, sometime between 40000 and 50000 BP. These dates do not coincide with the above lake high-stand episodes for the Wādī al-Ajāl or the Sahara in general. However, it should be noted that material associated with past lake high-stands occurs at significantly lower elevations in Wādī ash-Shāṭi than in the Wādī al-Ajāl, and that the separate groundwater reservoirs associated with lakes in these two regions exhibit limited or negligible interaction (Pallas 1978). The *Cardium* terraces dated by Petit-Maire *et al.* (1980) to yield the dates given above lie some 150 m below the 500 m amsl shoreline features in the Wādī al-Ajāl. It is therefore plausible that a lake high-stand episode limited to Wādī ash-Shāṭi occurred some 40-50000 BP, as a result of changes in groundwater levels in the lower aquifer, which does not affect the Wādī al-Ajāl. Nonetheless, further collection and dating of molluscs and lake sediments are desirable to clarify this situation further.

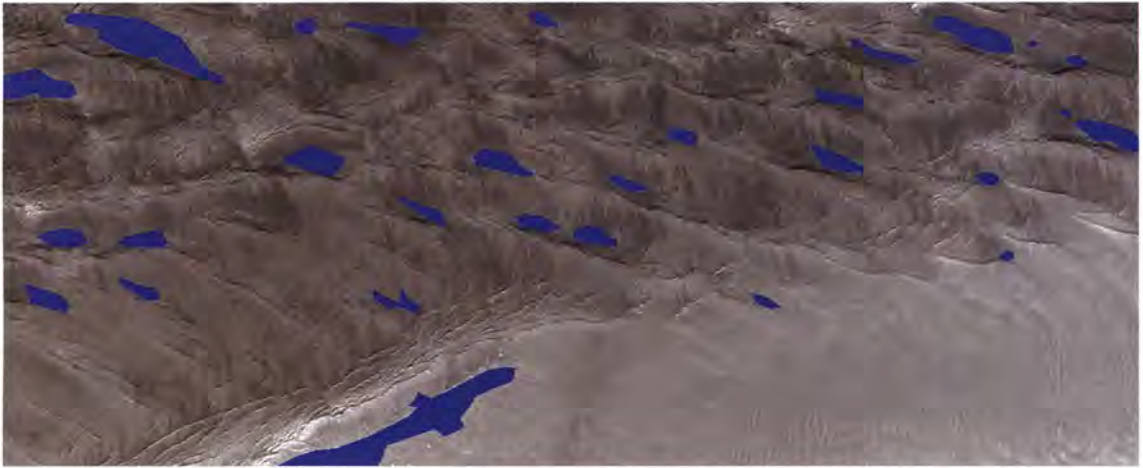


Fig. 2.17. An 812 km² section of the Dabān Ubārī mapped in detail using remote-sensing and field surveys, showing 29 palaeolake deposits.

PALAEOLAKES OF THE UBĀRĪ AND MURZUQ SAND SEAS

The Ubārī Sand Sea is characterised by numerous palaeolakes. In one sample area north-west of Ubārī we have surveyed an area of 812 km², identifying 29 palaeolake basins (Fig. 2.17). Another large palaeolake exists north-east of Ubārī and others have been noted north of Jarma. These lakes are located in interdune corridors and appear to lack any interconnecting drainage network, suggesting that they formed by a rise in the groundwater table during a wetter phase or phases in the past. To date we have visited several of these lakes lying up to c.12 km into the Ubārī Sand Sea. Extensive deposits of duricrust associated with lake sediments were found at the following locations: (a) 26.6396N, 11.9462E (EDU 2); (b) 26.7497N, 12.4265E (EDU 18); (c) 26.7082N, 12.9025E (EDU 5); d) 26.7363N, 12.3705E (EDU 28) (see Figs 2.9b, 2.17). At EDU 2 the lake deposits had been subjected to considerable aeolian deflation forming inverted relief and yardangs, as these locations are relatively more resistant to aeolian erosion than the surrounding loose sands (Fig. 2.18). The large expanse of duricrust overlaying palaeolake sediments suggests that a single lake, at least 3 km by 1 km in extent, existed here. Numerous lithic artefacts attest to significant human activity. Six and a half kilometres east of this site, extensive pan calcretes within an interdune have also been identified. EDU 18 was of a similar nature, but of more pronounced relief, with numerous large mesas exhibiting thick calcrete crusts overlying lake sediments and grey-green friable silty sand. EDU 5 exhibited a range of surfaces including calcrete, aeolianite with rhizoliths and gypsum crust. Calcretes exhibited spaces where large roots had previously existed, and petrified roots were also apparent. Thick calcrete crusts (about 0.75 m) capped mesas of lake sediment some 8-10 m above the lowest level of deposits. Lower mesas suggest more than one stand of this lake. This site was exceptionally rich in lithics, including Acheulean hand axes as well as Holocene microliths. EDU 28 was less extensive and exhibited the lowest relief, comprising a calcrete surface over lake sediments. This site was notable for the construction of an antenna tomb built on top of the duricrust layer from slabs of calcrete (for the tomb type, see below Chapter 6). Samples of lake sediment were obtained for optically stimulated luminescence (OSL) dating from EDU 2; dark organic sediments were sampled at the other three sites for accelerator mass spectrometer (AMS) dating.

Though the dating results from the samples acquired at the above sites are not yet available, the deposits appear to be similar to those described by Cremaschi (1998) in



Fig. 2.18. Field photograph of palaeolake deposits in Dabān Ubārī from area represented in TM image in Figure 2.9, illustrating inverted relief due to preferential erosion of the surrounding surface.

the northern margins of the Dahān Murzuq and the ‘Arq Wān Kāsā near Ghāt. These are of Holocene age, formed during two sedimentary cycles, one starting around or before 8445 ± 160 BP and terminating around 7400 BP, and the other at 7325 ± 130 BP and culminating in a lake high-stand around 6600 BP. Lake sedimentation was interrupted for some time between 8000 and 7300 BP, around the time of the documented Saharan arid phase coinciding with northern hemisphere cooling (Nicholson and Flohn 1980; Alley *et al.* 1997; Barber *et al.* 1999). The lakes were still in existence in the 6th millennium BP, but their levels were probably dropping at this time; they later turned into sabkhas as the region became hyper-arid. Cremaschi (1998a) suggests that these lakes were formed as a result of a rising water table, and describes possible terraces formed by earlier Pleistocene lakes in the same region. They are associated with archaeological remains, bioturbated peat including wood fragments, calcereous mud and caliche crusts, and occur at different levels within the interdune corridors. Similar deposits are present in the ‘Arq Wān Kāsā, although here the lake floors are bedrock rather than sand.

The palaeolake deposits of the Ubārī Sand Sea generally occur at elevations below 530 m amsl, although at 26.61372N, 12.07889E they were recorded at around 560 m amsl, abutting against the southern edge of the sand sea. The sediments at this site consisted of green sands overlain by white laminated lake sediments capped by calcrete, forming mesas about 4 m above the surrounding surface. Their position at the edge of the sand sea, and the limited extent of these particular deposits suggest that they may represent a relatively localised lake level controlled by the topography and hydrology associated with the surrounding sand dunes, rather than being characteristic of the Wādī al-Ajāl/Irāwan in general. Indeed, it is unclear whether the palaeolakes of the Ubārī Sand Sea were connected with water bodies in the Wādī al-Ajāl/Irāwan or whether they were a manifestation of locally increased groundwater levels. While the wadi regions appear to have been inundated at various times throughout the

Pleistocene, the hydrological situation in these areas during the Holocene is unclear; the existence of playa surfaces indicate that the central parts of the Wādī al-Ajāl contained water bodies, but the maximum Holocene water level of these bodies is uncertain.

There is considerable evidence of an extensive set of lakes in the west of the Murzuq Sand Sea (Cremaschi 1998a); however, the eastern and northern central portions of the sand sea have not yet been investigated. Remote sensing suggests that there are many lakes in these regions, though perhaps they are not as common as in the west. To date we have visited two palaeolake sites in the north-eastern sector of the Murzuq Sand Sea: near ash-Sharrāba (BBG 13: 25.58602N, 13.17306E; 25.95038N, 13.13226E), and at MAR 10 (26.03745N, 13.30949E). At the last site, lake sediments form extensive terraces associated with abundant archaeology, including Garamantian-type cemeteries. All the sites are characterised by scattered patches of calcrete, cal-silcrete and silcrete now forming inverted relief. These duricrusts are generally highly indurated, grey in colour, with a rubbly/pebbly texture. The cements are predominantly made up of finely crystalline micrite with small amounts of later-stage coarser sparry crystals that have displaced the largely quartz matrix. The fine size of the crystals may be a result of rapid precipitation under conditions of high evaporation. In places rhizoliths (Fig. 2.19) are abundant and are a result of calcium carbonate precipitation around plant roots. Under the scanning electron microscope there is no evidence of any calcified organic structures indicating biological activity within these samples, unlike the duricrusts of the Wādī al-Ajāl. The cements are a mix of a primary calcrete phase followed by a later-stage partial replacement by silica. Fig. 2.19 shows the typical cement fabric of a duricrust sample from the Murzuq Sand Sea.



Fig. 2.19. Scanning Electron Micrograph showing fabric of duricrusts of a Murzuq sand sea palaeolake.

PLAYAS OF THE WĀDĪ AL-AJĀL

Apart from the evidence for a Late Pleistocene palaeolake, a chain of more recent ephemeral lakes (playas) occupies topographic depressions at the base of the Wādī al-Ajāl. They are characterised by extensive polygonal mud flats exhibiting varying degrees of salt crust development. The playa north of the town of Jarma (see Fig. 2.3) has extensive areas of mudflats with a thin, ephemeral halite crust. Playas further to the east are more saline, resulting in a much rougher surface, caused by extreme haloturbation forming features such as thrust polygons and mud volcanoes. Because of their extreme surface roughness (Millington *et al.* 1995), they show up as bright (high backscatter) targets in the ERS radar images (Fig. 2.8).

The mechanical excavation by the local authorities of a deep trench from the southern shore to the centre of the playa north of Jarma, provided the opportunity for a detailed sedimentological study to be undertaken. Trench sections were examined and logged at intervals of between 40 m and 450 m, dependent on visible sedimentological variation in the sections (Fig. 2.20). The playa is underlain by aeolian sands beneath 1–2 m thickness of laminated fine-grained red silts and clays indicative of lacustrine origin. Fossils are absent from these sediments, but they contain an increasing concentration of lenticular gypsum crystals towards the top of the trench, indicative of intense evaporation. This stratigraphy suggests that sometime in the past a lake became established on a sand sheet surface at the base of the Wādī. After a period of deposition of fine clastic sediments the lake became desiccated with more concentrated saline waters inducing displacive gypsum crystallisation within the near surface sediments and finally an ephemeral halite efflorescence on the surface.

In order to date this lake, samples were collected for optically stimulated luminescence at the top of the basal aeolian sand layer (3 m depth) and in the lacustrine clay layer (2 m depth). The optically stimulated luminescence dating failed to provide a reliable date for the sand layer but the lacustrine clay yielded a date of 5900 ± 1000 BP. It is interesting that a lake should be here at this time, as this was shortly before the onset of the final desiccation of the Sahara around 5000 BP (Claussen *et al.* 1999; Cremaschi 1998a).

Another line of evidence indicating the intensification of aridity and consequent lowering of the groundwater table in the Wādī al-Ajāl is provided by the palaeospring-line gypsum deposits mentioned above. We have successfully dated four such deposits using the Uranium/Thorium technique applied to the outer leachate of individual crystals, in order to determine the last phase of crystal growth and therefore the age at which the springs dried up. The results indicate that the four sampled springs dried up at 4100 ± 700 BP, 3000 ± 2000 BP, 3500 ± 1200 BP and 4000 ± 2100 BP. These dates are of considerable significance to the FP, as they provide some age control on the lowering of the aquifer and presumably on the need of the inhabitants to start large-scale construction of foggara irrigation systems (cf. Chapter 7 below).

SUMMARY OF THE GEOMORPHOLOGY COMPONENT OF THE FP 1997-2001

The geomorphology and palaeoenvironmental reconstruction component of the FP has focussed on duricrusts and palaeolake deposits. Dating and geomorphological interpretation suggest that a very large lake filled the Wādī al-Ajāl around 85000 BP. There is some apparent inconsistency between dates obtained from the Wādī al-Ajāl and the Wādī ash-Shāṭī, which requires further study. There is also widespread evidence of numerous smaller lakes in the Wādī al-Ajāl and in the Ubārī and Murzuq sand seas. As yet we have not dated any material from the sand seas and therefore cannot relate them to the deposits found in the Wādī al-Ajāl. However, the existence

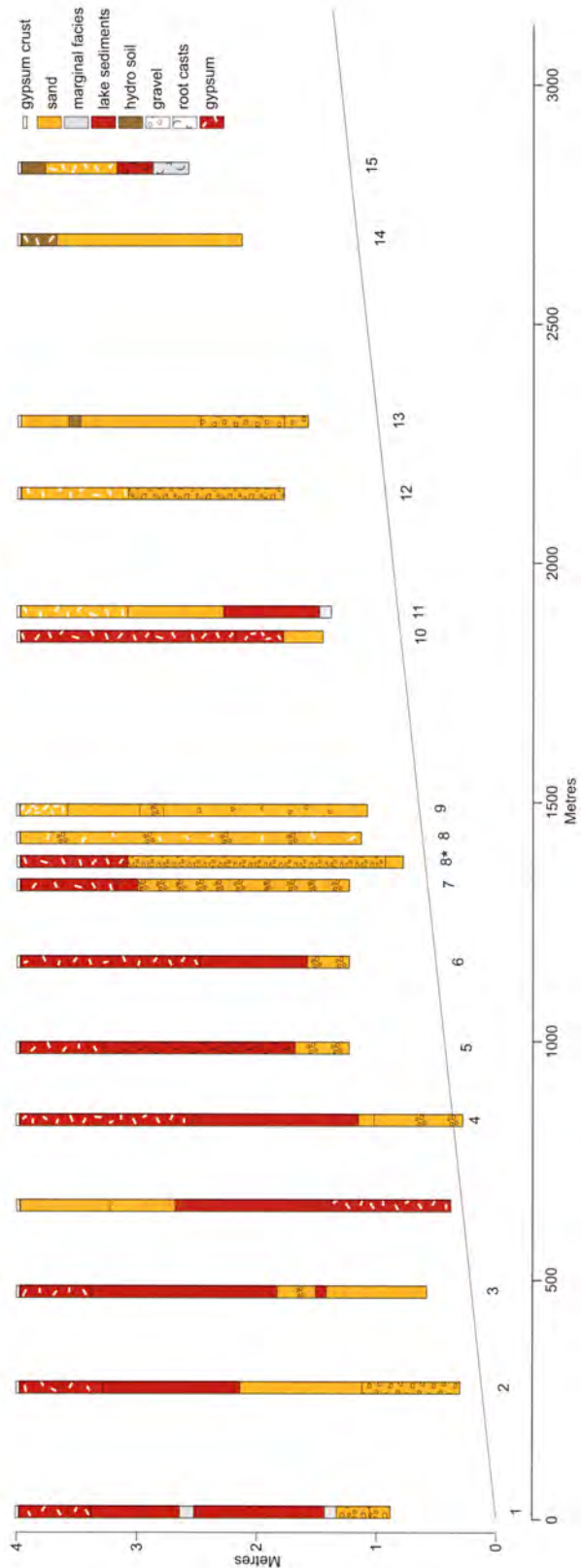


Fig. 2.20. Cross section of the sedimentology of the playa north of Jarma, revealed by excavation of a trench.

within both the Murzuq and Ubārī Sand Seas of duricrusts and other lake deposits of a similar nature to those found in the Wādī al-Ajāl indicate that the sand seas have been a feature of the region throughout the period relevant to this study. These deposits also demonstrate that interdune lakes have been common in the past, although these were not necessarily contiguous with water bodies in the Wādī al-Ajāl itself. By analogy with the findings of Cremaschi (1998; 2001), and to judge by the extensive Holocene artefactual evidence associated with our palaeolakes, it is likely that at least some of the duricrusts in the sand seas (and possibly elsewhere) represent material of Holocene age, but further investigation is required to allow further precision. The chain of small lakes or playas along the base of the Wādī al-Ajāl appears to have been full of water around 5900 ± 1000 BP. Springs still appear to have been active along the base of the escarpment up to about 3000 years BP.

CLIMATIC AND ENVIRONMENTAL CHANGE IN THE SAHARA

Late Pleistocene climatic variability

The above findings relating to geomorphological indicators of past environments should be interpreted within the context of global climatic change and its impact on the Sahara in general and Fazzān in particular. Our current understanding of the global climate system indicates that arid phases in the Sahara have generally coincided with glacial conditions in the northern hemisphere, with humid episodes being associated with interglacial stages. Glacial conditions result in lower sea surface temperatures, reduced evaporation, lower atmospheric moisture availability and decreased atmospheric instability. Atmospheric subsidence may be further enhanced by increased coastal upwelling resulting from intensified zonal atmospheric circulation. All these processes will affect African rainfall, although a southerly displacement of the zone of westerly cyclones may increase rainfall along the North African coast. In this case, subtropical high pressure regions will also be displaced southwards, resulting in increased subsidence and enhanced aridity over the Sāhīl (Nicholson and Flohn 1980; Szabo *et al.* 1995).

Evidence from lake sediments in north-western Sudan and south-western Egypt indicates five humid episodes at about 320000-250000, 240000-190000, 155000-120000, 90000-65000 and 10000-5000 BP (Szabo *et al.* 1995). Kowalski *et al.* (1989) describe a rich faunal assemblage derived from sediments of two consecutive lakes at Bīr Tarfawī in south-western Egypt, which dates to around 135000 BP. They suggest that this area received at least 500 mm of rainfall per year during this period. Two humid episodes have been identified in southern Tunisia at around 150000 and 90000 BP (Causse *et al.* 1989). Gaven *et al.* (1981) suggest that the major lacustrine phase in this period took place around 130000 BP, preceding the moist "climatic optimum" associated with the last (Eemian) interglacial commencing around 125000 BP. They suggest that dates from around 90000 BP represent a separate, less humid phase, and identify a possible similar phase around 40000 BP. However, the 40000 BP dates have since been questioned; Causse *et al.* (1988; 1989) have suggested that the last Pleistocene humid phase in the western and northern Sahara occurred between 80000 and 100000 BP.

Cremaschi (1998) describes sequences of palaeosols in south-western Fazzān as indicating a number of alternating arid and humid episodes during the Quaternary. Thermoluminescence (TL) and optically stimulated luminescence (OSL) dating of fossil dunes at the base of stratigraphic sequences in rockshelters at Wān Afūda and Wān Aṭābū (Akākūs region, south-western Fazzān) indicate arid conditions for a range of dates between 50000 and 100000 BP, although the uncertainties in the dating methods are such that the age of the oldest material may be as young as 80000 BP. (Martini *et al.* 1998).

The above data provide a context for dates acquired during the FP. Uranium/Thorium dating of *Melanooides tuberculata* shells from palaeolake sediments south of the town of al-Ghrayf yielded dates of between 61000 ± 12000 and 84500 ± 4600 BP, generally consistent with the last well-established Pleistocene lake high-stand in the Sahara before the Last Glacial Maximum (LGM), as described above. Although some of these dates are later than that suggested for the lake high-stand, regional variations in environmental response to climatic change should not be excluded. Samples of Cardium (*Cerastoderma glaucum*) shells collected in Wādī ash-Shāṭi during the 1999 field season dated to between 40000 and 50000 BP. As discussed previously, the apparent contradiction between these dates and other palaeoclimatic interpretations may be the result of the regional hydrology, and/or of a less extensive wet phase that led to limited recharge of aquifers in lower lying regions.

The Last Glacial Maximum: an arid phase in Africa

The period during the Late Quaternary that has been the subject of the most intensive study in terms of Saharan palaeoclimate and environment is that extending from the Last Glacial Maximum, around 21000 BP (Clark *et al.* 1999; Hostetler and Clark 2000), to the onset of the latest phase of Saharan desiccation some 5000 years ago. The earlier part of this period (from 20000 to 12000 BP) was associated with generally enhanced aridity throughout most of Africa, although the northern Sahara and the Saharan highlands were wetter than at present for most of this period, as were parts of southern Africa (Street and Grove 1976). Rainfall in the southern Sāḥilian regions was reduced to 20-50% of present day amounts during much of this period, with the isohyets displaced some 500-700 km south of their current positions, and mobile dunes extending up to 5° further south than today (Talbot 1983).

Nicholson and Flohn (1980) speculate that around the peak of the last glaciation, the extensive ice sheets of the northern hemisphere displaced the zone of westerly flow and cyclonic activity (and therefore the subtropical high pressure regions) southwards, resulting in enhanced aridity over continental Africa. The general southward movement of the circulatory systems in the northern hemisphere would have been more pronounced than any similar northward displacement in the southern hemisphere, owing to the greater land area and larger-magnitude changes in ice cover in the former. The meteorological equator (where warm dry Saharan air meets cooler, moist oceanic air at the inter-tropical convergence zone (ITCZ)) may well have been more-or-less coincident with the geographical equator. Today, the average position of the ITCZ is some 6° north (Hastenrath 1990), due to asymmetry between the hemispheres, with zonal circulation being more intense in the southern hemisphere.

At the time of the LGM, aridity intensified and extended to previously wetter areas; highland and northern Saharan coastal regions were subject to a millennial-scale arid interval centred around 18000 BP (Nicholson and Flohn 1980). It may be speculated that, during the LGM, cooler temperatures led to such a reduction in evaporation and atmospheric instability as to inhibit rainfall even in the zone of westerly cyclones, while stronger easterlies due to an increased meridional temperature gradient may have led to increased upwelling off the West African coast, causing further subsidence. Both observational and modelling studies indicate significant cooling in the tropics at the LGM; groundwater studies in Oman indicate that average ground temperatures were some $6.5 \pm 0.6^\circ$ C lower than today, while isotopic studies indicate different sources of atmospheric moisture at the LGM than today (Weyhenmeyer *et al.* 2000). Hostetler and Clark (2000) suggest, based on glacial mass-balance models, that LGM temperatures in the tropics ranged from 3.5 to 6.6° C cooler than today, while Bush and Philander (1998) used a global climate model to infer intensified trade wind circulation and sea surface temperature decreases of up to 6° C in the tropical Pacific.

The arid-humid transition and the first Holocene humid phase

The Pleistocene-Holocene boundary was marked by a general transition from arid to humid conditions in Africa, particularly pronounced in the Sāḥil and southern and central Sahara. Northern hemisphere temperatures rose rapidly and moisture availability increased around 14000 BP (Nicholson and Flohn 1980), resulting in rainfall patterns somewhat similar to today; rapid temperature increases are also recorded at some sites in the southern hemisphere around this time (Steig *et al.* 1998; Stocker 1998). Cremaschi (1998) suggests that the period from 14000 to 9700 BP was the wettest epoch in south-western Fazzān over the past 16000 years, based on analysis of tufa deposits in wādīs in the Tadrart Akākūs. The general climatic amelioration in the Sahara after the LGM was punctuated by an arid period lasting several centuries and coincident with the cool phase known as the Younger Dryas in Europe (Thomas and Thorp 1995). Gasse *et al.* (1990) find evidence for aridity between 10600 and 9300 BP in the northern Sahara, and between 10300 and 10000 BP in the Sāḥil, indicating some decoupling between the climates of these regions. After this dry episode, conditions reverted to those similar to or moister than today. By 10000 BP (the beginning of the Holocene), conditions in northern and central Africa were much moister than at present, and the Sahara was covered with semi-arid and seasonal vegetation (Ritchie 1994). Lézine (1989) describes a 400-500 km northwards shift in vegetation zones in the central Sahara for around 8000 BP, with the northernmost migration of the Sāḥilian vegetation zone occurring around 8500 BP. Lake levels were at their highest between 9500 and 7000 BP (Jolly *et al.* 1998), and Lake Chad occupied several times its present area, with inter-dune lakes widespread throughout the Sāḥil and southern Sahara (Maley 1977).

This general early Holocene arid-to-humid transition was not manifest everywhere in the Sahara; there is evidence that changes in the northwestern Sahara were out of phase with the central and southern Sahara, with aridity replacing the wetter conditions of the earlier cool period in Morocco and western Algeria (Nicholson and Flohn 1980). It is also notable that dating of travertine by Cremaschi (1998) in the Akākūs mountains yields no date younger than 9000 BP, indicating that in the highlands of the south-western Fazzān, precipitation decreased around this time, at the height of the first Holocene wet phase. However, dating of lake sediments by the same author indicates that open water bodies were widespread in the adjacent dune fields between 9000 and 8000 BP, with many lakes in these regions persisting until much later in the Holocene. Wet conditions have also been recorded in the Levant between 15000 and 8000 BP, interrupted by a millennial-scale arid phase at around 11000 BP (Magaritz and Goodfriend 1987).

Maley (1977) suggests that this Holocene humid phase was characterised by rainfall generated by tropical depressions such as the Sudano-Saharan and Khamsin depressions which today are responsible for rainfall in Saharan regions in spring and autumn. The low pressure associated with these depressions encourages the northwards advection of moist air associated with the ITCZ, where warm dry Saharan air meets cooler air of oceanic origin. It is the interaction between these systems which causes occasional rainfall over parts of the Sahara at the present time. Nicholson and Flohn (1980) suggest that during this first Holocene humid phase the summer position of the ITCZ was similar to or north of its present position. The northern hemisphere ice was still present, although reduced in extent. The remnant Laurentide and Scandinavian ice sheets would have been associated with quasi-stationary low pressure regions over eastern North America and east-central Europe. These factors, and continued intense circulation in the zone of westerly flow, would have led to the frequent development of depressions and cyclones over North Africa, which in turn would interact with moist air in the vicinity of the ITCZ to generate abundant rainfall.

The climatic regime would have consisted of monsoonal summer rains at Sāḥilian latitudes, with most of the Sahara subject to rainfall generated as the result of the interaction between mid-latitude and tropical circulation systems, explaining the abundance of lakes in the southern Sahara. Aridity in the northwestern Sahara may be explained by the northerly displacement of the sub-tropical high pressure region, shifting the zone of subsidence from the now-humid Sāḥil to the vicinity of Morocco and western Algeria.

An arid interruption and the re-establishment of wetter conditions

The humid phase described above was interrupted by a period of aridity lasting in the order of centuries sometime around or before 8000 BP, although the timing of this arid phase may not have been synchronous throughout northern Africa (Gasse and Van Campo 1994; Alley *et al.* 1997). Between about 8400 and 8000 BP, a widespread cooling signal is evident in oxygen isotope records from Europe and Greenland (von Grafenstein *et al.* 1998). Steiger and Mayewski (1997) describe palaeoclimatic records that indicate an abrupt climatic reorganisation lasting 200 years or less between 8200 and 7800 BP at sites in equatorial East Africa, Antarctica and Greenland, as circulation underwent a transition to full postglacial conditions. Barber *et al.* (1999) argue that this period saw a cooling due to the collapse of a remnant of the Laurentide ice sheet, injecting cold, fresh water via Hudson Bay into the Labrador Sea. This would have resulted in a freshening of the North Atlantic, a suppression of deep water formation and a reduction in North Atlantic sea surface temperatures (Street-Perrott and Perrott 1990). As well as reducing atmospheric moisture content and possibly inhibiting the development of rain-bearing convection systems, these changes would have significantly altered both the oceanic and atmospheric circulation; it is likely that all these factors contributed to a reduction in rainfall over much of northern Africa. There is indirect evidence that this arid period also affected Fazzān, in the form of a stratigraphic gap in sequences of both lake sediments and anthropogenic cave fill in the vicinity of Wādī Tishūnīt on the east side of the Akākūs range, indicating a reduction in human activity. Calibrated radiocarbon dates of related material indicate that this phase occurred after 8990-8610 BP and before 8370-8140 BP (Cremaschi 1998a); radiocarbon dating of organic sediments in the nearby ‘Arq Wān Kāsā to around 7500 BP may indicate the desiccation of a swamp as a result of enhanced aridity.

Around or soon after 7000 BP, conditions in much of northern Africa were more humid than today, but less so than during the first Holocene humid phase. Several authors describe a second moist phase occurring from 6500 to around 4500 BP (e.g. Maley 1977). Dating of calcereous mud and organic deposits from palaeolakes in the ‘Arq Wān Kāsā, south-west of the FP study area in the vicinity of Wādī Tishūnīt, suggest a lake high stand between about 6700 and 6000 BP (Cremaschi 1998a). Dating of lake deposits in the Murzuq Sand Sea as part of the same study indicate a lake high stand around 6600 BP. There were significant qualitative differences between the first and second moist phases. In contrast to the first Holocene wet phase, this second humid episode was characterised by wetter-than-present conditions throughout the southern and central Sahara, but arid conditions in northern regions (Nicholson and Flohn 1980). Pollen analysis indicates a more seasonal rainfall regime, with semi-arid savannah prevailing in many locations, including parts of Fazzān (Grandi *et al.* 1999).

Maley (1977) suggests that the second phase was associated with West African Monsoon type rains similar to those occurring in the Sāḥil today, rather than the rainfall generation by Saharan depressions that characterised the first phase. Nicholson and Flohn (1980) suggest that monsoon rains in the second Holocene moist phase may have extended as far north as 30° N in the Atlas Mountains and Libya. If this was the

case, Fazzān would have been subject to summer monsoon rainfall as are parts of the Sāḥil today, and monsoonal precipitation would probably have amounted to several hundred mm/yr. Modelling studies by Kutzbach and Liu (1997) suggest an increase in the intensity of the seasonal cycle of solar insolation in the northern hemisphere at 6000 BP. Decreased aridity in northwestern Africa may be explained by the large reduction in northern hemisphere ice cover, leading to warming and a weakening of the hemispheric temperature gradient, and hence to a weakening and further northwards displacement of the subtropical high over the eastern Atlantic. However, the remainder of the northern Sahara was subject to further aridity, as the factors previously resulting in the frequent generation of Saharan depressions were no longer present and the monsoon rains did not extend to the northern Saharan regions.

It is notable that the second wet phase described above was associated with a warming of the northern hemisphere and a cooling of the southern hemisphere (Nicholson and Flohn 1980), in turn probably associated with an intensification of the West African Monsoon. During the 20th century, decadal-scale warming (cooling) of the northern hemisphere relative to the southern hemisphere has been associated with increased (decreased) rainfall in the Sāḥil (Folland *et al.* 1986; Ward 1998). This relationship appears only to hold for a monsoonal rainfall regime; during the first Holocene wet phase the northern hemisphere was much cooler and the southern hemisphere warmer. The situation in northern Africa appears to have been mirrored elsewhere; environmental reconstructions for the Thar desert in north-western India reveal a similar pattern, with fluctuating lake levels in the early Holocene, followed by an abrupt increase at the time of the second Holocene humid phase in Africa (Enzel *et al.* 1999), suggesting that changes in the Saharan environment were a manifestation of global climate change.

Saharan desiccation over the past five millennia

Many indicators suggest a drying of northern Africa (relative to conditions around 6500 BP) by 5000 BP (Lioubimsteva 1995), with lake levels reaching a minimum between 5500 and 4000 BP (Jolly *et al.* 1998). Cremaschi (1998) has found evidence of increased aeolian erosion, sand incursions and the collapse of the roofs of rock shelters around 5000 BP in the Akākūs, indicating that this region was also subject to a rapid desiccation. Pollen extracted from dung associated with Pastoral sites in the Tadrart Akākūs Massif indicates a desiccation from around 5000 to 3900 BP (Grandi *et al.* 1999). Evidence from other parts of the arid zone of the Old World indicate that the desiccation was not restricted to Africa but extended throughout the Near East and Asia (e.g. Enzel *et al.* 1999). Cullen *et al.* (2000) dated an increase in aeolian dust deposition in the Gulf of Oman to 4025 ± 125 BP, and associate this with increased aridity in Mesopotamia and the collapse of the Akkadian empire. Modelling studies by Claussen *et al.* (1999) indicate that the onset of aridity in the Sāḥil-Sahara zone may have occurred in two stages, the first from around 6700 to 5500 BP and the second between 4000 to 3600 BP. They attribute the onset of this millennial-scale desiccation to changes in solar insolation over Africa resulting from cyclical variations in the Earth's orbital parameters. Faunal records of sea surface temperature off West Africa are consistent with these results, indicating cooling events at 6000 and 4600 BP (de Menocal *et al.* 2000); earlier cooling events at 10200 and 8000 BP are associated with the arid episodes described above.

Dates obtained from the FP are consistent with the above data relating to the last phase of Saharan desiccation. However, it is clear that limited upland rainfall and groundwater resources elsewhere were sufficient to sustain human activity in at least parts of Fazzān for some millennia after the onset of the Saharan desiccation. As discussed elsewhere in this volume, the Garamantian civilisation flourished until some

1500 BP ago by utilising groundwater available in the vicinity of the Wādī al-Ajāl. It is not clear whether Garamantian occupation ceased as a result of diminishing water resources, although there is ample evidence that groundwater levels exhibited a lagged response to changes in rainfall in Fazzān. The authors have dated the drying-up of springline deposits to c.4100-3000 BP. Cremaschi (1998) has dated Acacia trees in a lake basin in the 'Arq Wān Kāsā to 2375 ± 110 BP, indicating that the gypsum crust on which they grew formed some time prior to this. Cremaschi and Di Lernia (1998) describe evidence of fluvial activity at 3900 BP along the main fluvial systems in the same region. They detail evidence of human activity in extreme south-west Libya during the Late Pastoral period (5000-3500 BP), concentrated around wādīs and oases, with the ergs or 'arqs being more-or-less deserted apart from evidence of ephemeral camps and hearths. It remains to be seen whether the Dahān Ubārī, the Massāk Ṣaṭṭafat and the Wādīs al-Ajāl/Irāwan/Barjūj will reveal a similar chronological pattern.

IMPLICATIONS FOR FAZZĀN

Figure 2.21 shows a summary schematic representation of the climate variations in the Holocene based on dating of lacustrine deposits in Fazzān. We have used the U/Th dates presented here and the radiocarbon dates tabulated by Cremaschi (1998). The results show presence of lakes (indicative of wet climate phases) starting at 10000 BP, interrupting periods where lacustrine deposits are absent, indicative of dry phases. The dry phases at 6000 and 8600 BP appear to correspond with dry phases reported elsewhere in the Sahara (as discussed above), however, the absence of lacustrine deposits we find at 7000 BP has not been widely reported elsewhere and could simply represent a gap in our sampling.

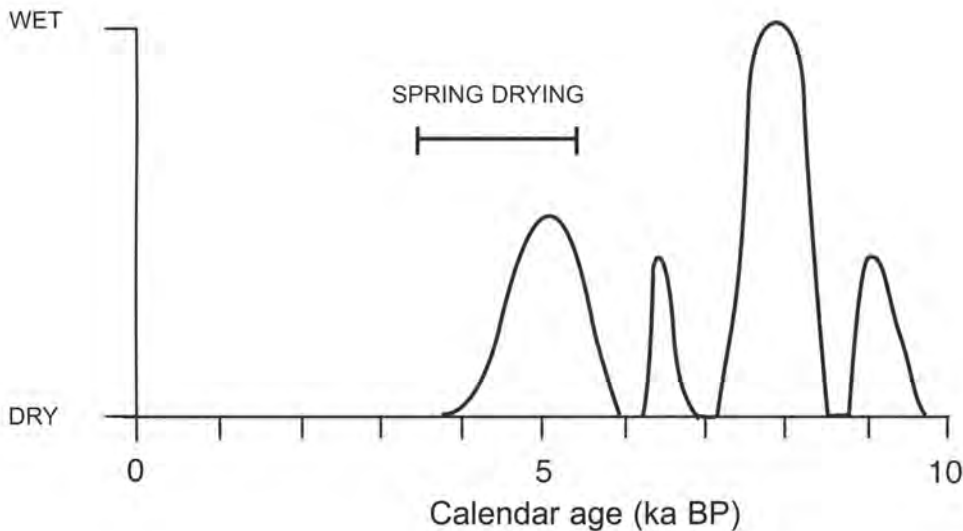


Fig. 2.21. Schematic diagram of dry and wet phases in Fazzān during the Holocene. The data from 10000 to 6000 BP are based on the frequency of radiocarbon dates acquired by Cremaschi (1998) from lacustrine environments in the Murzuq Sand Sea and the Wādī Tanzzūft that we have calibrated. The black lines represent a schematic interpretation of the water level in Jarma Playa and the activity of springs in Wādī al-Ajāl based on the OSL and U/Th dates presented in this chapter.

Environmental change in the Libyan Fazzān must be understood within the context of general Saharan climatic and environmental change. The pluvial history of the Sahara over the latter part of the Quaternary has been determined largely by changes in high latitude ice cover and global temperature patterns. These changes have modulated African rainfall via their influence on regional scale oceanic and atmospheric circulation. In Saharan regions, rainfall may be generated by monsoon-type circulation, the development of spring and autumn Saharan depressions, or the winter passage of Mediterranean cyclones. Certain regions may receive rainfall from a combination of these mechanisms, with the relative importance of the different mechanisms changing over time and varying with geographic location. For these reasons, changes in regional hydrology are not likely to be synchronous throughout northern Africa. The nature and duration of lake high-stands will also be influenced by topography, catchment extent and subsurface geology. Although the formation and refilling of lakes appears to have been a more-or-less immediate response to increased rainfall, lakes may persist for some time after the onset of an arid phase depending on groundwater resources.

All of these considerations are important for Fazzān, which is located at a latitude where both monsoon rains and precipitation generated by Saharan disturbances are likely to have been important at various times in the past. During the first Holocene humid phase, Fazzān is likely to have received rainfall generated by the interaction of Saharan depressions and moist air associated with the ITCZ, occurring in spring and autumn. Mediterranean cyclones may also have penetrated to Fazzān, resulting in winter rainfall. The second Holocene humid episode, different in nature to the first, is likely to have been characterised by summer monsoonal rainfall in Fazzān, perhaps with a more pronounced and restricted wet season. This phase corresponds to the Neolithic, or Pastoral, period in Fazzān. Work by Cremaschi (1998) indicates that the pluvial history of south-western Fazzān closely followed the regional-scale Saharan pattern of two Holocene moist phases, separated by a multi-century arid episode around or before 8000 BP, and terminating with the widespread Saharan desiccation around 5000 BP. Since that time, desiccation has proceeded in the region, being controlled predominantly by the influence of the hydrogeology on groundwater levels. Although large bodies of open water probably disappeared within one or two thousand years of the onset of the last phase of desiccation, it is not clear whether the hydrologic environment has been stable since that time, or whether groundwater levels continued to vary as a lagged response to climatic change. Certainly there is evidence for groundwater surges in the past in Fazzān and elsewhere in the Sahara (White *et al.* 2000; Fontes and Gasse 1991), and some perennial open water bodies exist today in the sand seas, as do playas, representing a range of arid-zone lacustrine features. The groundwater record is further complicated by late 20th-century and 21st-century abstraction for urbanisation and irrigation; interviews with local farmers during the 2000 field season indicated that groundwater levels have fallen by tens of metres (up to 100 m according to some) in the last several decades in parts of the Wādī al-Ajāl.

These issues are of great importance from the geoarchaeological perspective, as the fate of the Garamantian civilisation is likely to be intimately connected with changes in groundwater availability. It is highly likely that the Garamantian culture arose as the result of the adoption of various coping strategies that enabled people to survive in an increasingly arid and hostile environment, with Late Pastoral societies concentrating in locations such as the Wādī al-Ajāl where water was still present relatively near the surface. The increasing complexity of the societies in these areas would have developed in tandem with the need to adopt more technologically advanced methods of access-

ing groundwater, and these developments may be viewed as a process of autocatalysis. The demise of the Garamantian civilisation may or may not have occurred as a result of a failure of their irrigation technology as groundwater levels fell. This question can only be answered by further investigation of the response of the regional aquifers to climatic desiccation, and by assessing the long-term stability of the groundwater table over the past several millennia. Further research into the relationships between climate change and groundwater hydrology will therefore be invaluable to studies of Saharan archaeology and environmental change in general, and will also help to elucidate the potential consequences of present day groundwater use.

CHAPTER 3 HISTORICAL SUMMARY

By David Mattingly

THE SAHARA IN HISTORY: KEY THEMES AND LACUNAE

This chapter will provide an overview of the main sources, themes and events of Saharan history relevant to Fazzān. The history of Fazzān can be broken down into a series of key periods, with several clusters of themes. These are essentially: the Garamantian period c.1000 BC–AD 700 (including a late antique transition); the early Islamic period AD 700–1000; the later Islamic period 1000–1500; the Awlād Muḥammad dynasty and early Ottoman rule c.1500–1813; later Ottoman and Italian rule 1813–1943.

The Garamantian period is notable primarily for the rise of the Saharan civilisation known as the Garamantes and the local evolution of urbanism, irrigated agriculture, writing, etc.. But this phase of Saharan history also saw the introduction of the horse, camel and wheeled transport, the development of trans-Saharan trade and exchange (of ideas as well as goods), the interaction of the Garamantes with the Roman empire. Another theme is the mismatch between the actual conditions in Fazzān in this period and the misconceptions (or prejudgements) of Greco-Roman (and later Arab) writers about Saharan peoples. There are many unresolved questions about the decline of the Garamantes and their afterlife (not least in modern mythologising) and this is linked to the sparse evidence of the first impact on Fazzān of the Arab invasion of North Africa and the initial spread of Islam in the Sahara. Another theme of the Islamic period is the consolidation of Trans-Saharan trade and the long-term consequences of this for regional centres of power in Fazzān (there was a shift of the centre of power from Jarma to oases in eastern Fazzān). Also important were the power struggles within medieval Fazzān and the influence of northern and southern neighbours. The rise of the Awlād Muḥammad dynasty and the power of families and holy men of Moroccan origin is a key development of the early modern period. However, the rulers of Tripolitania to the north periodically contested the political and economic control of Fazzān. This intervention in Fazzān of the Tripoli-based government (Ottoman and Qaramānli) increased from the 16th century onwards and at times resulted in direct control being imposed. A rise in slave trading and a decline of Fazzāni agriculture in the early modern period were consequences of this external intervention.

Some of these themes are susceptible to conventional historical study, whilst others are most easily addressed with the archaeological data. This chapter will review the historical data and construct a framework for understanding how these changes may have affected the people of Fazzān and their lifestyles.

LATE PREHISTORIC SOCIETY IN FAZZĀN

Before turning to the historical periods, a few comments are required on the late prehistoric period, for which some further key themes can be identified, notably the transition to farming (first pastoralism, then crop production) and the emergence of complex societies. However, these are more susceptible to investigation through non-historical approaches and will be dealt with more fully in later chapters. We lack sources dealing specifically with the key period of the transition to farming in the (Neolithic) Pastoral period in southern Libya. Studies of rock-art and excavations of rock-shelter sites combine to suggest that this was a protracted process in the middle-late Holocene period (broadly from the 6th–1st millennium BC). The earliest evidence of fully domesticated animals in Fazzān is now thought to date to the 7th millennium BP (for key summary statements see Barich 1998; Cremaschi and di Lernia 1999;

di Lernia 1999; Muzzolini 1993c). The final stages of this process can be tracked in the evidence for irrigated agriculture in early 1st millennium BC contexts from the Garamantian hillfort of Zinkekrā (van der Veen 1992). Some of this evidence will be reviewed below (Chapter 9). As we shall see, the Garamantes can be linked with the late Pastoral people of the region, but these connections can only really be explored archaeologically and our history of Fazzān properly starts with the rise of the Garamantian civilisation.

THE GARAMANTES

The Garamantes mark the start of recorded history in the Central Sahara and feature in numerous ancient writings (Table 3.1), though this evidence is not unproblematic (Desanges 1962, 93-96 remains the fullest discussion, though note *Encyclopédie Berbère s.v. Garamantes*, 2969-71; Breton 1974; Fantoli 1933; Mattingly 1995, 17-49). Not least of the problems is the fact that many of the references are fleeting allusions reliant on ingrained cultural preconceptions of the Mediterranean world or on literary tropes of antiquity. Desert regions and their populations produced a fair number of such *topoi* (Abboudy Ibrahim 1992; Abd-el-Ghany 1992; Ball 1942; Desanges 1980, *passim*). There are also problems with reconciling the literary perception with archaeological reality. The most important point to grasp is that the majority of source references do not deal with the native population in isolation, but in terms of their contacts with Romans, Greeks or Carthaginians. The perspective thus always reflects a 'Mediterranean' view of desert dwellers (Brett and Fentress 1996, 10-80).

Source	Date of source	Description
Herodotus 2.32-33	5 th c. BC	Tale of group of Nasamonian youths journeying southwest across the Sahara to a great river (the Niger?).
Herodotus 4.174	5 th c. BC	Inland and south of Psylli dwelled Garamantes (or Gamphasantes?), who reputedly shunned sight of other men, had no weapons of war and were defenceless.
Herodotus 4.181	5 th c. BC	Describes hillocks of salt from top of which springs issue. Describes oasis of Ammon, a 10 day-journey from Thebes. Notes hot spring at oasis of Ammon (Siwa) that was cold in the day and hot at night.
Herodotus 4.182	5 th c. BC	Describes oasis of Augila (modern Awjila), 10 days from Ammon.
Herodotus 4.183	5 th c. BC	Next oasis beyond Augila (10-day journey) was in land of Garamantes. The Garamantes described as an exceedingly numerous people. Herodotus notes that they cultivated salty ground by spreading humic material over it. He also records that they herded cattle, noting the peculiarity of the cattle to graze backward. Garamantes situated a 30-day journey from the coast – most direct route was via land of Lotophages (Gerba). Reference to their hunting Troglodyte Ethiopians in 4-horse chariots.
Herodotus 4.184-85	5 th c. BC	Garamantes situated 10 days' journey from the next oasis to west where Atarantes lived, and 10 days W again there was a mountain called the Atlas and people called the Atlantes by another oasis, and 10 days beyond the Atlantes there was a salt mine.
Agathemerion 2.7	3 rd c. BC	Timosthenos is cited as authority for location of Garamantes southwest of the Syrtes.
Schol. ad Apoll. Rhod. 4.1495 = Frag. Hist. Graec. 4.294.4	3 rd c. BC?	Refers to the mythical Garamas.
Livy 29.33	1 st c. BC	Massinissa taking flight from Carthage, found refuge between the lesser Syrtes and the land of the Garamantes (2 nd c. BC). Suggests Garamantian territory extended quite close to the Emporia on the Tripolitanian coast.
Strabo 2.5.33	1 st c. BC	People of interior Libya practically unknown (only small part of territory visited by military expeditions or travellers). Indigenous inhabitants rarely travelled outside area and those that did could not be relied on to give accurate information. Most southern are Ethiopians, with Garamantes to the north of them.
Strabo 17. 3.19	1 st c. BC	Above the Gaetuli was the country of the Garamantes from which came the <i>carchedones</i> (semi-precious stones known as Carthaginian stones). Garamantes lived 9-10 days from Ethiopians and 15 days from oasis of Ammon. Generalised description given here of interior Libyan tribes - describes simple mode of life and dress, men have many wives and children, resemble nomads of Arabia. Notes horse-rearing as very important (among Garamantes and Gaetuli?).

Strabo 17.3.7	1 st c. BC	Generalised comments on Libyan tribes of interior – notes their attention to their hair (braiding) and their horsemanship. Most cavalry armed with spears, small animal skin-covered shields. Some tribes also used bow and even chariots.
Strabo 17. 3.11	1 st c. BC	Geographically imprecise reference to copper mines and ‘Lychnite’ and ‘Carthaginian stones’ (both red stones?) found in mountains of desert. Notes that some desert dwellers reaped two crops of grain each year, in spring and summer [must be irrigated agriculture].
Strabo 17. 3.23	1 st c. BC	Describes country between Syrtis and Cyrenaica (a barren and arid region) occupied by Nasamones and Psylli and certain Gactuli and then Garamantes and to east the Marmaridae who extended towards oasis of Ammon. Mentions uninhabited country between Augila and land of Garamantes.
Virgil <i>Aen.</i> 4.198	1 st c. BC	Poetic reference to Garamantian king Iarbas (son of Ammon and the nymph Garamantis) and the many temples and altars to Ammon in his kingdom.
Virgil <i>Aen.</i> 6.791-97	1 st c. BC	On the extension of the Roman empire under Augustus as far as the land of the Garamantes and to India (<i>super et Garamantas et Indos proferet imperium</i>).
Virgil <i>Georgics</i> 8.44	1 st c. BC	Poetic description of Garamantes as ‘outermost’ - <i>extremi Garamantes</i> .
Florus 2.31	1 st c. AD	Either late in the 1 st c. BC or early in the 1 st c. AD, P. Sulpicius Quirinius ordered to suppress the Marmaridae and the Garamantes.
Lucan <i>Pharsalia</i> 4.679, 4.677-83	1 st c. AD	Poetic mention of plain ploughed by naked Garamantes. Context also indicates that the Libyan tribes were cavalry force and tent-dwelling people.
Lucan <i>Pharsalia</i> 9.511-12	1 st c. AD	Poetic mention of sole temple in interior Libya, dedicated by the ‘unrefined Garamantes’ (<i>inculti Garamantes</i>) to Jupiter Hammon (this was evidently the site where the oracle was based, which appears to conflate the land of the Garamantes and oasis of Ammon). Describes ‘forest’ of trees supported by subterranean water.
Mela 1.23	1 st c. AD	Garamantes separated from the Gactuli by a tract of desert. Beyond Garamantes lay the Augilae, the Troglodytae and the Atalantes. Beyond these tribes, other races were scarcely human (e.g. Blemyaec, Gamphasantes, etc.).
Mela 1.45	1 st c. AD	More on sub-human tendencies of Atalantes (have no individual names, do not eat flesh and never dream) and Troglodytae (have no possessions, have squeaky voices, live in caves and eat snakes). Garamantian backward-grazing cattle noted, also fact that Garamantian women were held in common and men adopted as own whichever children they felt most resembled themselves.
Pliny 5. 35-38	1 st c. AD	Reference to campaign of Cornelius Balbus in 20 BC against Cidamus (Ghadâmes) and the Garamantes, starting from Sabratha and crossing desert from Cidamus to the Wâdi ash-Shâtî where Thelgae (or Matelge) and Debris (or Dedris)–Garamantian <i>oppida</i> –were probably located (the latter with a hot spring). Mentions subjugation of Garamantian capital (<i>clarissimum oppidum Garama caput Garamantum</i>) by Balbus –Pliny lists other places and tribes mentioned in the triumphal procession, but not all are certainly in Fazzân. Mount Gyri indicated as location from which precious stones (<i>gemmae</i>) came. Reference to Garamantian brigands (<i>latrones</i>) covering over well heads to impede pursuit to their desert heartlands and to the discovery in AD 70 of shorter route to Garamantian territory–the ‘head of the rock’ road.
Pliny 5.26	1 st c. AD	Garamantes lived ‘below the Psylli’.
Pliny 6.209	1 st c. AD	Deep desert location of Garamantes noted.
Pliny 8.142	1 st c. AD	Tale of a Garamantian king who returned from exile accompanied by 200 dogs, attacking all who resisted him.
Pliny 8.178	1 st c. AD	Repeats Herodotus’ story of backward-grazing Garamantian cattle.
Pliny 13.111	1 st c. AD	Describes large date palms with fine fruit from deserts of interior Africa, including lands of the Garamantes. Most famous dates from Ammon (Siwa).
Pliny 37.92, 37.104	1 st c. AD	Carthaginian or Garamantian stones listed as one of two main types of red stones (carbuncles)–the other main type was from India. The stones from the Sahara (formed in the mountainous country of the Nasamones) were smaller than those from India and of varied quality. The best type from the Sahara are known as Syrtitae.
Seneca <i>Herc. Oet.</i> 1106-10	1 st c. AD	Reference to the ‘scattered’ Garamantes (<i>sparsus Garamans</i>).
Seneca <i>Phaedrus</i> 68	1 st c. AD	Reference to the ‘miserable’ Garamantes (<i>inops ... Garamans</i>).
Silius Italicus <i>Punica</i> 2.58	1 st c. AD	Poetic fantasy about Asbyte, daughter of Iarbas king of the Garamantes and nymph Tritonide. Account suggests Garamantian hegemony over many other desert peoples.
Silius Italicus <i>Punica</i> 2.82-83; 3.287-93; 5.185; 9.220; 11.183, 15.672	1 st c. AD	Numerous allusions to Garamantes and other recruits from southern tribes serving in Hannibal’s army (context implies they are cavalry)–describes them as ‘naked’ (13.479), ‘fierce’ (12.749), ‘panting’ (3.12), and speaks of their savage rites, their tents, etc. These references are unhistorical and the frequency probably due to the fact that the name scanned well in poetry!
Silius Italicus <i>Punica</i> 2.58	1 st c. AD	Myth of temple of Ammon in midst of the ‘panting Garamantes’ – though again this is probably intended as a reference to the oasis of Ammon (Siwa).
CIL 8.20453	2 nd c. AD?	Publia Aelia Garamantia used as cognomen in inscription at Sillêgue in Algeria (possibly a freed slave?).
Dionysius Periegetes 217	2 nd c. AD	Reference to the ‘innumerable’ Garamantes
Dionysius Periegetes 323	2 nd c. AD	Reference to ‘savage’ Garamantian (<i>trux Garamas</i>)
Lucian, <i>Dips.</i> 2	2 nd c. AD	Garamantian kings hunt onagers and ostriches

Ptolemy 1.8	2 nd c. AD	Disputes Marinus of Tyre's account of latitude of Agisymba, mentioning two journeys: a) by Septimius Flaccus with his army who in the space of a three-month journey passed through the land of the Garamantes and headed due south to the land of the Ethiopians; b) voyage of Julius Maternus from Lepcis and Garama in company with Garamantian king who was making an expedition against the Ethiopians, and reached Agisymba where rhinoceros found after four months. Ptolemy says Garamantes are for the most part Ethiopians and have the same king.
Ptolemy 1.9	2 nd c. AD	Comments on Ethiopians as black-skinned 'such as from the same cause are the Garamantes'.
Ptolemy 1.10	2 nd c. AD	Distance between Lepcis Magna and Garama given as 5,400 stadia according to Marinus. Refers to two journeys on this route of 20 and 30 days by Flaccus and Maternus (notes that they kept careful daily records of their journeys on account of changes in the water and the weather).
Ptolemy 1.11	2 nd c. AD	Mentions four-month journey from Garama to Agisymba, made by king with no small preparation in fine weather.
Ptolemy 4.6.3-5,	2 nd c. AD	Co-ordinates given for the Garamantian defile (= Wādī al-Ajāl ?), also refers to an inland river Gir uniting the Garamantian defile and the Usargala mountains (could this be the Wādī Tanzzūft?). Names Garamantes as amongst the great peoples of Africa extending from the source of the Bagradas river to the Nubas lake.
Ptolemy 4. 6.12	2 nd c. AD	Reference to Garama metropolis and Sabai (Sabhā).
Ptolemy 4. 8.2	2 nd c. AD	Reference to land of Aethiopians and Agisymba.
Tacitus <i>Ann</i> 3.74	2 nd c. AD	Reference to attacks on Tripolitania by rebels under overall command of Tacfarinas (AD 17) who would afterwards fall back on the land of the Garamantes.
Tacitus <i>Ann</i> 4.23-26	2 nd c. AD	King of Garamantes named as an ally of Tacfarinas in raids and as 'receiver of booty', but notes that light-armed troops were sent by him, not a proper army. After death of Tacfarinas (AD 24), the Garamantes sent a deputation to Rome to sue for peace.
Tacitus <i>Hist</i> 4.50	2 nd c. AD	Account of Garamantian intervention in dispute between Oea and Lepcis and attack on lands and city of Lepcis. They devastated territory of Lepcis and laid siege to city, before arrival of Roman units put them to flight. Garamantes described as an indomitable people who were given to brigandage (<i>gentem indomitam et inter accolas atrociniis fecundam</i>). Roman army recovered most of booty apart from that portion dispersed to inaccessible hut villages.
Arnobius <i>Adv. Gentes</i> 6.5	3 rd c AD	Reference to 'black' Garamantes.
Hippolytus <i>Chron</i> 200.22, 26	3 rd c AD	Distinguished between Garamantes interior and Garamantes exterior (those of heartland and those of wider desert region?).
Marichal, <i>Ostraca</i> 28.2	3 rd c. AD	Roman soldiers from fort at Bū Njīm (Gholaia) sent to Garamantes (to Fazzān?).
Marichal, <i>Ostraca</i> 71.2	3 rd c. AD	Garamantes leading donkeys reported approaching fort at Bū Njīm.
Marichal, <i>Ostraca</i> 72.1-2	3 rd c. AD	Garamantes reported bringing barley to fort of Bū Njīm.
Solinus 16	3 rd c. AD	Repeats Pliny's story of the king returning from exile with 200 dogs.
Solinus 28	3 rd c. AD	Beyond Garamantes are the Psylli whose bodies resisted effects of poison.
Solinus 30	3 rd c. AD	Repeats Pliny's account of hot spring at Debris (appears hot at night, cold in the day). Garamantian capital Garama had long been inaccessible because of covering over of wells. Comments on strange grazing habits of cattle.
Solinus 30	3 rd c. AD	Garamantian Aethiopians did not practice marriage – promiscuous relations between men and women, with parentage of children being decided by chance. Equates Garamantes with Ethiopians (that is negroes).
Tabula Peutingeriana 7.4	3 rd c. AD	Names Garamantes on map between river Giris and a (salt) lake to the southeast of Lepcis Magna.
<i>Anthologia Latina</i> 1 (eds Riese and Bücheler), 183, p. 155-56	3 rd c. AD?	Black slave in Africa Proconsularis – originally from Garamantian region? (described as Garamantian excrement, <i>faex Garamantarum</i>).
<i>CIL</i> 8.3308	3 rd c. AD?	Sittia Garama used as cognomen at Lambacsis
<i>ICVR</i> 9.24058	3 rd c. AD?	Garamantius used as a cognomen in Rome
Ammianus Marcellinus 22.15.2	4 th c. AD	Vague reference to land of Garamantes south of Greater Syrtes, along with various other peoples.
Aurelius Victor, <i>de Caes</i> 1.7	4 th c. AD	Reference to Indians, Garamantes, Bactrians sending embassies to seek peace treaties with Augustus (1 st c. BC).
Claudian <i>Elogium Stil</i> 1.248, 255, 1.355	4 th c. AD	Refers (poetically) to rallying of peoples of mysterious interior regions to Gildo's revolt, including swift light-armed Garamantes and archers.
Claudian <i>Minor Poems</i> 28.20.23	4 th c. AD	Reference to 'unmastered' Garamantes and Gyrae who live in rocky caves, collect ebony and steal ivory tusks from elephants.
Orosius 1.2.88, 2.90	4 th c. AD	Includes Garamantes in geographical lists of peoples in interior Africa.
Prudence, <i>Conta Symm</i> 2.809	4 th c. AD	States that Romans walk same earth as their enemies (Vandals, Huns, Garamantes, etc.) but that same divide between their two worlds as between biped and quadruped.

Iul. Honorius B. 47, 53, A 48, 54	4 th c. AD?	Five major peoples of inland Africa (Nasamones, Baquates, Bures, Bacuenses and Garamantes).
Saint Augustine <i>Epistles</i> .1.91.12	4 th -5 th c. AD	Use of term Garamas as a personal name (<i>Garamas ex Granias</i>).
Saint Augustine <i>de Civ. Dei</i> 21.5.7	4 th -5 th c. AD	Mentions the hot/cold spring at Dedris.
Saint Augustine <i>Quaest. Utro. Test.</i> 115	4 th -5 th c. AD	Refers to Garamantes using bulls as draught animals?
Sidonius Apollinarus 5.36	5 th c. AD	Claims Genseric owed his victory over Romans not to his own arms but to Gaetules and Garamantes (i.e. traditional 'troublesome' peoples from interior of Africa).
Sidonius Apollinarus 9.50	5 th c. AD	Reference to Jupiter Ammon as <i>Jupiter Garamantici</i> .
Corippus <i>Ioh.</i> 6.198	6 th c. AD	Reference to cultivators from among the tribes dwelling 'near the Garamantes' joining the Laguatan rebellion against Byzantine rule in Tripolitania. The characterisation of the Laguatan as Austur or Nasamones suggests they originated primarily in vicinity of the Greater Syrtes.
John of Biclar (Wolf 1990, 63)	6 th c. AD	Garamantes sent envoys in AD 569 to request peace with Rome and, according to the source, asked to become Christians and were granted this.
Procopius <i>de Aed</i> 6.3.6	6 th c. AD	Cidamus (Ghadāmis) noted as long-term allies of Rome. Won over by Justinian and 'voluntarily adopted Christianity'.
Isidorus of Seville 9.11.125, 128	7 th c. AD	States that the Garamantes were a people of Africa near Cyrene, named after their king Garamante (son of Apollo) who founded city of Garama. They lived near the Ethiopians and had a reputation for cruelty. Equates Garamantes with Ethiopians.

Table 3.1 Literary source references to the Garamantes

To a large extent there was also more interest in locating geographically where these diverse peoples were to be found, than in their culture and society (Fig 3.1). Comparatively little ethnographic detail was recorded and some such material was clearly repeated anachronistically from earlier sources. As Desanges has demonstrated, both Mela and Pliny reproduced stories from Herodotus and other Greek sources whose validity in the first century AD must be doubted (Desanges 1980, esp. 452-77; Herodotus 4.174, 4.183, 4.186; Mela 1.23, 1.45; Pliny, *NH* 5.43-6). Nor does the inclusion of material which is plainly mythical or apocryphal, such as tales of people with no heads and eyes in their chests, encourage confidence in the veracity of other uncorroborated stories. There is also the danger that an undetected official bias may have distorted certain facts or that the Roman historians and geographers may have introduced their own inventions in order to match their information with their preconceptions. We have no guarantee that even when better quality information was available that our sources made full use of it. Just occasionally we can catch them out, when they have plainly misunderstood a point of detail – as in Pliny's failure to appreciate that Cornelius Balbus in 20 BC campaigned in southern Algeria as well as against the Garamantes in Libya (Desanges 1957; 1978, 189-95; 1980; Mattingly 1995, 17-25; cf. also Ayoub 1968a/b). However, these potential weaknesses are often not detectable, particularly once a passage has been extracted from its full context.

In this section we shall review several key aspects of the textual evidence: the issue of literary stereotyping, the geographical location of the Garamantes, the history of external (notably Roman) contact with them, and the depiction of the Garamantes by the sources (including the nature of their society and race).

Conceptual frameworks and stereotypes

A potentially serious defect with the ancient sources is the conceptual framework within which they were written. There was a tendency to categorise tribes within a series of zones moving away from the coast into the interior, with each zone representing a stage in increasing barbarity and degeneracy (Mattingly 1995, 22-23). These crude stereotypes, based on ingrained cultural expectations, were persisted with even when they were contradicted by other information. The perspective of the ancient

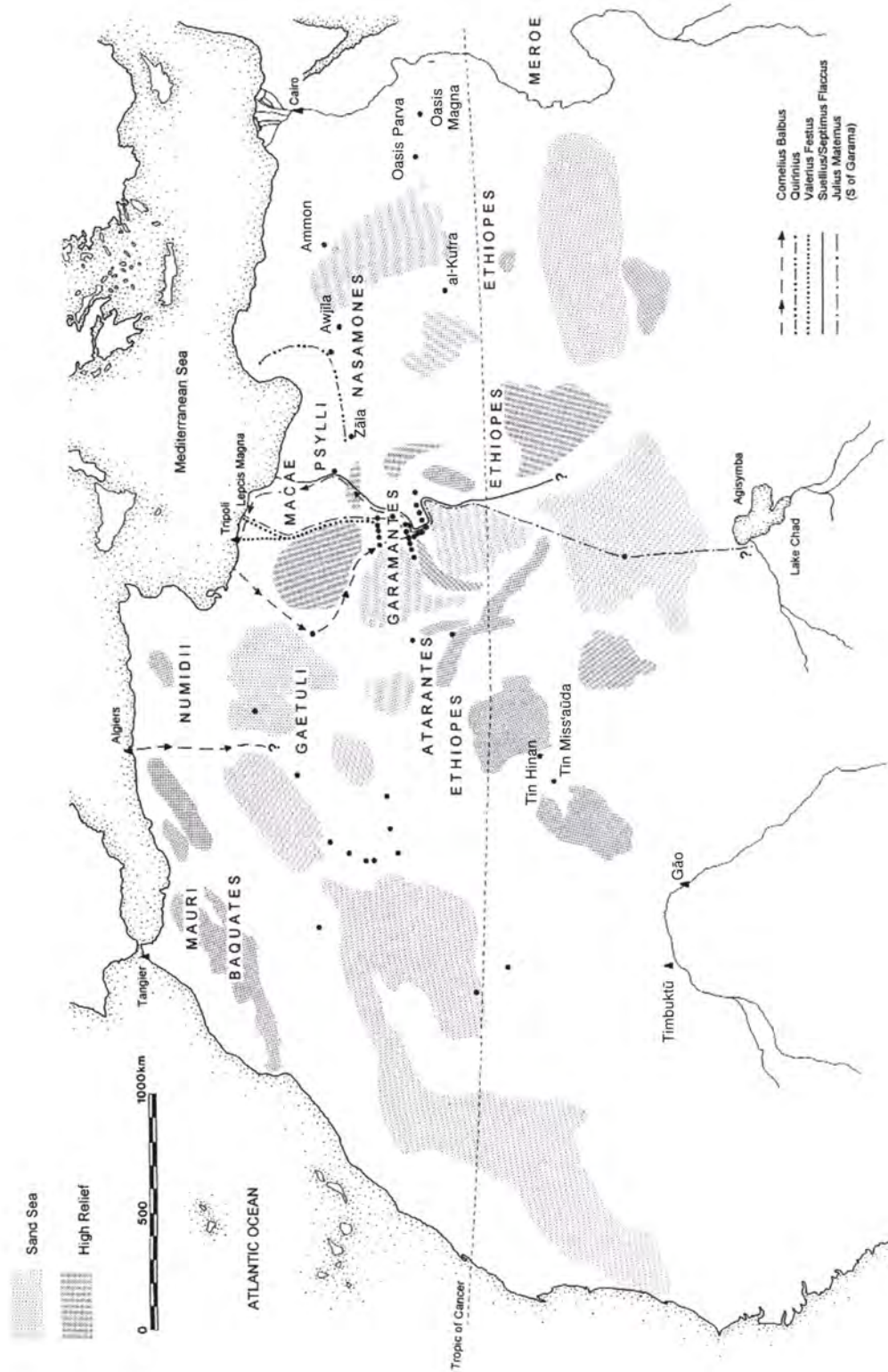


Fig. 3.1. The Garamantes in the Sahara, showing hypothetical courses of Roman expeditions against them.

compilers has thus distorted the truth through the selection of information that seemed to fit their model. The difficulty concerns how to spot the authentic information and to see its significance even when it has been deployed within a rigid and artificial framework (see further, Mattingly 1996; Mattingly and Hitchner 1995, 171-74).

Agriculture was one of the main criteria of 'civilisation' used by the ancient writers, but the reality of Saharan farming was rarely discussed (with the exception of some travellers' tales in Herodotus) and the issue of relations between agriculturalists and pastoralists in the Sahara was for the most part not addressed and seems to have been of little interest to the Greco-Roman audience. Thus the generalised and simplified approach adopted by Pliny, Mela, Diodorus and others to explain the way of life of barbarian peoples was not so much deliberate distortion as a prejudgement based on their general perspective. As in some more recent societies, a generalised model of nomadic or pastoral peoples was developed that was mostly assumed to apply to broad groups of people purely in view of the geographical location (Mattingly 1995; Shaw 1981; 1983; Trouset 1982). Sometimes the crude stereotypes have been over eagerly adopted by modern scholarship, reducing history to a series of clashes between civilized sedentary Romans and barbarous nomadic Libyans (Leschi 1942; Racht 1970).

The geographical location of the Garamantes

The general whereabouts of the Garamantian heartlands is not in doubt (Fig. 3.1). Several sources indicate that the Garamantes were a people of the desert in the region south of Tripolitania (modern north-west Libya) and south-west of the Greater Syrtes (Livy 29.33; Strabo 17.3.19; Mela 1.23; Pliny, *NH* 5.35-38; Ptolemy 4.6; *Tabula Peutingeriana* 7.4). The clearest indication of the distance from the Mediterranean coast is provided by Ptolemy (1.10), who records journeys of 20 and 30 days to Garama (both match travel times to a location in the heart of Fazzān). The modern identification of the Garamantian capital Garama with Jarma in the Wādī al-Ajāl goes back to Duveyrier (1864, 276 – though he equated ancient Garama with the abandoned settlement of Qaṣr al-Waṭwāt (GER 4) not with Old Jarma itself) and has been considerably strengthened by subsequent archaeological research. There is another group of sources, however, that has a much less precise sense of the geographical location of the Garamantes and it is clear that the Garamantes were sometimes conflated (whether deliberately or in error) with other exotic desert locations, notably the oasis of Ammon (Siwa) and its oracle (Lucan *Pharsalia* 9.511-12; Isidorus of Seville 9.11.125). For these authors, and for many people in antiquity, it was enough that the Garamantes were synonymous with the vast sweep of the southern desert and with its more curious features.

Of potentially greater interest is the indication of the territorial limits of the Garamantes. Ancient references to the Garamantes often focus on their physical distance and separation from the Mediterranean coast or other fixed points, but the distances cited are not necessarily to their heartlands. When Herodotus wrote that the land of the Garamantes lay 10 days' west of Augila (modern Awjila) oasis (Pliny, *NH* 5.26, gives the figure as 12 days), this would not allow a traveller to reach Jarma itself. In the opposite direction, the distance between the oasis of Augila and Ammon according to Herodotus was also 10 days travel (actual distance 455 km). Following the logical route west of Augila, 450 km lies in open desert, but 422 km would bring a traveller to Zāla via Marāda and may indicate that the ancient limits of Garamantian power lay at Zāla to east of the modern limits of Fazzān (Liverani 2000b/c). As Liverani has observed, the 10-day stages between oases mentioned by Herodotus correspond almost perfectly with the traditional caravan routes of the medieval and early modern trans-Saharan trade routes (Liverani 2000c). He is surely correct to

suggest that the basic elements of the medieval Saharan economy (oases, trade between them and 10 day/400-500 km caravan stints) were already being developed by the 6th–5th centuries BC. It also follows from Herodotus that the tribe of the Akākūs/Wādī Tanzzūft area was the Atlantes, though the region was evidently later assimilated into the Garamantian territory.

The northern extension of Garamantian influence is demonstrated by their involvement in rebellions against Rome of people living closer to the Mediterranean and by their intervention in the quarrel between Lepcis and Oea. This might suggest that in the 1st century BC and 1st century AD they controlled some of the intermediate oases between the coast and Fazzān proper (in particular those of the al-Jufra – Hūn, Waddān and Sūkna). Several sources mention Garamantian activity to the south of their heartlands, where the Ethiopians lived. There are indications that the Garamantes claimed suzerainty over some of them and a Roman Iulius Maternus accompanied the Garamantian king on a four-month ‘campaign against the Ethiopians’ to an area called Agisymba ‘where the rhinoceros was to be found’ (Ptolemy 1.8; Stephenson 1932). This expedition is generally believed to have penetrated to Lake Chad (Desanges 1978). Although the boundaries of the Garamantian territory changed over time (and one result of Roman domination to the north may have been to set limits on Garamantian influence in that direction), the evidence suggests that Garamantian power extended far beyond the heartland territory of the Wādī al-Ajāl. In this context we might note Ptolemy’s comment (1.8) that Garamantes and Ethiopians in the central Sahara had the same king, implying a considerable extension of Garamantian hegemony to the south.

On the other hand, the sources repeatedly mention the difficulties of access to the heartlands – the desert wastes, the shortage of water, the problem of locating hidden wells, the need of guides (Herodotus 4.183; Pliny, *NH* 5.26; 5.34; Ptolemy 1.8). Ptolemy noted the importance of travellers keeping careful day records of their travels on these very routes (1.10). This was an information-gathering process that was to reach obsessional levels with the European travellers of the 19th century and the colonial servants of the 20th century. What is being described in these sources that dwell on the geographical minutiae is not so much the Garamantes themselves, but the Romans attempts to master them and their environment.

A minor puzzle about the ancient geography of the region is the lack of correlation between the Roman term Phazania and the Arab and modern Fazzān. There is no doubt that the region known as Phazania (and the people called Phazanii) is to be located in the immediate area of Ghadāmis (ancient Cidamus) (Mattingly 1995, 30; *Encyclopédie Berbère s.v. Fazzān*). There is no conclusive evidence that the Phazanii were ever under Garamantian hegemony, though the campaign of Balbus, which targeted first Cidamus and then the Garamantian heartlands, is suggestive (Desanges 1957). It is possible that some people from the Ghadāmis area migrated into Garamantian territory in late antiquity, taking their name with them. Another possibility might be that the name Phazanii, whatever its origins, had become synonymous with ‘oasis cultivators’ and that the name came to be applied more widely in the Libyan desert at a time when the agnate or tribal significance of the term had ceased to be valid. As the area of the greatest concentration of oasis cultivation and cultivators, Fazzān would have been an obvious candidate to inherit the name. Certainly in the early modern period, the term Fazzāni has been strictly limited to sedentary agriculturalists.

External contacts of the Garamantes (Greeks, Carthaginians, Romans, Ethiopians)

There were three main types of contact between the Garamantes and the Mediterranean world, military, diplomatic and commercial (on the relationship with Rome, see *inter alia*, Daniels 1970a; 1987; Fentress 1979; Mattingly 1992; 1995; Weiss

1964). Military contacts dominate the sources more than commercial or diplomatic ones, though this probably misrepresents the true balance (Table 3.2). For many of the Roman sources the Garamantes were a natural enemy, whether described in the context of actual confrontation with Rome or as a probably apocryphal ally of Rome's enemies (as with Hannibal, Gildo and Gelimer).

Date	Event
5 th c. BC	Herodotus provides evidence for long-distance Saharan trade route from Niger to the Nile, passing through Fazzān. Notes another route from Fazzān north towards Lesser Syrtes (and Carthage). Oasis agriculture attested.
20 BC	Campaign of Cornelius Balbus—started at Sabratha, proceeded to Ghadāmis (Cidamus), then across the desert southeast to Idri (Dedris) and from there across the Dahān Ubāri to Jarma, probably returned to the north via eastern Wādī al-Ajāl. First Roman penetration to Garamantian heartlands.
c. 15 BC	P. Sulpicius Quirinius campaigned against the Marmaridae and Garamantes (while Governor of Crete and Cyrene), with the action probably limited to oases south of Cyrenaica and Syrtes (Zalā?).
3 BC	Roman Proconsul killed in Africa, by Nasamones?
AD 3-6	Gaetulian revolt—may have involved Garamantes also.
AD 17-24	Tacfarinan revolt against Rome—certainly involved Garamantes as allies of Tacfarinas. Roman forces were posted to Tripolitania to counter their raids. After death of Tacfarinas, Garamantian envoys sent to Rome to sue for peace.
AD 69	<i>Garamantes</i> joined <i>Oea</i> in war against <i>Lepcis</i> . Defeated by Roman advance guard.
AD 70	Campaign of Valerius Festus to Fazzān. Major defeat inflicted on <i>Garamantes</i> and new treaty terms imposed.
c. AD 85-86	Revolt of the <i>Nasamones</i> . Governor Suellius Flaccus active in <i>Syrtyca</i> and Tripolitania.
c. AD 87	Delimitation of lands of Syrtic tribes and campaign of 'Septimius' Flaccus to Fazzān and beyond.
Between AD 88-92	Expedition of Maternus proceeded south of Garama to Agisympa (four-month journey = Lake Chad?). Accompanied Garamantian king on campaign against Ethiopians.
Early 3 rd c. AD	Attacks by warlike tribes (<i>bellicosae gentes</i>) on Tripolitania. May have included Garamantes, though they were not named specifically in sources. Garamantian 'types' illustrated on contemporary Zliten mosaics showing exposure of Libyan tribesmen to wild beasts in arena at <i>Lepcis Magna</i> .
Mid-3 rd c. AD	Garamantes kept under close military supervision on desert routes in southern Tripolitania near Bū Njīm. Some soldiers detached <i>cum Garamantibus</i> —does this mean troops sent to Fazzān or simply to escort a group of Garamantes on the road north?
AD 290s	Maximian campaigned against tribes in Africa—probably in the Syrtic region.
AD 360s	War in Tripolitania involving the Syrtic Austuriani.
Late 4 th -early 5 th c. AD	Repeated raids of Austuriani against Tripolitania and Cyrenaica.
AD 455	Formal ceding of Tripolitania to Vandal control.
Early 6 th c. AD	Libyan (Laguatan) tribal force defeated in Tripolitania by Vandal army.
AD 532-33	Byzantine reconquest of Africa and Tripolitania.
AD 544-48	Byzantine massacre of Laguatan and other Libyan tribal chiefs, followed by revolt.
Mid-6 th c. AD	Justinian concludes peace treaties with oasis communities at Cidamus, Augila and with the Garamantes (suggests their involvement in earlier revolt).
AD 643	First Arab raids reached Tripolitania
AD 666-67	Arab raid to Fazzān, submission of rulers of Waddān and Garama

Table 3.2 Main historical events certainly or possibly involving the Garamantes.

The overriding images are of a warlike and exotic barbarian people, and the latter 1st century BC and 1st century AD appear to be periods of sporadic conflict with Rome (Fig. 3.1). They were first subdued under Augustus when a remarkable long-range raid by his general Cornelius Balbus penetrated to the Garamantian heartlands in the al-Ajāl (for the history of Roman military action against the Garamantes, Daniels 1969, 37-38; 1970a, 13-21; Desanges 1978, 189-213; Mattingly 1995, 70-73; Romanelli 1977). Pliny's account (*NH* 5.35-37) of the resulting triumph suggests that the conquest of the desert landscape was being celebrated as much as was the military victory (in the same way that Caesar's crossing of the ocean at the world's end excited an exaggerated response in Rome, far beyond the merits of his actual achievements in Britain).

According to Florus (2.31) a further Augustan campaign against the Garamantes and the Marmaridae was undertaken by P. Sulpicius Quirinius. The exact date is uncertain, though he was governor of Crete and Cyrene at some point between 21 and 15 BC, so the campaign may have been a secondary action against the Cyrenaican and Syrtic oases at about the same time as that of Balbus further west. It is clear that the action focused on the Marmaridae, since Florus praised Quirinius for not exaggerating

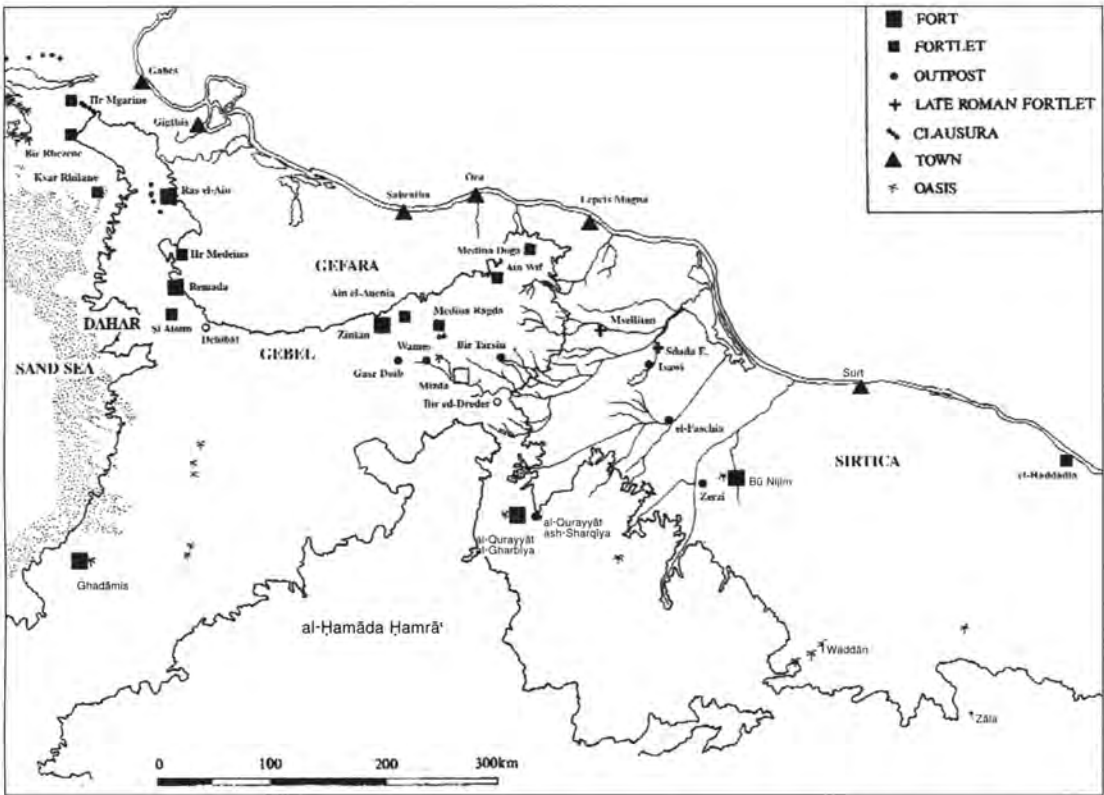


Fig. 3.2. The Roman frontier in Tripolitania to the north of Fazzān (from Barker et al. 1996a).

his achievements to claim the title of Marmaricus (in the way that Cossus Lentulus (see below) was later to be designated Gaetulicus). If the Garamantes controlled oases as far to the east as Zāla, it is possible that Quirinius may have encountered their forces there, though it seems highly improbable that he made a push for their heartlands. Alternatively, it is conceivable that Quirinius held a special command at a later date, perhaps at the time of the Gaetulan revolt in AD 3-6 (Dio 55.28.1-4), or in relation to the possible killing of a Proconsul of Africa by the Nasamones in *c.* 3 BC (Desanges 1969; Mattingly 1995, 70 and n. 6). Cossus Lentulus, the Roman proconsul who eventually subdued the Gaetulan revolt, was honoured at Lepcis Magna, underlining that Tripolitania had been a theatre of the war. The Garamantes, though not explicitly named by our sources, were most likely active participants on the side of the rebels. At any rate, when trouble flared up in AD 17 between Rome and a broad coalition of Libyan tribes under the overall leadership of Tacfarinas, the hinterland of Lepcis Magna was again affected and this time the Garamantes were certainly involved. Troops were stationed in Tripolitania to counter Garamantian raids, though there is no suggestion of Roman retaliatory campaigns to Fazzān (Tacitus, *Ann.* 3.74, 4.23-26). At the end of the Tacfarinan war (AD 17-24), the Garamantes, aware of their guilt (this perhaps implies a pre-existing treaty), sent envoys to Rome, where they evidently stood out from the crowd (Tacitus, *Ann.* 4.26: *raro in urbe visi*).

In AD 69, the Garamantes were taken as allies by Oea, one of the coastal cities, in a squabble about territory with her greater rival Lepcis Magna. The Garamantes obligingly besieged Lepcis and looted the surrounding countryside before being chased off by Roman army units, who then pursued them into the desert and secured a victory (Tacitus, *Hist.* 4.50 and Pliny, *NH* 5.38). Their booty was recovered apart from that which they had sold as “they wandered through inaccessible hut settlements” (Tacitus, *Hist.* 4.50: *gentem indomitam et inter accolas latrociniis fecundam ... recepta omnis praeda nisi quam vagi per inaccessa mapalium ulterioribus vendiderant*).

In the later first century AD, there were several further Roman expeditions to Fazzān, one by a man referred to by Ptolemy as Septimius Flaccus, probably to be identified with the governor of the mid-80s, Suellius Flaccus (Desanges 1978, 197-213; Mattingly 1995, 71-74). There are hints here though of a changing relationship. Flaccus evidently visited Garama after first crushing a revolt by another desert tribe, the Nasamones. He then travelled south from Garama for three months' duration (Ptolemy 1.8, 1.10). A few years later, a certain Iulius Maternus again travelled far south of Garama, in company with the king of the Garamantes (who was evidently 'hunting Ethiopians' – presumably a slaving raid) to a lake where the rhinoceros was to be found, almost certainly Lake Chad (Ptolemy 1.8). It is unclear whether this was a military expedition or a trading venture. At any rate, both these journeys seem to have taken place with the active assistance of the Garamantes, implying some closer treaty relationship.

From this evidence it seems reasonable to postulate no less than three Roman military expeditions to the Garamantian heartlands (20 BC, AD 70, late AD 80s) and an increase in visits by traders and other travellers from the later 1st century AD (Fig. 3.1). Trade with the wider world was probably part of the Garamantian pattern of contact from early times, especially if we recognise in Herodotus' account a caravan route of 10-day stages stretching from the Nile west and south-west towards the Niger. Allusions to 'Carthaginian' stones (the red carnelian), to salt mines, to horse-breeding, date cultivation, ivory, ebony and the hunting of Ethiopians (for slaves?) give a hint at a range of Saharan commodities of trade (Herodotus 4.185; Strabo 17.3.19; Pliny 13.111; 37.92; Claudian, *Minor poems* 28.20.23).



Fig. 3.3. The Roman fort at al-Qurayyāt al-Gharbiya on the central route to Fazzān.

There are signs of further trouble with desert tribes at the start of the 3rd century AD, though again the Garamantes are not specifically named by our sources (HA *Sept. Sev.* 18.3; Aurelius Victor, *de Caes.* 20.19). The occupation of the oasis of Ghadāmis and the creation of a screen of other desert forts (Fig. 3.2: al-Qurayyāt al-Gharbiya – Fig. 3.3 – and Bū Njīm) between Tripolitania and Fazzān suggests that the root of the problems lay further south (Mattingly 1995, 73, 80-83). However, in the mid-third century, informal documents from one of these Roman forts on the route north of Fazzān at Bū Njīm refer several times to Garamantes being encountered by patrols or outposts on desert trackways (Marichal 1992, 110-14). Some of the tribesmen were evidently trading with the garrison. The later history of contacts with Rome is uncertain, though the Garamantes may have been caught up in the events that saw the influx of new Berber tribes from the east into the Syrtic desert, with consequent destabilisation of the frontier zone (Mattingly 1983; 1995).

In general, then, Garamantian resistance to Rome's expansionism was interpreted by ancient writers as nomadic antipathy for sedentary peoples and 'civilising' powers, and little credence was given to the specific references to oasis agriculture. Nor is there much attention focused on the scale or sophistication of the Garamantian state. Yet it is inconceivable that over several centuries of diplomatic, military and trading contact, that the Roman empire lacked a better understanding of the Garamantes.

Diplomatic contacts are the hardest to trace as the normal context for mentioning diplomatic envoys was in the immediate aftermath of a war. The limited source evidence demonstrates treaty relations in the 1st century AD and the 6th century AD (Tacitus, *Ann.* 4.26; Jean of Bictar 459 = Wolf 1990, 63). However, there is good evidence that the Roman empire maintained more regular contacts with its neighbours and these relationships might be sustained over long periods (Mattingly 1992; Whittaker 1990). The detailed evidence available to Rome has unfortunately not been transmitted to us.

Depictions of Garamantian society, culture and race

Ancient writers from the time of Herodotus to the end of the Roman period depicted the Garamantes as the epitome of a barbarian people, menacing the Mediterranean world from their desert strongholds. Consider the epithets used to characterise them: numerous, savage, fierce, indomitable, outermost, panting, naked, miserable, tent- or hut-dwelling, scattered, promiscuous, lawless, receivers of booty, light-armed, given to brigandage, black. The almost universally negative tone of these terms must be recognised for what it is – a mixture of preconception and prejudice. Perhaps it is not surprising, then, that the only proposed identifications of Garamantes in Roman art show them meeting a fate appropriate to criminals and barbarians, thrown to wild beasts in the Roman arena (Aurigemma 1926, 178-201; 1960, 55-60; Pace *et al.* 1951, 489-92) (Fig. 3.4).

Anachronisms are another problem with our sources. The Garamantes as defined by Herodotus in his famous account (Herodotus 4.183), featured in similar terms in many later sources (Mela 1.45; Pliny 8.178). Likewise Pliny was cullled for information by later writers (such as Solinus 16, 28, 30 and St Augustine, *Civ. Dei* 21.5.7). Despite

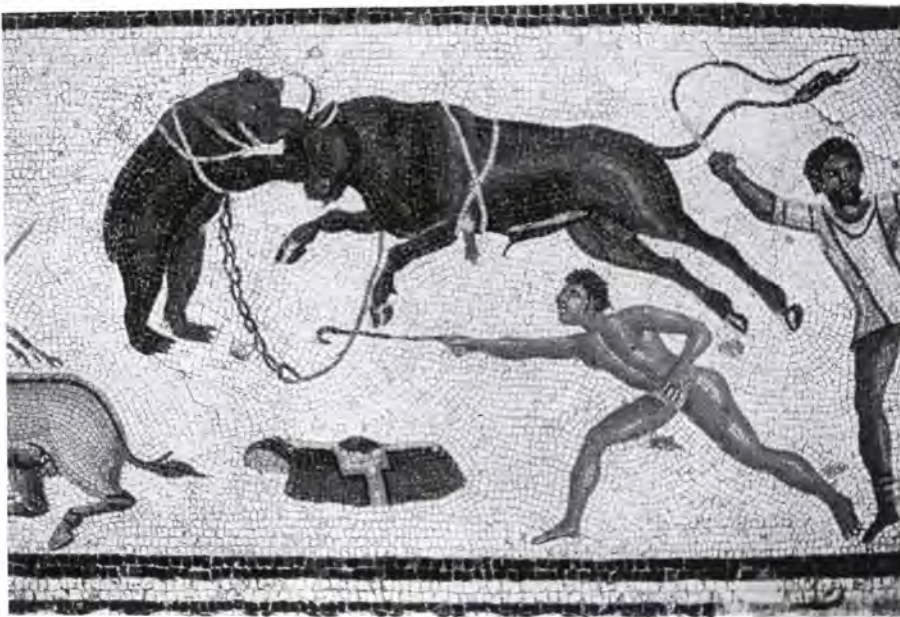


Fig. 3.4. 'Garamantian prisoners' exposed to the beasts in the arena at Lepcis Magna, as depicted on the Zliten villa mosaic (early 3rd century AD).

the data gathering we know was associated with the three military expeditions to Fazzān and the long journey of Iulius Maternus, it is striking to note how little new information appeared in the sources of 2nd century and later date.

An imperial or colonialist vision is clear in all this. After Balbus' Triumph over the Garamantes in 19 BC, the Augustan poets described the tribe as belonging to the 'limitless empire' of Rome (Vergil, *Aeneid*, 6.791-97). When they took part in later rebellions, Tacitus denigrated them as brigands (*latrocinēs*) and stated that the Garamantian king was a "receiver of stolen goods and partner in the raids, not by taking the field with an army, but by dispatching light-armed troops, whose numbers report magnified in proportion to distance" (Tacitus, *Ann.* 4.23). As we have seen (Tables 3.1, 3.2), only the barest outline of events is given by our sources and we learn almost nothing of the tribe beyond their reputation as warlike and ungovernable people who habitually engaged in banditry on their neighbours. They are portrayed as 'devious' for their tactic of covering up the well heads with sand to hinder pursuit when retreating from raids to the north, though this might be seen as a sign of strategic organisation.

Several other snippets of information in our literary sources suggest that the Garamantes were not quite the nomadic barbarians, they have often been taken for. They were a populous people (Herodotus 4.183; Dionysius Periegetes 217; Ptolemy 4.6; Tacitus, *Hist.* 4.50, describes them as a *gens*) whose major settlements were evidently of urban or proto-urban character, even if their dwellings are elsewhere (Tacitus, *Hist.* 4.50) dismissed as huts (*mapalia*). *Garama* was described as the Garamantian capital (Pliny, *NH* 5.36: *clarissimum oppidum Garama caput Garamantum*) and as a *metropolis* of the tribe (Ptolemy 4.6.12), and several other sites are referred to specifically as *oppida* (Pliny, *NH* 5.35-37). Herodotus mentioned both agricultural and pastoral practices among the Garamantes, referring to the spreading of loam onto the salty soil before cultivating it and to their peculiar, long-horned backward-grazing cattle (Herodotus 4.183). Whilst Pliny referred to the cultivation of the date palm in Garamantian lands (*NH* 13.111), he added nothing else to our knowledge of Garamantian agriculture. One could easily assume from our sources that the Garamantes lived primarily by brigandage and pastoralism (the assumed normative model for desert dwellers).

The Garamantes were certainly ruled by kings. Silius Italicus related the story of Asbyte, daughter of a Garamantian leader Hiarbas or Iarbas, serving under Hannibal, though this has the air of a romantic fiction (Silius Italicus 2.82-83). The king allied to Tacfarinas in Tiberius' reign has already been mentioned (Tacitus, *Ann.* 4.23). In the late 1st century AD a Roman expedition was accompanied to the Sudan by a Garamantian king (Ptolemy 1.8.4) and when 'Uqba bin Nāfi' invaded Fazzān in AD 666-67 there was still a king at Jarma (al-Bakrī = De Slane 1913, 32-35). Pliny (*NH* 8.142) also mentioned a deposed king staging a coup d'état, though there are no other references to the process of succession or limitations to the power of the kings. Although attempts to identify specific tombs around Jarma as those of kings have been fraught with uncertainties (cf. Ayoub 1967b), it is clear that there are plenty of good candidates for royal or aristocratic burials, reflecting the sophistication of Garamantian culture (Chapter 6, below).

Herodotus (4.183) stated that the Garamantes fought from chariots, but other evidence points to the fact that a dominant feature of warfare was the mounted cavalry engagement. Lucan and Silius Italicus recorded contingents from the southern tribes, including Garamantes, fighting variously alongside Numidians and Carthaginians. The descriptions of battles are mostly fantastic, but they reflect the fact that the Libyans were later recruited by the Romans mainly as cavalry (Lucan 4.677-83; Silius Italicus 2.56-57; 2.82-83; 3.287-93; 5.185; 9.220; 15.672). Strabo confirmed that horses and horsemanship were essential features of the Gaetuli and Garamantes tribes.



Fig. 3.5. Garamantian 'cavalry' (FJJ 28).



Fig. 3.6. Garamantian infantry depicted on Zinkekrā (ZIN 279).

Describing the interior regions occupied by these two broad groups, he wrote, "Horse-breeding is followed with such exceptional interest by the kings that the number of colts each year amount to one hundred thousand" (Strabo 17.3.19). However exaggerated this figure, horses were evidently the preferred vehicle for war and travel in the Sahara. Although camels were increasingly used as baggage carriers, even into late antiquity the desert tribes fought primarily as equine cavalry (Mattingly 1995, 40-41; 178-80). Numerous rock-art images of warriors on horseback are known from the Wādī al-Ajāl (see below Chapters 8-9) and these probably are a form of self-representation by the Garamantes (Fig. 3.5). Infantry armed with spears and round shields are also depicted in the Garamantian period rock-art and stand in complete contrast with the emphasis on the bow and arrow of the Pastoral period (Fig. 3.6).

Garamantian chariots should not be dismissed as simple myth; the huge number of depictions of chariots in the late Pastoral rock-art of the Sahara attests to their presence in the region (for a range of views on the significance of chariots see Camps 1989; Camps and Gast 1982; Lhote 1982; Muzzolini 1986; 1995; Chapter 9 below). There are a few rare examples from close to Jarma (Fig. 3.7). The idea that the Garamantes travelled long distances across the Sahara in their chariots is clearly nonsensical, as anyone who knows the terrain will attest. But, between the sand and hard rock areas, there are stretches of gravel plain which would have been an ideal surface for chariots and the great advantage of the chariot was that it could easily be disassembled for onward transport and then reassembled for use. The psychological impact of even a few chariots deployed alongside equine cavalry in raids or military campaigns against neighbouring peoples could have been significant. Many of the finest paintings of chariots at full gallop from the Akākūs and Tassili mountains may well have been



Fig. 3.7. Detail of rock engraving of a Garamantian chariot (GSC 41), cf. Fig. 8.21 below.

painted by the intended human prey. Other desert communities may have borrowed the idea of the chariot from the Garamantes and this may account for the extremely wide distribution of such imagery within the central Sahara.

Several of our sources imply that the Garamantians were negroid or very dark skinned (Arnobius *Adv. Gentes* 6.5; Ptolemy 1.9), others conflate or confuse the Garamantians and Ethiopians, presumably for similar reasons (Solinus 30), yet others imply a difference between the Garamantes and the Ethiopian (that is black-skinned) peoples (Strabo 2.5.33; on the Ethiopians, see *Encyclopédie Berbère s.v. Aethiopes*, 168-81). Clearly the perception of some of the Roman writers was that some Garamantians were negroid or very dark skinned, whilst others saw them as essentially aligned with the Berber peoples. This mixed picture most likely reflects the ancient reality (as we shall see later when archaeological evidence is considered). It is certainly incorrect to assume that all Garamantians were black. The cognomina Garamantius and

Garama are attested in the Roman empire (Jongeling 1994), suggesting the presence of slaves from Fazzān. The influx of some black slaves from Garamantian lands to the Roman empire may have created a strong association for some observers between negroes and the Garamantes themselves (for images of black Africans in Roman art, see Desanges 1976; Snowden 1970). An unpleasant poem referring to a black slave as ‘Garamantian excrement’ – *faex Garamantarum* (*Anthologia Latina* I [eds. Riese and Bücheler], 183, 155-56), illustrates the extent of prejudice that could exist. However, images in the late prehistoric rock-art suggest a mix of racial types in Fazzān and the appearance of Libyans identified as ‘Garamantes’ on Roman amphitheatre mosaics suggest a Berber type more than negro. Ptolemy (1.8) stated that the Garamantian king claimed suzerainty of some of the Ethiopian peoples he marched against in company with Maternus in the late 1st century AD. On the evidence of the sources alone, the likelihood is that the Garamantes encompassed a mixture of racial types: Berber, negro and various levels of miscegenation.

The religion of the Garamantes was most likely centred on the cult of Ammon and other desert deities, though clearly we must be cautious about accepting at face value all the source references to Ammon being worshipped at Garama. There are good reasons to suspect that some at least of those are conflations made by ancient writers between the major known people of the central Sahara and the most famous religious centre at Siwa in the eastern desert. On the other hand, as we shall see, a temple has been discovered at Jarma and Ammon is a strong possibility for the deity worshipped there. In late antiquity, there is a single literary reference to the Garamantes adopting Christianity as part of treaty arrangements with the Byzantine state (John of Biclar in Wolf 1990, 63): “[in AD 569] the Garamantes asked through their envoys that they be

incorporated into the peace of the Roman state and into the Christian faith. Both requests were granted.” Although this is often taken to indicate that the Garamantes were hereafter Christian, until converted to Islam (Christides 2000, 39, 51), there are strong reasons to doubt this. The early Islamic sources make no reference to Christianity in their reports of Fazzān and some imply that the region was still pagan (Brunschvig 1986, XII). Until archaeological support can be found at Jarma or elsewhere, it seems best to treat John of Biclar’s claim with scepticism. The wording clearly shows that it was Garamantian envoys, presumably sent up to Lepcis Magna, who concluded the treaty, not Byzantine forces in Fazzān. At a time when Byzantine territorial control scarcely extended beyond the coastal hinterland, let alone into the central Sahara, this may well have been little more than a paper exercise, with no actual attempt to convert the Garamantian populace.

The Garamantes as presented by the ancient sources are enigmatic, but there are sufficient hints at a more complex reality – a Saharan kingdom, with advanced agricultural systems and political, military, trade and economic relations extending over a wide area.

POST-GARAMANTIAN HISTORY OF FAZZĀN (7TH–16TH CENTURIES AD)

The history of the post-Garamantian period has few fixed points, due to a dearth of contemporary source material. Even when Arabic sources become more abundant (after AD 1000), the information relating to events in Fazzān and the people of the region is meagre (Levtzion and Hopkins 1981 provides a good selection of the relevant sources). There are few modern accounts dedicated to the history of Fazzān (Ayoub 1968a is a rare exception, but is not wholly reliable). There are also problems caused by the fact that Fazzāni history has often to be understood in relation to the contacts between the region and the Islamic world and to wider events and trends (Rossi 1968 remains important for the political structure of the state of Tripoli to the north). Thiry (1995) and Savage (1997) are particularly useful discussions of the medieval period covered in this section, though they are usefully supplemented by a range of other secondary sources (Christides 2000; Fisher 1975; 1978; Idrisi 1962; Lethielleux 1948, 1-24; Lewicki 1976/1983; 1988; Rossi in *Sahara Italiano* 1937, 333-51; Verrier 1960). Similarly, Wright (1989) is excellent on relations between Libya and Chad across a broad time-frame.

What happened to the Garamantes?

A key question to address is what happened to the Garamantes in this period (Table 3.3). The Arabic sources do not explicitly mention them (Thiry 1995, 88), though the account of ‘Uqba bin Nāfi’s raid in 666-67 involves a king of Jarma. This man was clearly no longer the ruler of a powerful kingdom covering most of Fazzān if he was defeated by a flying column of c. 400 cavalry (Fig. 3.8). From the sequel, it is clear that there was no attempt at this stage to Islamise Fazzān – this was at base a raid for booty and tribute, not territory (Thiry 1995, 55-56, 82). It appears that contact with the Arab world was maintained primarily through the centres of Zuwīla and Waddān (to judge from Arabic source references), whilst western Fazzān (centred on the Wādī al-Ajāl) probably remained independent, and thus to a large extent unreported on (Thiry 1995, 89; el-Hesnawi 1986, 27-32). Zuwīla is the more commonly mentioned centre in early Arab sources (al-Ya‘qūbī, *Kitāb al-buldān*, 345.11; Levtzion and Hopkins 1981, 22; al-Istakhri 40.2, Levtzion and Hopkins 1981, 41: “a town of middle size with an extensive district bordering Sudan”).

Al-Ya‘qūbī divided the desert into three zones – the territories of Waddān, Zuwīla and Fazzān – with the latter apparently a large region with an overall chief and a main town. He also supplied the information that the population of Fazzān was frequently

Date	Events
AD 640s	First Arab raids launched against Waddān and Zuwila?
AD 661-64	Revolt of Lawāta and Mazāta Libyans of northern Libya against Arab suzerainty. Suppressed by ‘Uqba bin Nāfi’.
AD 666-67	Campaign of ‘Uqba bin Nāfi’ against Waddān for breach of treaty with Islam. Subsequently he continued his raid to south against Jarma (‘big town of Fazzān’), then attacked ‘castles’ of Fazzān (Wādī Hikma area?), then invaded Kāwār to south of Fazzān (Jādū area), finally returning to Waddān via Zuwila. A cavalry squadron was also sent against Ghadāmis. Treaty relations were probably established at this time with Saharan centres.
750s-760s	Ibādī conflict with ‘Abbāsids in Tripolitania.
761-63	Defeat of Ibādī army and ‘Abbāsīd military campaign launched against survivors at Waddān and Zuwila (where Ibādī leader ‘Abd Allāh ibn al-Khaṭṭāb Hawwārī was killed).
9 th c. AD	al-Ya‘qūbī mentions Ibādī population at Zuwila. Divides desert into three zones: area of Waddān, area of Zuwila (eastern Fazzān) and Fazzān (western Fazzān – Wādī al-Ajāl and Barjūj/‘Utba?). States that latter area had a single ruler, a large town at its core and was often at war with Ibādī Mazāta (in Wādī ash-Shāṭi).
9 th c. AD	Saḥnūn of al-Qayrawān reported that Fazzānī were an Ethiopian race and that they were unconquered and unconverted to Islam at this time.
811-12	Widespread revolt against Arab government based in Tripoli (involved Tripolitanian and Syrtic tribes and population of al-Jufra oases).
918	Banū Khaṭṭāb dynasty in power at Zuwila, capital of eastern Fazzān.
921-22	Ibādī revolt in Jabal Nafūsa against Tripoli-based Arabs – refugees fled from Nafūsa to Fazzān? Several other revolts in 10 th c.
11 th c. AD	Zuwila noted as a commercial centre of the Libyan Sahara by al-Bakrī. Unwalled at this date, but with a cathedral mosque. Al-Bakrī also mentions towns of Tānzāwa (in Wādī ash-Shāṭi) and Sabhā, the latter evidently also with cathedral mosque and bazaars.
1060s	Conversion of Sūltan Hawa, ruler of Kānim.
11 th -12 th c.	Migration of Banū Hilāl and Banū Salām. Their main impact in Fazzān was due to southward movement of some Lawāta, Mazāta and Hawwāra Berbers and arrival of some Arabs in northern oases (especially in ash-Shāṭi).
1175-76	Banū Khaṭṭāb defeated by Sharaf al-Dīn Qaraqūsh. End of Banū Khaṭṭāb dynasty. Qaraqūsh tried to establish own powerbase.
1212-13	Death of Qaraqūsh and son in Waddān. Their conqueror, the Almohades general Yaḥyā bin Ghāniya used Waddān as his own base.
1221-22	Almohades governor of Tunis captured Ghadāmis and Waddān – Ibn Ghāniya flees.
mid-13 th c.	Another son of Qaraqūsh regained control of Waddān (and part of Fazzān?).
1258	King (Maī) of Kānim sent expedition to Fazzān. Defeated and killed son of Qaraqūsh. Established control of Fazzān (possibly uniting eastern, western and northern parts?).
Late 13 th – 14 th c. AD	Kingdom of Kānim ruled in Fazzān for much of period through viceroys based at Trāghan (dynasty of the Banū Naṣūr).
Late 14 th -early 15 th c.	Civil war in kingdom of Kānim (four kings died in battle) – hold on Fazzān weakened or broken in this period? Phase of Khurmān rule from Zuwila? Abuse of power by Khurmān leads to revolts and disorder?
1407	Ḥafṣids gained control of Ghadāmis.
1460	Tripoli gained independence from Ḥafṣid control.
1461-62	Tripoli successfully resisted Ḥafṣid attempts to reimpose authority.
1465-98	Maī ‘Alī bin Dunāma (strong king of Kānim) ended civil war in kingdom, renewal of Bornu slave route via Fazzān.
Late 15 th /early 16 th c.?	Arrival of founder of Awlād Muḥammad in Fazzān, part of a movement of <i>murābitūn</i> from the western Sahara?

Table 3.3 Events of the early Islamic period affecting Fazzān.

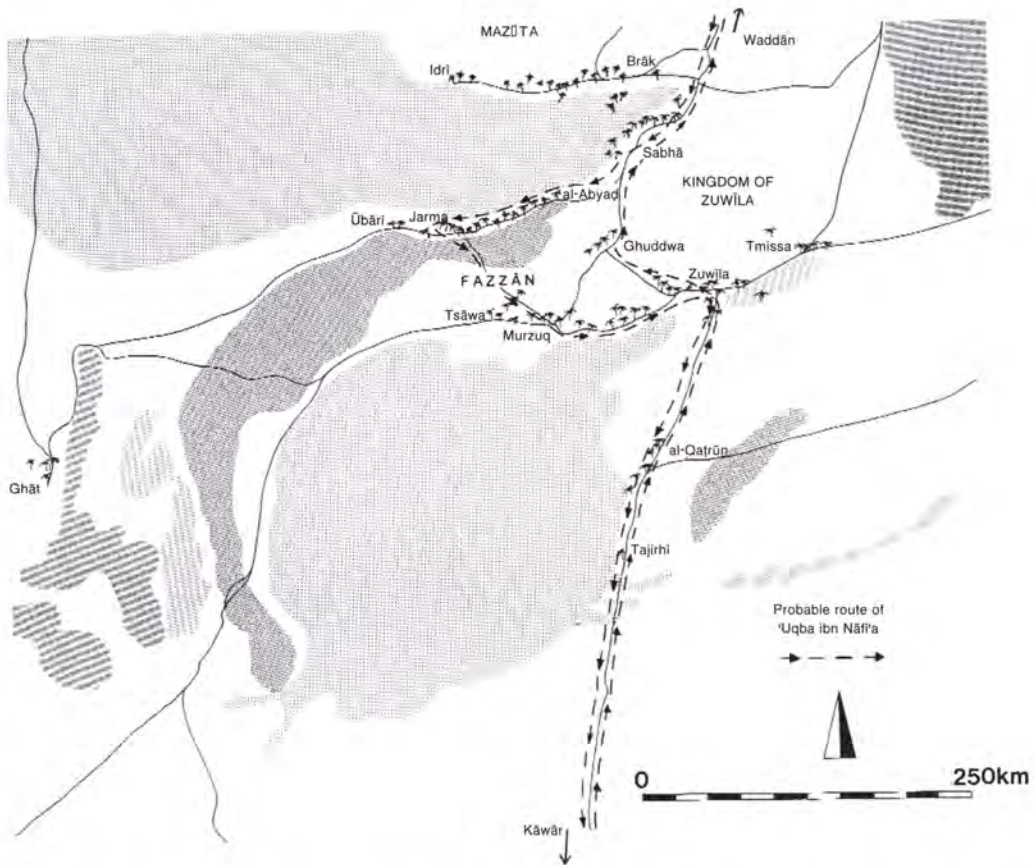


Fig. 3.8. Early Islamic Fazzān and the likely course of 'Uqba ibn Nāfi's raid of AD 666.

at war with the Mazāta Berbers, who had presumably infiltrated the northern part of the territory (*Kitāb al-buldān*, 345.6; Thiry 1995, 89). Al-Idrīsī (Levtzion and Hopkins 1981, 120-21) mentions 'Fazzān' as a region distinct from the territory controlled from Zuwila and containing two main towns, Jarma and Tsāwa (or Little Jarma). Thus, although the Garamantes slipped out of history, there are some grounds for thinking that part of their heartlands for a prolonged period remained an independent kingdom, with its main centre at Jarma. They no longer controlled eastern Fazzān (the Sabhā oases, the al-Ḥufra and ash-Sharqiyāt zones) nor the Wādī ash-Shaḥī (progressively falling to the Mazāta), but they were still dominant in the Wādī al-Ajāl and the Wādī 'Utba areas. At certain points in the later history of Fazzān, the descendants of the Garamantes may have re-emerged onto a larger stage. The people known in the sources as the Khurmān in the 14th-17th centuries provide an echo of the old tribal name. The Khurmān can be shown to have ruled greater Fazzān on at least two occasions (14th-15th centuries and from 1623-27) and were clearly major players in the balance of power within the region. Although they are known to have ruled (and been accused of misrule and abuse of power) from the traditional medieval capital at Zuwila in the 14th-15th centuries and from Murzuq in the 17th century, it is clear that the heartlands of the Khurmān were actually in the Wādī al-Ajāl (and specifically in Wādī al-Gharbī, which is also referred to interchangeably as Wādī al-Khurmān). There are good reasons to believe that Jarma was their main centre there. If the Khurmān represent a relic of the old Garamantes, it is clear that the key development of the post-Garamantian period was the fragmentation of the old kingdom into a number of smaller polities or regional power blocks. Only on a few rare occasions did the people of the Wādī al-Ajāl hold overall ascendancy over Fazzān again.

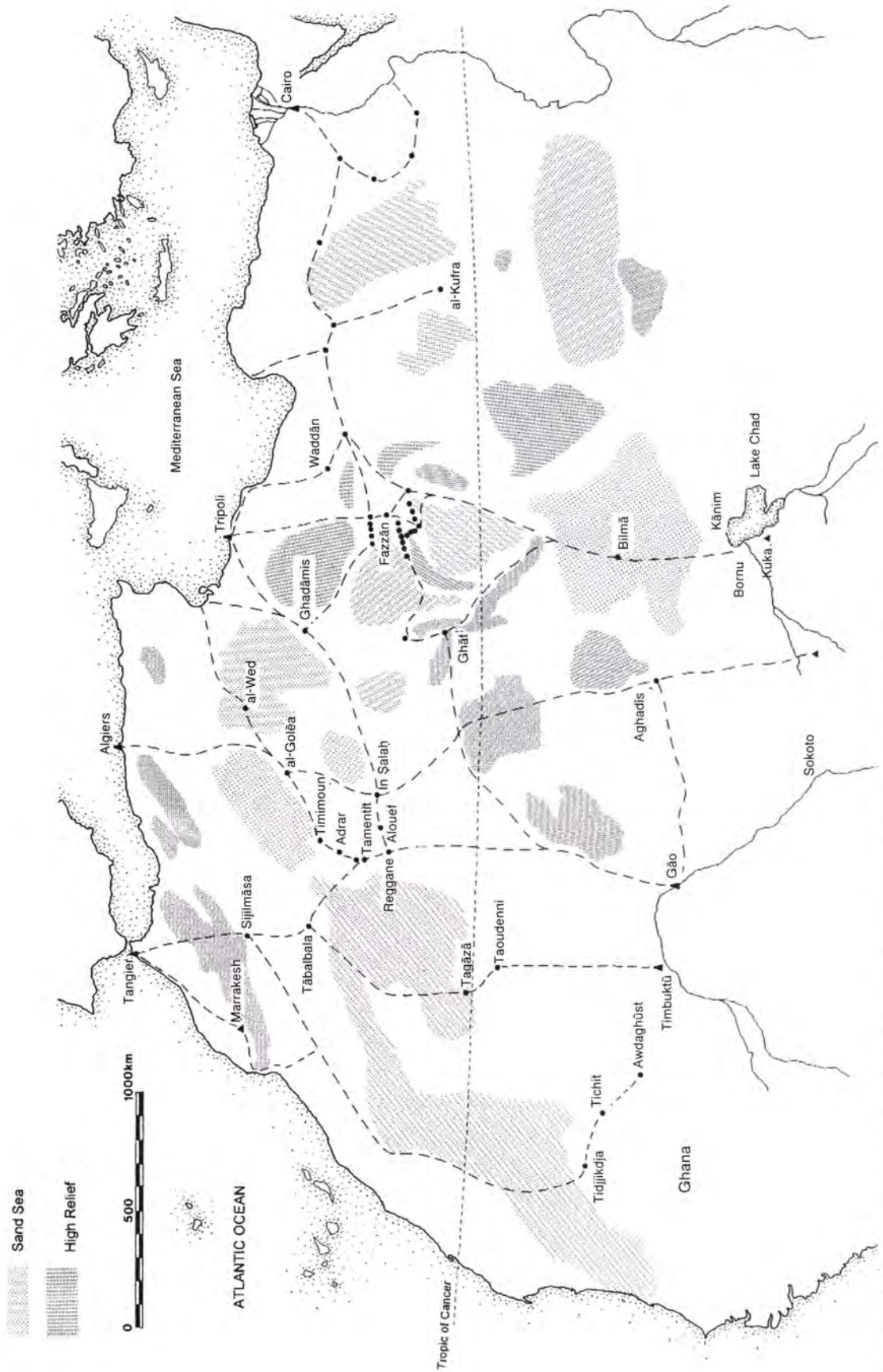


Fig. 3.9. Principal medieval trade routes across the Sabara (east, centre and west).

‘Uqba’s raid

The historicity of ‘Uqba ibn Nafi’s raid in the AD 660s has been questioned, notably by Brunschvig (1986, XI-XII – see also the discussion in Thiry 1995). Although there are many aspects of the account of ‘Uqba’s campaign that appear doubtful (notably the repetition of the tribute of 360 slaves demanded from each ruler who submitted), the broad outline makes geographical and logistical sense (Thiry 1995, 76-108). The raid is consistent with the sort of military action of the early years of Arab expansionism in terms of its audacity, range and objectives (Fig. 3.8). In the long term, it appears to have resulted in a refocusing of political contacts between the Mediterranean world and Fazzān, with Waddān and Zuwīla at the northern and eastern fringes respectively emerging as the new key foci of relations at the expense of Jarma. Because of their relative accessibility from the north and the north-east, these two oases were at the centre of Arab attempts to extract tribute from the region and to exploit the possibilities of trans-Saharan trade.

The Sahara in the Arab sources

The Arab sources dealing with the Sahara suffer from some of the same problems as those of the Classical world. There were undoubtedly preconceptions about what the people living in the Sahara and Sudan were like and significant gaps in knowledge. The main sources of information were the trade routes of the eastern, central and western Sahara, the last of these via the desert-edge city established at Sijilmāsa in southern Morocco (Fisher 1975; Lewicki 1988). The eastern route was the shortest and ran down from Tripoli, via Waddān and Zuwīla to Chad (Fig. 3.9). At its southern end lay the important oases of Kāwār, centred on an area of salt production, and the kingdom of Kānim by Lake Chad. Outside of the narrow corridors covered by these routes, information is much less secure. As a crude illustration of this, the index in Levtzion and Hopkins (1981) yields only four early Arab source references to Jarma, with one to Ghāt, against 24 references to Zuwīla and 12 to Waddān.

As in the Roman period, there are plenty of examples of the gross assumptions about the less frequented areas. Ibn Ḥawqal for instance (late 10th century) stated that Fazzān,

“contains water points around which are tribes of unheeded Berbers who are unacquainted with cereals and have never seen wheat and barley or any kind of grain. They are for a most part in a state of wretchedness and their dress is a piece of cloth worn sash-wise. Their staple diet is milk and flesh.” (Levtzion and Hopkins 1981, 46)

The description is remarkably similar in its elements to the stereotype of nomads in Roman sources (Shaw 1983) and is clearly inappropriate to the oasis farmers of Fazzān!

These early Arab sources indicate that the region covered by the modern Fazzān was divided into three broad zones (Thiry 1995, 104, 167, 175). In the north were the oases of the al-Jufra, notably Waddān, which seem to have controlled a territory extending into northern Fazzān and to have included some of the Mazāta Berbers, who spread Islam in its Ibādī or Khawārij form (Savage 1997). To the south-east was the city of Zuwīla, where there is again evidence of a fairly early adoption of Islam, the presence of Mazāta Berbers and of Ibādī influence. These two areas were links on the eastern trans-Saharan route which ran south from Tripoli to the area north of Lake Chad, where the kingdom of the Zaghāwa or Kānim developed (Lewicki 1988, 292-95; Lange 1988, 445-50). The Zaghāwa are sometimes identified with the Tubu, but seem to have lost their dominant position in Kānim by the 12th century (on the early history of Kānim/Bornu, see Lange 1977; 1984; 1988).

Western Fazzān seems to have been left to its own devices – it is referred to in the 9th century in vague terms as ‘greater Fazzān’, ruled by a sole authority (*raʿīs*) and with a major city (presumed to be Jarma); it is also said to have been at war perpetually with the Mazāta (al-Yaʿqūbī *Kitāb al-buldān*, 345.6). Brunschvig has also drawn attention to another 9th-century source, Saḥnūn, who reported that the Fazzāni were an Ethiopian race and that the Arabs were not inclined to fight them until they had been first offered the chance to embrace Islam (1945; 1986, XI-XII). In the 12th century this area of western Fazzān was still independent of the kingdom of the Banū Khaṭṭāb at Zuwīla, possessing (according to al-Idrīsī, in Levtzion and Hopkins 1981, 120) two major cities, Jarma (Fig. 3.10) and Tsāwa, the latter also known as Little Jarma, though they were apparently of similar size and population. Tsāwa is today a small village in the Wādī ʿUtba, with no clear urban antecedents (though see now Edwards 2001 for an undated possible earlier site) and it will be argued below (p. 149) that the town referred to by al-Idrīsī was in fact the site of Qaṣr ash-Sharrāba, located c.15 km south-west of modern Tsāwa. If that is accepted, then it would appear that the territory known as Fazzān up to the 12th century was indeed a successor state to the Garamantes, based around two of its major centres, but by-passed by the main north-south Saharan trade route, now controlled by the Mazāta at Zuwīla and Waddān. Support for this reconstruction can be found in the spread of Islam, which was clearly fastest in the northern and eastern districts of Fazzān, where the Ibāḍī sect was soon well established, in part as a result of refugees arriving at Waddān and Zuwīla after defeats of the Ibāḍīs further north (AD 762-63, 811-12). There is no mention in our sources of conversions to Islam or of mosques being built in the western region of Fazzān at so early a date (*contra* Lewicki 1988, 288 who suggests that the population of Jarma were early converts). All the sites noted in the sources as having mosques or as being Ibāḍī centres up to the time of al-Idrīsī are located in eastern or northern Fazzān (Zuwīla, Sabhā, Tānzāwa). The impact of the Sunni muslim attempts at repression of the Ibāḍī communities further north was presumably a source of immigration to the Ibāḍī communities in eastern and northern Fazzān. The rise of Zuwīla created a new geo-political reality, in which the seat of power in Fazzān was shifted eastwards from

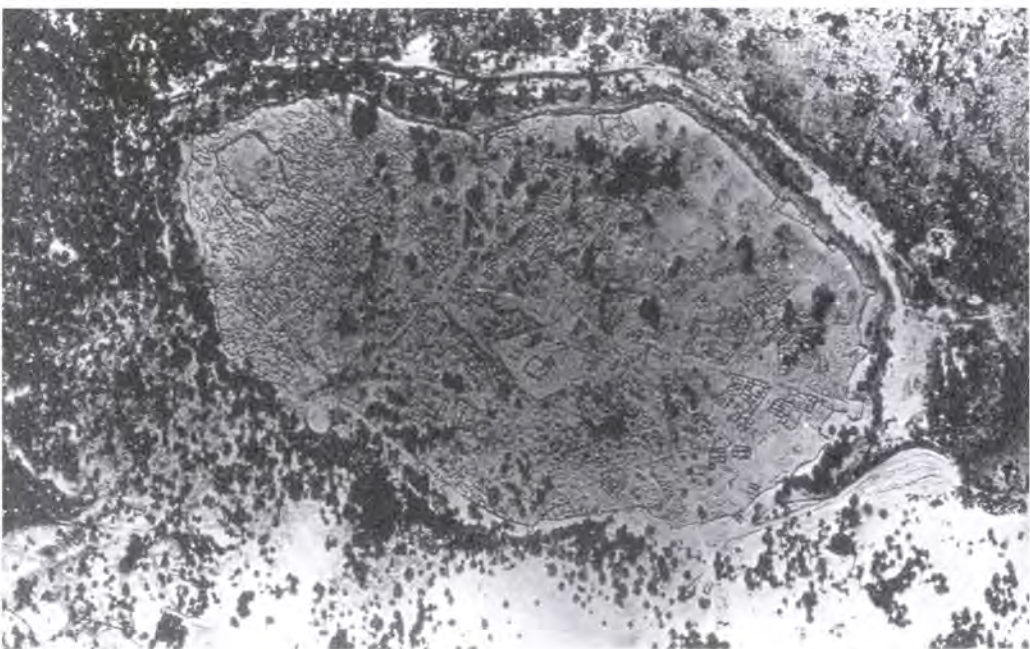


Fig. 3.10. Aerial view of Old Jarma, showing its early 15th century wall circuit, kasba and internal layout.

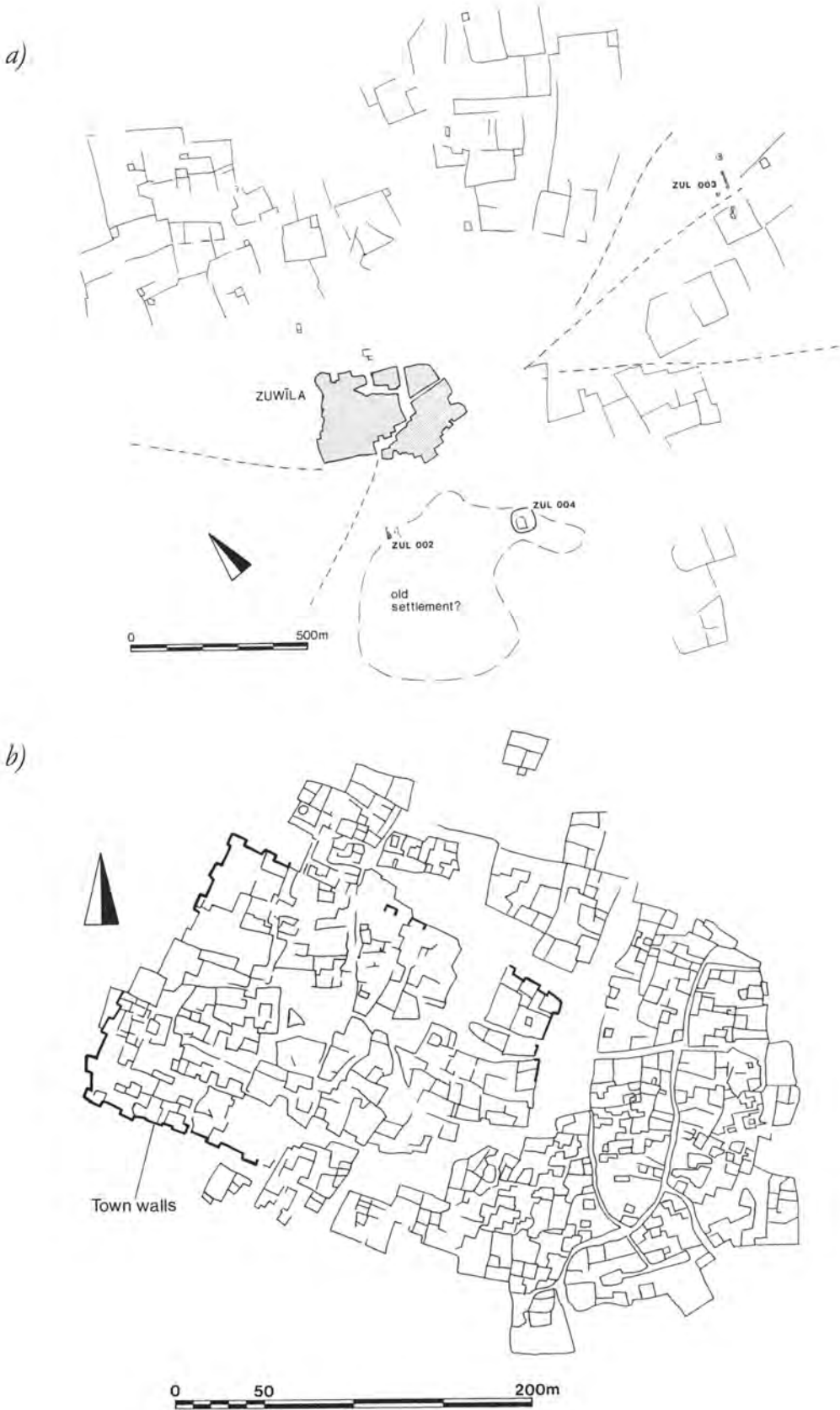


Fig. 3.11. The town of Zuwila: a) showing the suspected early town and mosque, with extensive associated abandoned gardens, in relation to the later walled town; b) detail of the walled town.

Jarma to a site on the line of the main routes north and north-east (Fig. 3.11). All later capitals of Fazzān have followed this trend (Trāghan, Murzuq and Sabhā) and when the Khurmān of the Wādī al-Ajāl exercised overall control of Fazzān later they did so not from Jarma, but from either Zuwīla or Murzuq.

The Kingdom of the Banū Khaṭṭāb

The emergence of a dynastic kingdom at Zuwīla under ‘Abd Allāh ibn al-Khaṭṭāb al-Hawwāri in the early 10th century marks an important stage in this shift of power (el-Hesnawi 1990, 29-33; Savage 1997, 118-19; Thiry 1995,

167-75). The Banū Khaṭṭāb dynasty lasted until 1175-76 and provided a measure of stability around which to build up trans-Saharan trade and contacts (Fig. 3.12). The first reported conversion to Islam of a Sub-Saharan ruler in the central Sahara was in the 1060s, involving Sultan Hawa of Kānim, at the southern end of the Tripoli-Zuwīla-Lake Chad route. As much as anything that would seem to attest to a high level of contact between Zuwīla and Kānim in this period. It also serves to emphasise that there were three main players involved in the politics of trans-Saharan trade by this date: the Arab authorities in the north and north-east (Tripoli or Cyrenaica); the rulers in Zuwīla (who controlled the key watering and supply points for caravans) and the rulers of Kānim and the other emergent states of central Africa.

The rule of Fazzān by the Kingdom of Kānim

The dramatic development of the power of the sub-Saharan state of Kānim is best illustrated by the fact that the kingdom conquered Fazzān and ruled it through a viceroy for a prolonged period in the 13th–14th centuries (Thiry 1995, 279-89). This may well be the first point in time after the waning of Garamantian power when the whole of Fazzān was reunited under a single ruler. This followed the breakdown of orderly government after the Banū Khaṭṭāb dynasty was overthrown in 1175 by Saladin’s general Qaraqūsh, who for a while set up his own principality based around Waddān and Zuwīla, to be followed by a succession of other short-lived Arab adventurers. The army of Kānim defeated and killed the last son of Qaraqūsh in 1258, occupied Fazzān and shifted the capital to Trāghan (Fig. 3.13). A succession of viceroys from



Fig. 3.12. Tombs of the Banū Khaṭṭāb at Zuwīla (photo: CMD).



Fig. 3.13. Mosque at Trāghan (photo: CMD)

the same family effectively created a ruling dynasty (the Banū Nasūr). The end of Kānim's control is uncertain, though oral tradition recorded by Duveyrier and Nachtigal were clear on the fact that it was followed by a period of rule by the Khurmān from the Wādī al-Ajāl (el-Hesnawi 1990, 33-34; Lethielleux 1948, 15-16). The Islamic sources make clear the importance of the eastern routes as an avenue of approach to West Africa as a whole (Fisher 1975; 1978; Levtzion 1977; Lewicki 1988; McCall and Bennett 1971).

Migration of Berber and Arab tribes

A further factor in favour of the long-term rise of northern and eastern Fazzān over western Fazzān was the impact of further Arab migrations in the 11th–12th centuries when the Banū Hilāl and Banū Sulaym entered northern Tripolitania. Some of the existing Hawwāra, Lawāta and Mazāta Berber tribes appear to have migrated south to avoid direct confrontation with the newcomers, and in general they became established in the northern and eastern districts (Savage 1997, 118-19). Whatever cultural affinity these districts had earlier felt with the Garamantian kingdom was replaced by new religious and agnate loyalties. This process was reinforced by the progressive inflow of transhumant Arab tribes into the ash-Shaṭī throughout the medieval period. Within a few centuries, the cultural and political character of this part of the old Garamantian kingdom was radically altered.

Trans-Saharan trade

Trade was evidently an important element of Arab relations with the Saharan and sub-Saharan peoples (Bovill 1968; Brett 1969; 1981; 1983; Fisher 1975; Lewicki 1988, 290-95; Martin 1969; Mauny 1978 (for the earlier period); Thiry 1995, 449-542). Many of the early sources mention trade in slaves from Sudan, gold from Ghana or salt from various locations. As already noted, there were three predominant axes in the early Islamic period, one in the east running south from Tripoli through Fazzān; a second from the Wārjīlā and Qardaya oases in southern Algeria, via In Ṣalaḥ to Gāo on the Niger; the third in the Moroccan Sahara running south from Sijilmāsa to Awdaghūst (Fig. 3.9). Many intermediate routes were also developed, including one running obliquely south-west from Fazzān towards the Niger, with a prolongation north-east of Zuwīla towards Egypt (Savage, 1997, 153-58; Thiry 1995, 433-48). Zuwīla was clearly an important early centre in the slave trade (Savage 1997, 84-85). Al-Ya'qūbī (Levtzion and Hopkins 1981, 22) specifically mentions the capture and export of black slaves by the inhabitants of Zuwīla and links them with the inhabitants of Kāwār, who evidently brought slaves to Zuwīla.

The Ottoman seizure of Tripoli in the early 16th century had important consequences for the future development of trans-Saharan trade, since it gave the Turks access to a large potential source of slaves to service their empire (Rossi 1968, 143-219, 297-352). There is no doubt that their governors (Pashas and Deys) attached particular importance to this trade as a source of income – a pattern that was repeated (and accentuated) when the Pashas of the Qaramānli family broke away from Ottoman control in the early 18th century (Dearden 1976; Rossi 1968, 221-94).

THE AWLĀD MUḤAMMAD (16TH – EARLY 19TH CENTURY AD)

The period of Awlād MuḤammad domination in Fazzān lasted from the 16th to the early 19th centuries (Table 3.4), though there are conflicting accounts in the sources regarding the exact date of the foundation of the dynasty (el-Hesnawi 1990 is the key work; see also Lethielleux 1948, 18-20). Duveyrier estimated the period of Awlād MuḤammad rule to have lasted 550 years, but the surviving primary sources suggest

something nearer 300-350 years at the most (el-Hesnawi 1990, 35-39). There are strong indications in several sources that the family was of Moroccan origin, possibly of *sharīf* status, and that the founder of the dynasty, who happened to be passing through Fazzān on the pilgrimage to Mecca (*hajj*), was asked by some of the local population to stay on as ruler and to restore order. It has also been suggested that the Awlād Muḥammad may have been linked to a more general diaspora of Moroccan *murābiṭūn* families after the defeat of a revolt at Fez in the late 15th century (el-Hesnawi 1990, 41-47; cf. Brett 1981; 1984). The earliest *zāwiyas* in Fazzān seem to be linked to the arrival of a number of *Ashrāf murābiṭūn* in the late 15th and early 16th centuries. The similarity with the later history of the establishment of Sanusi power in the Libyan Sahara is interesting (Wright 1989, 81-108). It is clear that the consolidation of the power of the Awlād Muḥammad and the proliferation of *murābiṭūn* throughout Fazzān were parallel developments of this period (el-Hesnawi 1990, 47-56). The Awlād Muḥammad can thus be seen to some extent as both a new political and religious movement in the region. When the dynasty was temporarily ousted from power, as happened several times because the Ottoman/Qaramānli government of Tripoli chose periodically to intervene directly in the affairs of the region, the *murābiṭūn* helped co-ordinate local resistance to external rule and secured the return of the Awlād Muḥammad sultan by force or negotiation. The period was one in which incomers (Moroccan, Ottoman, Arab, Tuareg) played a dominant role and in which the quality of life of the ordinary Fazzānī farmers appears to have deteriorated. This is also the phase when the capital shifted to Murzuq (Fig. 3.14).

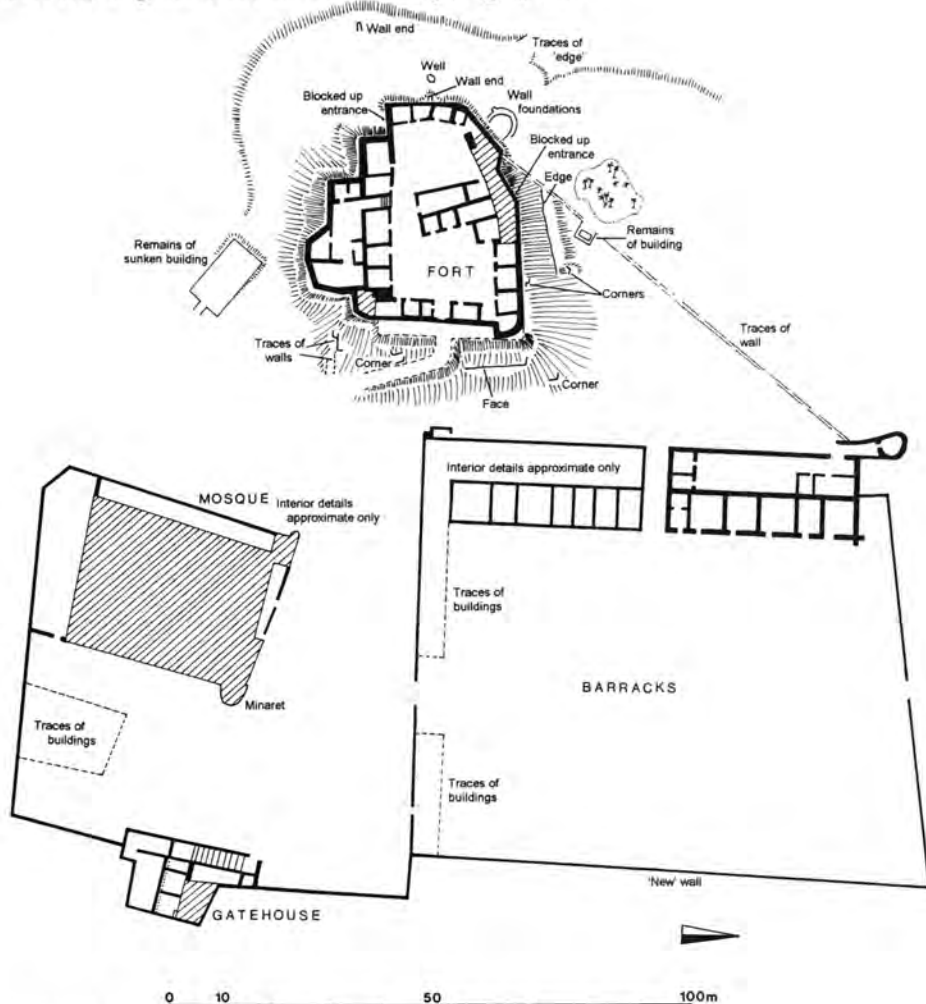


Fig. 3.14. The kasba area at Murzuq (plan: CMD).

Date	Ruler in Tripoli	Ruler in Fazzān	Events
1510-30	Spanish	Kingdom of Kānim	Spanish occupied Tripoli.
1530-51	Knights of St John		Knights of St John (Malta-based) occupied Tripoli.
1551	Murād Aghā		Establishment of Ottoman Turks, with capture of Tripoli and establishment of Turkish rule under officials (Pāshās or Deys).
1556-65	Draghut Pāshā		
15??-15?? (date ?)		Muḥammad al-Fāsi	Foundation of Awlād Muḥammad dynasty in 16 th c. by Moroccan adventurer Muḥammad al-Fāsi?
1569- c.1580	Mustafā Pāshā		Strong Ottoman Pāshā, whose rule followed by period of instability with at least seven Pāshās known in next 25 years, before accession of Sulaymān Dey.
15??-		Al-Muntaṣir	Accession of al-Muntaṣir (son of Muḥammad al-Fāsi?) as second Awlād Muḥammad Sultan – date unknown in mid-16 th c. Capital now (if not before) at Murzuq.
1577			Khūda, one of two wives of al-Muntaṣir, in conflict with him – called on Ottoman Pāshā for help.
			Death of al-Muntaṣir while besieging Khūda at Sabhā. Ottoman forces arrived and captured and killed Khūda.
1577		Al-Nāṣir	Son of al-Muntaṣir proclaimed himself Sultan, but forced to flee by Ottoman forces.
1577 f.		Muḥammad Bey (Ottoman governor)	Campaigns south of Fazzān.
1581			Revolt against Ottomans in northern Tripolitania.
1582			Revolt against Ottomans in Fazzān and massacre of garrison.
1587-1602		Al-Nāṣir	Return of al-Nāṣir as Awlād Muḥammad Sultan.
1600-04			Further revolts against Ottoman authority in Tripolitania.
1602-12		Muḥammad al-Manṣūr	4 th Awlād Muḥammad Sultan in Fazzān.
1604-14	Sulaymān Dey		Re-emergence of a strong Ottoman leader in Tripoli.
1612			Sulaymān Dey sought renewal of traditional tribute payment from Fazzān. Refused by al-Manṣūr, who was killed in battle of Knir (north of Sabhā) when Ottomans invaded.
1612-13		Ḥusayn al-Nāʿal	Ottoman Governor of Fazzān installed.
1613			Revolt against Ḥusayn al-Nāʿal and Ottoman garrison. Return of Awlād Muḥammad, al-Tāhir as Sultan.
1613-23		Al-Tāhir	Awlād Muḥammad Sultan.
1614-30	Muṣṭafā Sharif Dey		Long-serving ruler in Tripoli.
1623			Revolt of Khurmān of Wādī al-Ajāl, received Ottoman support.
1623-27		Aḥmad bin Huwaydī al-Khurmānī	Khurmān ruler of Fazzān, with capital at Murzuq. Reports of abuses of power.
1626			Revolt against Khurmān rule (in eastern Fazzān?). Return of Awlād Muḥammad ruler Muḥammad bin Juḥaym from exile, led to inconclusive war, with involvement of Ottoman force commanded by ʿUṭmān Bek.
1626-56		Muḥammad bin Juḥaym	Awlād Muḥammad Sultan of Fazzān, initially share of power with Aḥmad bin Huwaydī, after <i>murābiṭān</i> brokered peace treaty.
1633-49	Muḥammad Sāqizli Pāshā		Long-serving ruler in Tripoli.
1649-72	ʿUṭmān Sāqizli Pāshā		Long-serving ruler in Tripoli.
1656-66		Juḥaym, bin Muḥammad bin Juḥaym	Awlād Muḥammad Sultan.
1666-82		al-Nāʿib	Awlād Muḥammad Sultan.
1672-87			Political problems in Tripoli (13 rulers in 16-year period), Fazzān stopped tribute payments.
1682			Ottoman campaign to Fazzān led by Murād Bek al-Mālṭi, captured Sūkna, Waddān, Sabhā and (after battle of ad-Dlīm, 10 km to the east) Murzuq. Al-Nāʿib and 6 brothers killed, treasury of Murzuq captured.
1682-89		Muḥammad al-Nāṣir	Awlād Muḥammad ruler allowed to govern Fazzān.
1687-1701	Muḥammad Shāhib al-Ayn		
1689		Muḥammad al-Ghazayl al-Muknī	Ottoman campaign against Fazzān led by Yūsuf Bek, besieged and sacked Murzuq. Ghazayl al-Muknī installed as Governor of Fazzān. Muḥammad al-Nāṣir taken as prisoner to Tripoli.

Date	Ruler in Tripoli	Ruler in Fazzān	Events
1689-90		Fātima	Further military expedition of Yūsuf Bek to support Ghazayl al-Muknī, who was killed in uprising of Fazzāni population. Female member of Awlād Muḥammad house, Fātima, was installed as temporary ruler.
1690		Tammām and 'Alī al-Muknī	Awlād Muḥammad puppet ruler installed by 'Alī al-Muknī who had led Ottoman reprisal campaign. 'Alī al-Muknī was effective ruler.
1690-91		Muḥammad bin Juhaym	Muḥammad bin Juhaym (nephew of Muḥammad al-Nāṣir) recruited support against al-Muknī in Wādī al-Gharbī. Al-Muknī defeated in battle in Wādī al-Gharbī area. 'Alī al-Muknī escaped to brother Yūsuf at Sabḥā.
1692-1699		Muḥammad al-Nāṣir	Released by Dey and restored to power in Fazzān. His nephew Muḥammad bin Juhaym evidently ceded place to him.
1699-1700		Khalīl Bek (1699) 'Alī al-Muknī (1699-1700)	Internal power struggle in Fazzān led to flight of Muḥammad al-Nāṣir and Ottoman expedition seizing power (initially split between 'Alī al-Muknī at Trāghān and Khalīl Bek at Murzuq, then all power devolving to 'Alī al-Muknī. Revolt against 'Alī al-Muknī by ash-Shaqiyāt area – rebels initially defeated at Trāghān – and western al-Gharbī area – 'Alī al-Muknī defeated at Jarma and Trāghān.
1699-1700		Muḥammad Kāyd	Effective ruler in eastern Fazzān.
		Yūsuf al-Muknī	Appointed governor by Ottoman authorities.
1700-1710		Muḥammad al-Nāṣir	Return from exile of al-Nāṣir. Al-Muknī retreated to Tripoli and Muḥammad Kāyd exiled to Sudan.
1701-1711			Renewed political instability in Tripoli (seven rulers in ten years).
1710-66		Aḥmad al-Nāṣir	Long-lived Awlād Muḥammad Sultan, died in 1766 on return journey from <i>hajj</i> .
1711-45	Aḥmad al-Qaramānli		Start of Qaramānli rule in Tripoli.
1716			Qaramānli campaign to Fazzān following period of non-payment of tribute. Siege of Murzuq lifted at news of riots in Tripoli.
1717			Further Qaramānli campaign and siege of Murzuq. Delegation of <i>murābiṭūn</i> to negotiate peace. Promise of resumption of tribute payments.
1718			Third Qaramānli attempt to take Murzuq – plundering of other villages in eastern Fazzān, including al-Qatrūn.
1732-33			Further campaign to Fazzān by Muḥammad Bek (son of Qaramānli Pāshā). Captured Murzuq and imposed new treaty. Return of Qaramānli forces in 1733, took Aḥmad al-Nāṣir to Tripoli as prisoner. Defences of Murzuq partially demolished.
1745-54	Muḥammad al-Qaramānli		Walls of Murzuq repaired during this period.
1766-73		M. al-Tāhir	Awlād Muḥammad Sultan.
1754-95	'Alī al-Qaramānli		
1773-90		Aḥmad	Awlād Muḥammad Sultan.
1790-1804		Muḥammad	Awlād Muḥammad Sultan.
1795-1832	Yūsuf al-Qaramānli		Revival of Qaramānli power. Muḥammad al-Muknī appointed as collector of tribute from Fazzān.
1798-99			Frederick Hornemann travelled from Egypt to Fazzān and spent seven months in Murzuq.
1804-13		al-Muntaṣir	Last Awlād Muḥammad Sultan.
1804-08			Fulanī <i>jihād</i> disrupted central Saharan state of Bornu and neighbours. Muḥammad al-Amin al-Kānīmī emerged as leader of revived Bornu by 1817.
1806-07			Revolt against Qaramānli by Awlād Sulaymān under Sayd al-Nāṣir (with some Awlād Muḥammad support). Defeated in Gulf of Surt area for Awlād Sulaymān.
1810			Qaramānli expedition against Ghadāmis.
1813		Aḥmad	Qaramānli 'expedition' to Fazzān led by Muḥammad al-Muknī, sought pretext for deposition of Awlād Muḥammad. Attempted to raze Murzuq. Al-Muntaṣir murdered and his kinsman and killer Aḥmad allowed to hold power briefly before he also killed.
1813		M. al-Muknī	Qaramānli governor.

Table 3.4. Key events affecting Fazzān under the Awlād Muḥammad.

Two key themes of the Awlād Muḥammad rule in Fazzān were the control of Saharan trade and the payments of tribute to the ruling power in Tripoli. For much of the period, the rulers of Fazzān acknowledged the military suzerainty of the Ottoman or Qaramānli government in Tripoli by paying tribute. The value of the tribute

payments is not clear and may have fluctuated considerably over time. However, periodically the Awlād Muḥammad ceased, delayed or reduced their payments, particularly at times when the Tripoli government was distracted by civil disorder or rebellion elsewhere (el-Hesnawi 1990, 99-134). Not infrequently when this happened, a military confrontation between the Awlād Muḥammad and the Tripoli power followed (as in 1577-82, 1612-13, 1682, 1689, 1699-1700, 1716-18, 1732-33, 1813). Another reason for conflict was sometimes additional tribute demands by the northern power. Both underpayment and excessive demands were linked to differing perceptions of the volume and value of Saharan trade passing along the route through Fazzān and the vicissitudes of the Tripoli government. Trans-Saharan trade was a mainstay of the economy of both Tripoli and Fazzān, but its proceeds were unequal year by year and were vulnerable in times of unrest (Martin 1969). For prolonged periods, mutual interests in the maintenance of trade revenues maintained the *status quo*. But the peace was an uneasy one as it is clear that on both sides there was a desire to increase their own stake at the expense of the other party. Much depended on the character of the Pasha or Dey in Tripoli and his spirit of military adventure, but the Tripoli-based al-al-Muknī family, who took a deep interest in Fazzān, were also an influential force. A complicating factor was the fluctuating fortune of the other primary source of revenue for the Tripoli state, corsairing (Dearden 1976). Periodically, the European maritime powers took action to limit or to quash the piratical activities of the Barbary states, and this almost inevitably put pressure on the Pashas to maximise their income from Saharan trade.

When it came to war, the Ottoman or Qaramānli army could generally be counted on to outgun the Fazzān forces in open battle, but holding the country for a prolonged period proved much more difficult and on several occasions the thin-spread garrisons were defeated and massacred by uprisings (notably in 1582 and 1613, but there were also defeats in 1689-91 and 1700, the latter two occasions involving battles in the Wādī al-Gharbī – with Jarma specified as the location in 1700). Thus, although there were several attempts to occupy Fazzān, following the expulsion or capture of the Awlād Muḥammad ruler, these generally ended in ignominious failure and a negotiated return to the *status quo ante bellum*. On at least one occasion the Ottomans tried a different tactic of supporting a rival faction within Fazzān against the ruling Awlād Muḥammad. Their support allowed a Khurmān revolt against the Awlād Muḥammad to overthrow the Sultan and initiate a period of Khurmān rule under Aḥmad bin Huwaydī. He chose to rule Fazzān not from Jarma, presumably his power base as leader of the Khurmān, but from Murzuq, now established as the political and economic capital. There are reports of abuses of power leading to a rebellion in favour of the ousted Awlād Muḥammad, with the country being initially partitioned between the two parties, but the Ottoman authorities accepting by 1627 that further support for the Khurmān faction was untenable and the recognition of Muḥammad bin Juhaym as sole ruler (el-Hesnawi 1990, 76-77, 116-19).

The Khurmān are depicted in some of the sources as traditional opponents of the Awlād Muḥammad within Fazzān. There is evidence, for instance, that they provided assistance to the Ottoman invasion of 1612 (el-Hesnawi 1990, 73). One reason for their revolt in 1622 was that the Sultan al-Ṭāhir had punitively increased taxation on them (el-Hesnawi 1990, 72). Again, this makes sense if it is seen as an attempt by the Awlād Muḥammad to tighten their control over the Wādī al-Ajāl area.

A recurrent, though not continuous, theme of the period from the late 15th to the early 19th centuries was that of heightened military tensions, both between Fazzān and the Tripoli government in the north and between the Awlād Muḥammad rulers in eastern Fazzān and the Khurmān in western Fazzān. There were at least ten invasion forces sent from the north and some of these remained in Fazzān for several years at

a stretch. The late 16th-early 17th centuries and the later 17th century were particularly intensive phases of military conflict (see Table 3.4). Murzuq was besieged at least six times and sacked on two or three occasions. There are fewer references in the sources to campaigns in western Fazzān, but Ottoman forces fought engagements there in 1691 and 1700, so the region was not always to be counted on as pro-Ottoman or anti-Awlād Muḥammad. At certain periods it is also clear that the Awlād Muḥammad must have strived to impose their own military authority on the Wādī al-Gharbī area and over Jarma. We should expect to find evidence of fortified settlements throughout Fazzān in this period, ranging from large fortified cities theoretically capable of withstanding sieges (Murzuq, Jarma, Sabhā, Trāghān, Zuwila), to smaller garrison points and local refuges (represented by the numerous ‘castles’ or *qsur* for which the region was famous, see below, 146-54).

Radiocarbon dates suggest that the kasba and urban defences at Old Jarma date to the early 15th century (see below, 145), the period just before the start of Awlād Muḥammad rule. They may represent efforts of the Khurmān to bolster their local autonomy within the Wādī. At any rate, some of the other fortifications in the Wādī will have been the work of the Awlād Muḥammad in an attempt to impose their authority in an area that was lukewarm to the reality of political control from Murzuq.

THE EARLY MODERN PERIOD (1813-1951)

A major change in the government of Fazzān occurred in 1813 (Table 3.5), when the last Awlād Muḥammad sultan was murdered as a result of Muḥammad al-Muknī’s intrigue and quickly replaced by a Qaramānli governor (el-Hesnawi 1990, 135-54 for the events). This launched a new ‘forward’ policy by the Qaramānli authorities, seeking not only to increase their income from Fazzān, but to augment it substantially by direct action southwards into the Central African states (Wright 1989, 60-66). It is clear from a number of events that the governors of Fazzān sought to increase revenue and the flow of slaves in particular by a variety of means, including direct slaving raids into Chad (Rodd 1936). Within Fazzān, Qaramānli taxation demands and extortion seem to have had a rapid and devastating effect on a land that had in any case been in decline over some period. European travellers consistently reported the extreme poverty of the region and the reluctance of locals to help them – small wonder when they travelled under the ‘protection’ of the Qaramānli Pasha and were thus associated with his regime. The Qaramānli adventurism (and its clear ambitions with regard to trading centres such as Ghāt) stirred up the other desert tribes (Arab, Tuareg and Tubu alike) and this was a period of frequent fighting and raiding. Despite that, it also marked a final flourish of the slave trade, not least because corsairing, the traditional mainstay of the Qaramānli economy, had been stopped by the direct intervention of the great naval powers of the Mediterranean, Britain, the U.S.A. and France (Dearden 1976, 243-44). The trans-Saharan slave trade accordingly rose to particularly high levels by the mid-19th century, before finally succumbing to the abolitionist pressure on the Tripoli government (Savage 1992; Wright 1998).

The end of Qaramānli rule in Tripoli in 1835, following extensive revolts in western and south-western Libya in 1830-32 and the forced abdication of the failing Yūsuf Pāshā (1832) and his short-lived successor ‘Alī (1832-35), caused an interruption of Tripoline control of Fazzān (for the events, see Dearden 1976, 297-316). Between 1830-1842, Fazzān was ruled by ‘Abd al-Jalīl bin Ghayth Sayf al-Naṣr of the Awlād Sulaymān tribe, but the re-establishment of Ottoman power in Fazzān in 1842 also continued the late Qaramānli exploitation of trans-Saharan trade (Wright 1989, 65-78; see also Savage 1992). There is little indication of any progressive investment in the productive potential of Fazzān itself in this period.

Date	Ruler in Tripoli	Ruler in Fazzân	Events
1795-1832	Yūsuf Qaramānli		
1804-13		al-Muntaṣir	Last Awlād Muḥammad Sultan murdered as result of Qaramānli intrigue.
1813-21		M. al-Mukni	Qaramānli governor.
1814			Revolt of Awlād Sulaymān of Wādī ash-Shaṭī crushed.
1814			Hanmer Warrington appointed British consul in Tripoli (serves until 1846).
1815, 1819			European naval powers took action to end activity of Tripoli corsair fleet and enslaving of Christians. Led to new emphasis on trans-Saharan slave trade in Tripoline economy.
1817-18			Shaykh al-Amin al-Kānīmi (ruler of Bornu) proposed joint expedition with Qaramānli forces against his neighbour Bājīrmi (in effect a slave raid). British explorers Ritchie and Lyon accompanied Qaramānli force south from Tripoli to Murzuq, where Ritchie (the first British Consul there) died.
1821		Muṣṭafā al-Aḥmar	Second joint Bornu/Qaramānli raid against Bājīrmi, new governor appointed in Fazzān.
1822-25			The Bornu Mission of Oudney, Clapperton and Denham began its journey from Tripoli.
1822			Clapperton and Oudney explored eastern and western Fazzān whilst delayed in Murzuq.
1822-24			Abū Bakr Bū Kallum sent by Pashā in command of military expedition to accompany the Oudney mission to Bornu. Denham nearly killed when accompanying a slave raid.
1825-26			Laing's ill-fated journey to Timbuktu crossed hostile Tuareg territory.
1820s			Slaving expeditions sent by al-Mukni to Tubu land, Kānim and Bājīrmi. General upward trend in slaving raids and trade in early 19 th century.
1830-32			Numerous revolts in Libya against Qaramānli rule.
1832			Abdication of Yūsuf Pashā, civil war between rival sons for succession.
1832-35	'Ali al-Qaramānli		Last of Qaramānli Pashās.
1830-42		'Abd al-Jalil bin Ghayth Sayf al-Naṣr	Son of Awlād Sulaymān leader killed in 1807, he gained control of Fazzān, until defeated and killed in 1842 by Ottoman forces. Surviving Awlād Sulaymān faction fled south to Kānim desert territory and established new power base.
1835	Najīb Pashā		Abdication of Yūsuf Pashā led to end of Qaramānli dynasty and return of Ottoman rule to Libya. After 1842, Ottoman power re-established in Fazzān also. Under new regime, Ottoman Pashās replaced every 2-3 years.
1843			Turks established Ottoman control over Ghadāmis
1843			Sanūsī confraternity established in Cyrenaica by Algerian divine, Sayyid Muḥammad bin 'Ali al-Sanūsī (the Grand Sanūsī). First <i>zāwīya</i> on the routes to Fazzān established at Mizda in 1845.
1843-1860			British Vice-Consul established in Murzuq (from 1843-54 held by G. Gagliuffi).
1845-46			James Richardson's visit to Ghadāmis, Ghāt and Murzuq on behalf of the British anti-slavery society.
1849-50			Totals of 1600 and 800 slaves reported to have died when two caravans lost on Bornu-Fazzān route.
1850-1855			Central Africa mission led by Richardson (died 1851), Overweg (died 1852) and Heinrich Barth.
1850-60			British Vice-Consul established in Ghadāmis.
1855-57			Export of slaves formally banned from Libyan ports and slave dealing abolished in Ottoman empire
1856			Sanūsī sect moved its headquarters to al-Jaghbūb in the Libyan desert – marked intensification of extensive Sanūsī missionary work in the Sahara (eventually 146 <i>zāwīyas</i> established – including Sūkna, Zuwila, Murzuq, Ghāt and Ghadāmis).
1859			The Grand Sanūsī died at al-Jaghbūb. Succeeded by son, Muḥammad al-Mahdi.
1859	Aḥmad Izzat		Ottoman governor sent mission to establish Turkish suzerainty over Tibesti region.
1850s-1890s			Growth of Sanūsī power and ban on slave trade via Tripoli diverted (illicit) slave caravan routes from Bornu and Wādāi east towards Egypt via al-Kufra and al-Jaghbūb oases.
1862			In response to French activity, Ottoman garrison installed at Ghadāmis – now administrative base for 'western Fazzān'.

Date	Ruler in Tripoli	Ruler in Fazzân	Events
1875			Ottoman garrison established at Ghât.
1895			Headquarters of Sanûsi movement relocated to the al-Kufra oases.
1900-06			French seized control of Chadian territories nominally under Ottoman suzerainty at southern end of Tripoli-Bornu trade route (French control of territory up to Tibesti secured by 1914).
1911	Italy		Italian invasion of Libya, overthrew Ottoman government, but confronted by concerted Sanûsi-led Libyan resistance.
1913		Italy	Italians established first garrisons in Fazzân.
1914			Libyan revolt in Fazzân involving Awlâd Sulaymân tribe and others, garrisons overrun.
1930		Italy	Reconquest and second Italian occupation of Fazzân.
1940-42			French raids, led by General Leclerc, on Italian-held Fazzân.
1943-1951		France	French occupation of Fazzân, continued in the post-war period.
1951			Independence of Libya.

Table 3.5. Events of the later Ottoman and modern period affecting Fazzân.

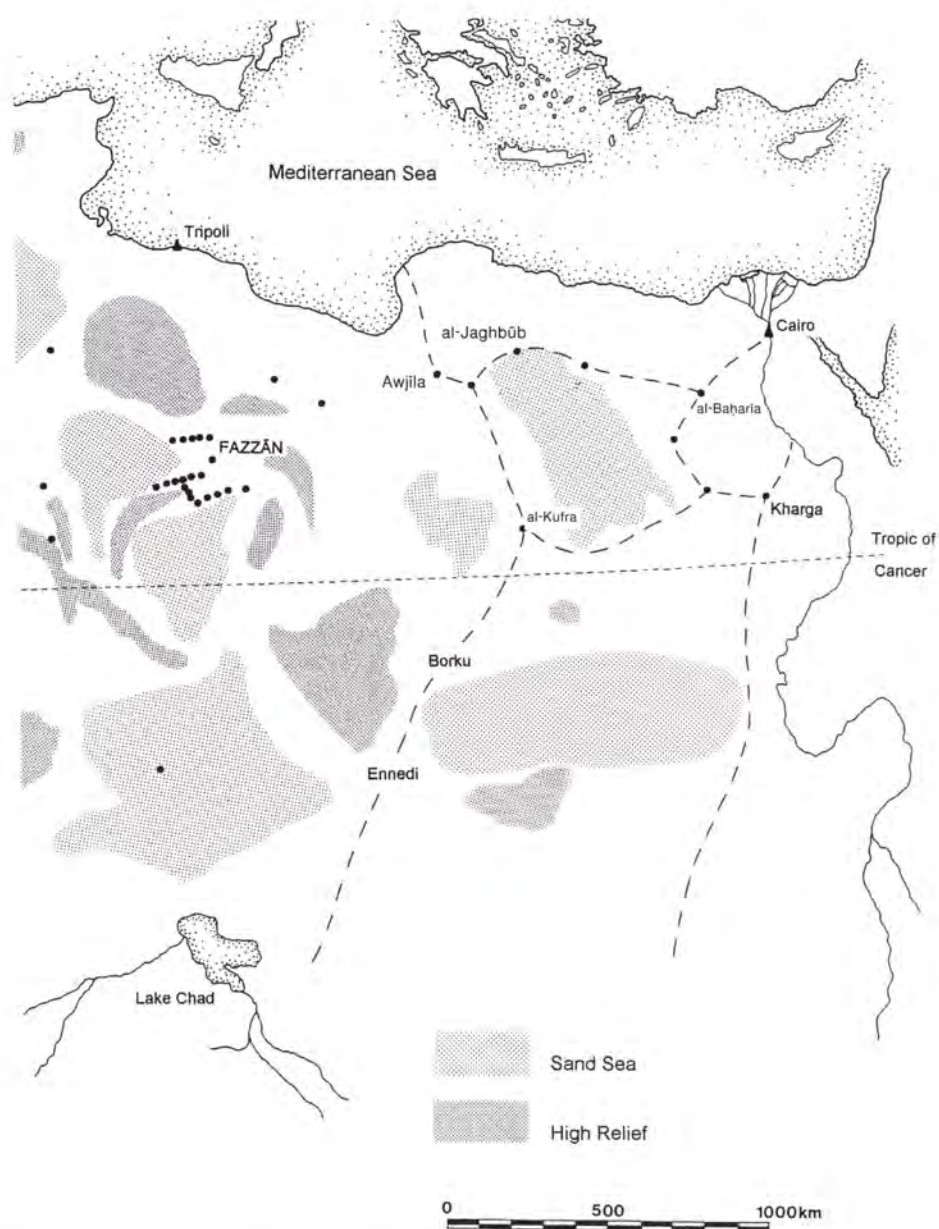


Fig. 3.15. Map of later 19th-century Sabaran trade routes, showing their deviation to the east of Tripolitania after the suppression of the slave trade via Tripoli.

The Islamic religious confraternity of the Sanūsī was an important player in the events of the mid-late 19th century (Evans-Pritchard 1963; Wright 1989, provide good summaries). From 1856 the main base of the Sanusi was at al-Jaghbūb and from 1895 at al-Kufra, reflecting the geographical focus of the order in the Libyan desert. The order established a series of secondary missionary centres (*ḡawīyas*) in Fazzān, in the Tripolitanian and Cyrenaican deserts to the north and north-east and in Chad and Tibesti to the south and south-east. As the European powers and Ottoman authorities clamped down on the movement of slaves on the traditional route to Tripoli, a new route was opened up, under Sanusi control, from Chad and Dārfūr towards the north-east, passing via al-Kufra towards the Cyrenaican ports and the Nile (Fig. 3.15). Slavery did not disappear quickly from the Sahara, though the trade routes were redirected away from Fazzān, with a significant impact on the regional economy (Savage 1992; Wright 1998).

The Sanūsī largely kept out of politics in the late 19th century, but the Italian invasion of 1911 made them a central element of Libyan resistance, especially in their desert hinterland. The Italian colonial annexation of Fazzān in 1913 followed a pattern familiar from the early Ottoman/Qaramānli experience, with that region proving one of the fiercest centres of revolt against Italian occupation in 1914. The Italian garrisons were isolated and defeated and, despite their superior fire-power, they were unable to re-establish themselves in Fazzān until 1930 (Badoglio *et al.* 1930; Graziani 1934). The replacement of Italian control by French rule during the Second World War extended the period of European domination up to Libyan independence in 1951. As noted already (above, Chapter 1), the data gathered by Italian and French researchers on the human geography and archaeology of Fazzān during this colonial period are invaluable to research (*Sahara Italiano* 1937; Pace *et al.* 1951; Scarin 1934; Bellair *et al.* 1953; Despois 1946; Lethielleux 1948).

CONCLUSION

The overall history of Fazzān has been turbulent at times, but the region has also known periods of stability, when oasis cultivation and trans-Saharan trade have flourished. Almost all our primary sources were written outside the area by people who were prejudiced, unsympathetic or poorly informed about actual conditions in the country. Unsurprisingly, these sources tend to focus on the wars and power struggles, rather than on the positive aspects of the region. As we shall see, the archaeological record speaks to this picture of periods of insecurity, but also demonstrates the scale of investment in agricultural and irrigation systems and the significance of phases of greatest local autonomy and culture. In many respects the archaeological picture differs from the historical one in that the latter is too reliant on the perspective of outsiders, who had limited interest in delineating the full complexity of desert communities. What archaeology provides above all is vital testimony on the changing lives of the inhabitants of Fazzān.

CHAPTER 4 RESULTS OF FIELDWALKING 1997-2000

By David Mattingly,
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INTRODUCTION

A key lacuna in all the earlier work had been the relative lack of identified oasis settlements to go with the numerous cemeteries (and 10,000s of still visible burials) noted along the escarpment pediment. CMD explained it thus (Daniels 1989, 49):

“Other wadi-centre sites have proved difficult to detect; perhaps not unrelated to the considerable amount of agriculture, rough scrub and dunes which occupy much of the wadi bottom. The sites so far discovered there for the most part appear post-classical in date, although the presence of abundant Roman-date cemeteries at frequent points along the escarpment does suggest that Roman habitation sites await discovery”.

As noted, mapping of sites visible on high-altitude vertical air photographs by CMD (with enhancement by David Edwards) had revealed the presence of numerous fortified structures (*qṣur*) and associated settlements within the oasis belt, but the vast majority were undated (Fig 4.1). Whilst a sample of these sites was revisited as part of the reconnaissance-level work of the FP, it was felt that a better understanding of these Garamantian and later settlement sites would come from intensive and systematic fieldwalking of a series of representative areas of the oasis belt in the Jarma region to test the theory that there were Garamantian settlement sites in this area and that these sites are susceptible to identification in this manner. This Chapter presents the key results of this aspect of the recent fieldwork, before we deal in Chapter 5 with the morphological aspects of settlements.

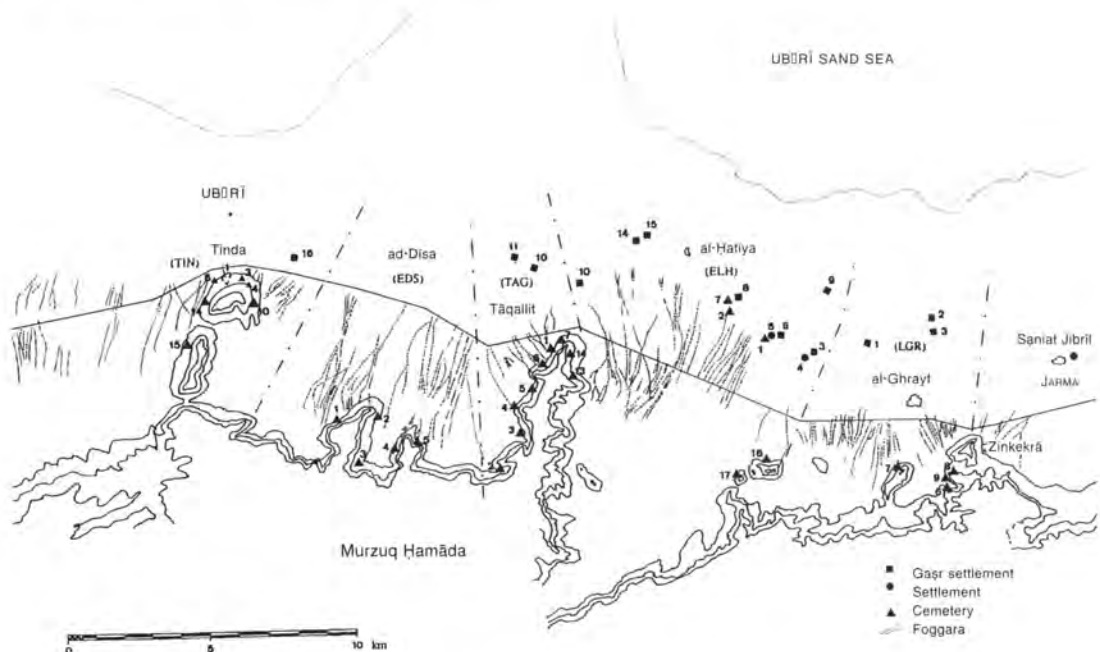
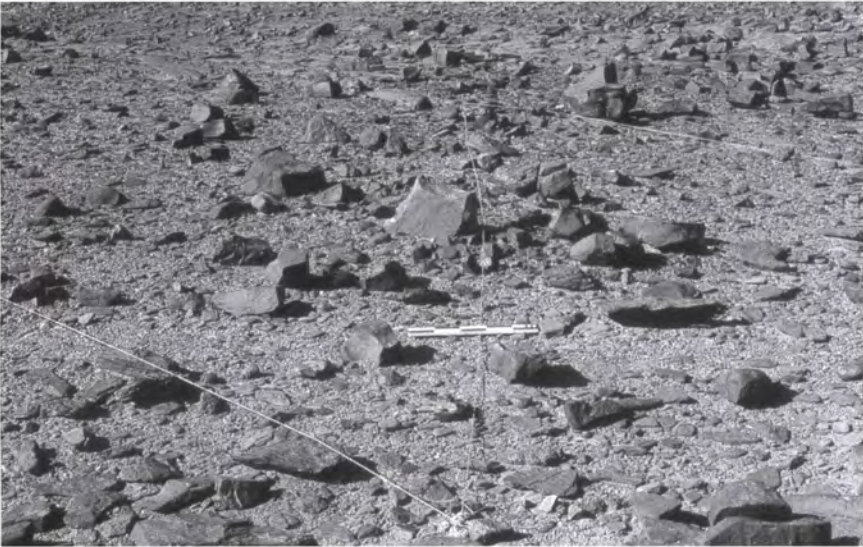


Fig. 4.1. The western sector of the Wādī al-Ajāl, showing a sample of the settlements, cemeteries and irrigation systems (foggaras) mapped from air-photographs by CMD. The division of the Wādī into a series of areas defined by three-letter codes is also illustrated - the system has been built on for our Gazetteer (after Edwards et al. 1999).



a)



b)



c)

Fig. 4.2. Fieldwalking/gridded collections: a) oasis; b) ḥamāda; c) sand sea.

There was also little previously recorded about prehistoric settlements or activity sites in the Wādī al-Ajāl and another key objective was to locate and sample some of these, particularly examples of Holocene date. The fieldwalking aimed to show whether it was possible to identify ‘sites’ from systematic study of site/off-site artefact distributions. This was rapidly confirmed and allowed us to examine aspects of the intrasite artefact distribution and also to address questions of site function.

The fieldwalking programme thus sought to answer two particular interpretative issues: in which parts of the landscapes of the Wādī al-Ajāl were later prehistoric communities active (and what forms did this activity take) and could the hypothesis of numerous Garamantian settlements within the oasis belt be confirmed (CMD had raised this as a possibility, but he had published supporting data on only two sites apart from Old Jarma/GER 1: Sāniat Jibril/GER 2 and Sāniat Sulaymān Krayda/GER 27).

Initial fieldwalking focused on the examination through 50 x 50 m grids of a series of potential oasis sites discovered by reconnaissance work (Fig. 4.2). This was

Series	Site No/Location
1997	
GRID001–GRID029	GER 2 (Sāniat Jibril) (29 grids)
1998	
GRID025 (rpt), 030–042, 092–099	GER 2 (Sāniat Jibril) (22 grids)
GRID043–091, 100–245	GER 3 (Old Jarma Area) (194) (Total 216 grids)
GRID501–506	ELH 1 (6 grids)
GRID507–520, GRID533–534, GRID540–575	ELH 5 (52 grids)
GRID521–532, GRID535–539	ELH 6 (17 grids) (ELH 1/5/6 AREA) (Total 75 grids)
GRID576–GRID621	ELH 3 ELH 4 ELH 3/4 (al-Ḥatiya Area) (46 grids)
GRID622–GRID651	ELH 8 (al-Ḥatiya Area) (30 grids)
GRID801–GRID820	GER 16 (Jarma Area) (20 grids)
1999	
GRID901–GRID948	GER 16 (Jarma Area) (48 grids)
GRID949–GRID963	GER 11 (Sāniat bin Huwaydī) (15 grids)
GRID964–GRID977	GER 18 (Jarma Area) (14 grids)
GRID978	GER 26 (Jarma Area) (1 grid)
GRID979–GRID992	GER 15 (Jarma Area) (14 grids)
GRID993–GRID999	TWE 26/27 (Tuwash Area) (7 grids)
GRID1000–GRID1005	TWE 28 (Tuwash Area) (6 grids)
GRID1006–GRID1017	GER 27 (Sāniat Sulaymān Krayda) (12 grids)
GRID1018–1020	CHA 26 (3 grids)
GRID1021–1026	CHA 27 (6 grids) (al-Kharāʿiq Area) (Total 9 grids)
2000	
G01–G22 (25 x 25 m grids)	GER 2 (Sāniat Jibril) (22 grids)

Table 4.1 The allocation of 50 × 50 m grid numbers by site. NB the grids numbered G01–G22 in the 2000 season are 25 × 25 m squares (the area sampled is equivalent to that of 11 of the 50 × 50 m grids).

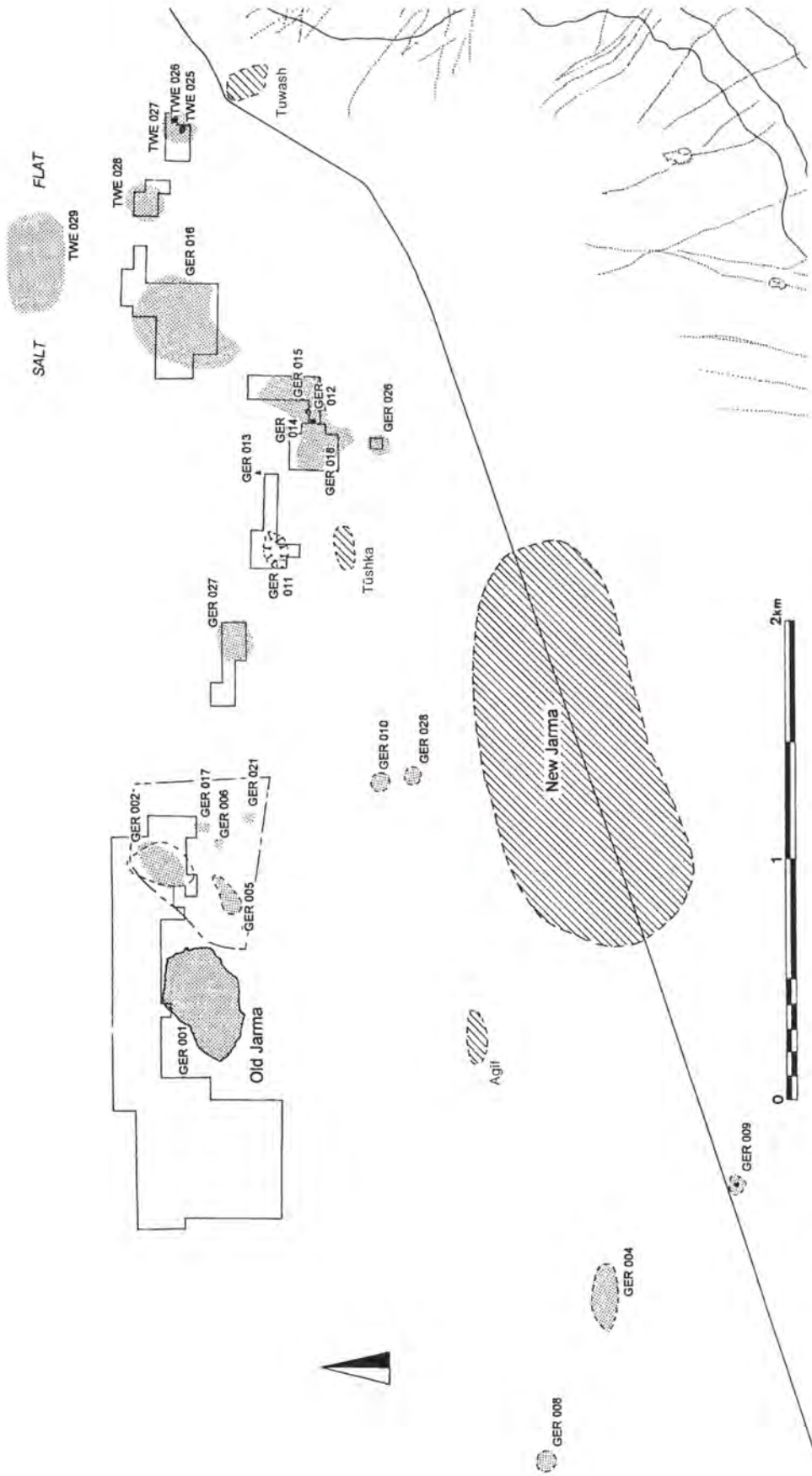


Fig. 4.3. Grid surveys and other suspected settlements in the Jarma area (GER). The stippled areas represent ancient settlements and the cross-hatched areas modern villages.

followed up by more detailed collection in 5×5 m grids of a series of suspected lithic sites. A series of linear transects extending for several km along and across the valley floor was also fieldwalked in 2000. This exercise complemented the results from the earlier grid-based collections in that it confirmed that the high densities of artefacts recorded were abnormal, when set against the 'background noise' of the area as a whole. It also shed further light on the wider distribution of lithic scatters in particular (the varied methodologies used in the fieldwalking programme are described in Chapter 1 above; Mattingly *et al.* 1997; 1998a/b; 1999; 2000a/b). The collected data provide an opportunity to describe and consider: (1) artefact densities at individual site; (2) the variability between artefact densities (including artefact 'gaps' or 'blanks' in the landscape).

The sheer bulk of collected or counted artefacts (potsherds and lithic materials) is impressive. For example, from the 50×50 m boxes alone $\approx 23,000$ potsherds, 2,300 lithics and over 2,200 small finds were collected or counted. In this Chapter, we shall describe the surface distribution and density of artefacts at a sample of typical sites and across the landscape. Further examples of fieldwalking results will be included in the Gazetteer in *Archaeology of Fazzān 2*, under the relevant site codes, such as GER 16 or TWE 28).

Gridded collections in 50×50 m squares

Most survey was carried out within 20 km of Old Jarma (Table 4.1). Within that area, there were five general localities targeted (i-iii are illustrated on Fig. 4.3, v on Fig. 4.4, iv represented a small and isolated area of fieldwalking and is not illustrated at this scale):

- (i) a large area contiguous with Old Jarma (and including the eastern satellite settlement of Sāniat Jibril – GER 2-3);
- (ii) a cluster of sites to the east of Old Jarma, the cemetery of Sāniat bin Huwaydi (GER

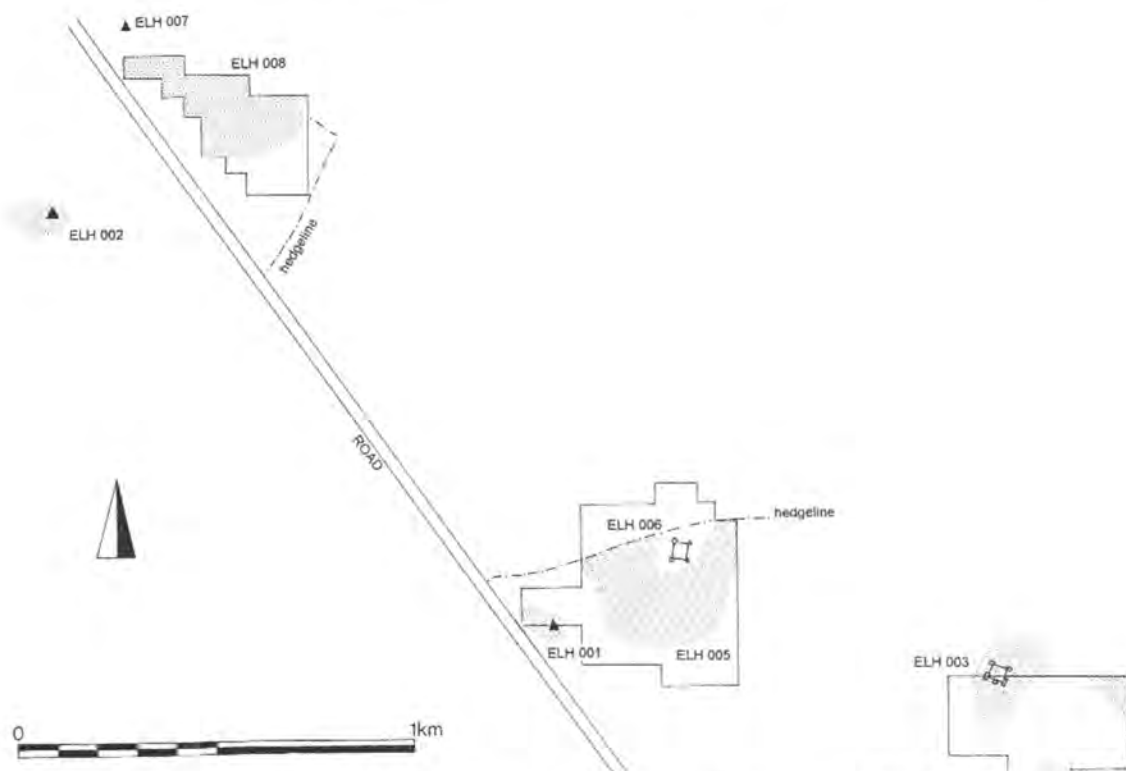


Fig. 4.4. Grid surveys and known cemeteries in the al-Hatiya area (ELH). The stippled areas represent ancient settlements and cemeteries.

- 11) and the nearby settlement at Sāniat Sulaymān Krayda (GER 27); two further suspected settlement sites (GER 15 and 16); a lithic scatter (GER 18) and a further small scatter of Garamantian pottery - either a settlement or a cemetery (GER 26);
- (iii) slightly further to the east of Jarma, further probable settlements were sherded in the oasis near to Tuwash (TWE 26-27, 28);
- (iv) further east again and to the north of the al-Kharāfiq cemetery a further suspected settlement was sherded (CHA 26-27).
- (v) to the west of Jarma, near al-Hatiya, a further group of settlements and cemeteries was studied (ELH 1, 3-4, 5-6, 8).

Although we shall concentrate on the case studies from areas (i) and (v), some general observations on the fieldwalking results are required. In total, 542 50×50 m grid squares were surveyed (135.5 ha). A further 22 25×25 m grid squares (1.375 ha) were recorded in a more intensive way in 2000 at site GER 2 (Sāniat Jibril). Combining the pottery data from the grid-walked 50×50 m squares ($n = 542$) and the 25×25 m squares ($n = 22$, equivalent to 11 50×50 m grids), a total of nearly 23,000 sherds were collected or counted, with an overall average of 41 sherds per square (Table 4.2).

The analysis of sherd distributions has been based on numerical density (calculated out to standard 0.1 ha areas). The total counts and collections from each 50×50 m grid square represent coverage of 5×50×1 m-wide corridors (0.025 ha, that is a 10 percent sample of the total 0.25 ha area of the square). In order to calculate the density of sherds (or lithics)/1000 m² (0.1 ha), it is thus necessary to multiply the raw count from a 50×50 m grid by 4. For the 25×25 m grids, the actual coverage in each square was equivalent to 5×25×1 m-wide corridors (0.0125 ha, that is 20 percent of the 0.0625 ha area of the square). In order to calculate the density of material/0.1 ha, it is thus necessary to multiply the raw count from a 25×25 m square by 8 (Table 4.2).

Site	No. grid sq.	Total counts	Av. no. sherds per grid sq.	(Av. no. sherds per 0.1 ha)
CHA 26/27	9	600	66.67	(266.68)
ELH 1	6	40	6.66	(26.64)
ELH 3/4	46	251	5.46	(21.84)
ELH 5	52	1429	27.48	(110)
ELH 6	17	357	21	(84)
ELH 8	30	512	17.07	(68.28)
GER 2 (Sāniat Jibril) (1997/98) [§]	51	5,114	102.28	(409.12)
GER 2 (Sāniat Jibril) (2000) [†]	? 11	3,404	309.45	(1237.8)
GER 3 (Old Jarma area)	194	177	0.9	(3.6)
GER 11	15	735	49.00	(196.00)
GER 15	14	1,064	76.00	(304.00)
GER 16 (1998)	20	1,310	65.50	(262.00)
GER 16 (1999)	48	5,433	113.90	(455.60)
GER 18	14	51	3.64	(14.56)
GER 26	1	57	57.00	(228.00)
GER 27	12	768	64.00	(256.00)
TWE 28	6	358	59.70	(238.80)
TWE 26/27	7	1,058	151.14	(604.56)
Totals	553	22,722	41.08	(164.35)
Totals excluding GER 2	491	14,204	28.93	(115.71)
Totals excluding GER 2& 3	297	14,027	47.23	(188.92)

[§] The 51 grids at GER 2 include one grid that was rewalked in consecutive years. The second collection from that grid is ignored in the total sherds and average sherd collection calculations.

[†] The 22 25×25 m grids are equivalent in area surveyed to 11 50×50 m grids.

Table 4.2 Sherd densities from sites explored by grid collections/counts.

On their own, of course, total potsherd counts may not always best describe collected materials as distinct pottery types are made of differing components and can undergo a variety of dissimilar post-depositional processes. We considered using weight analysis of collected sherds as an additional method of calibrating total counts. However, in view of the relatively small number of sherds picked up along the collection transect (as opposed to just counted) within each grid, and because the range of data values derived from potsherd counts and weights were broadly similar, we have not incorporated sherd weight into our final analyses.

This overall average number of 41 sherds/grid (164/0.1 ha) includes both the abnormally low totals obtained from the survey of the northern and western suburbs of Jarma (GER 3) and the exceptionally high totals from the atypical site of Sāniat Jibril (GER 2) (Fig. 4.5). If we discount the GER 2 material, the mean is 29 sherds/grid (116/0.1 ha), while if we exclude both GER 2 and 3, the mean is 47 sherds/grid (189/0.1 ha). The extraordinary high density in the GER 2 collections made in 2000 stems directly from the more intensive methodology adopted and is not directly comparable with the other results. However, the 1997 collections at GER 2 when combined with an envelope of grid squares walked in 1998, which show a diminishing density, provide an overall density that is comparable with other high values, as at GER 16 and TWE 26/27. It could be argued that GER 2 is a special site in the settlement hierarchy and this is a factor in the very high sherd densities here. But it is also the case that overall visibility at this site was better than at most others and the aeolian erosion of CMD's spoilheaps has left material concentrated on the surface (Fig. 4.5). The very high density value recorded in 2000 relates to a smaller area of the core of the site centred on the old excavations and must be considered abnormal for this reason. At the other end of the scale, the dearth of material in other grid squares around Old Jarma (GER 3) is undoubtedly a reflection of the fact that this was an area of few structures (part of it is now salt-flat and may have been lake or marsh in antiquity), perhaps coupled with a generally poorer level of visibility. The few clusters of sherds within this large area may be indicative of some sort of

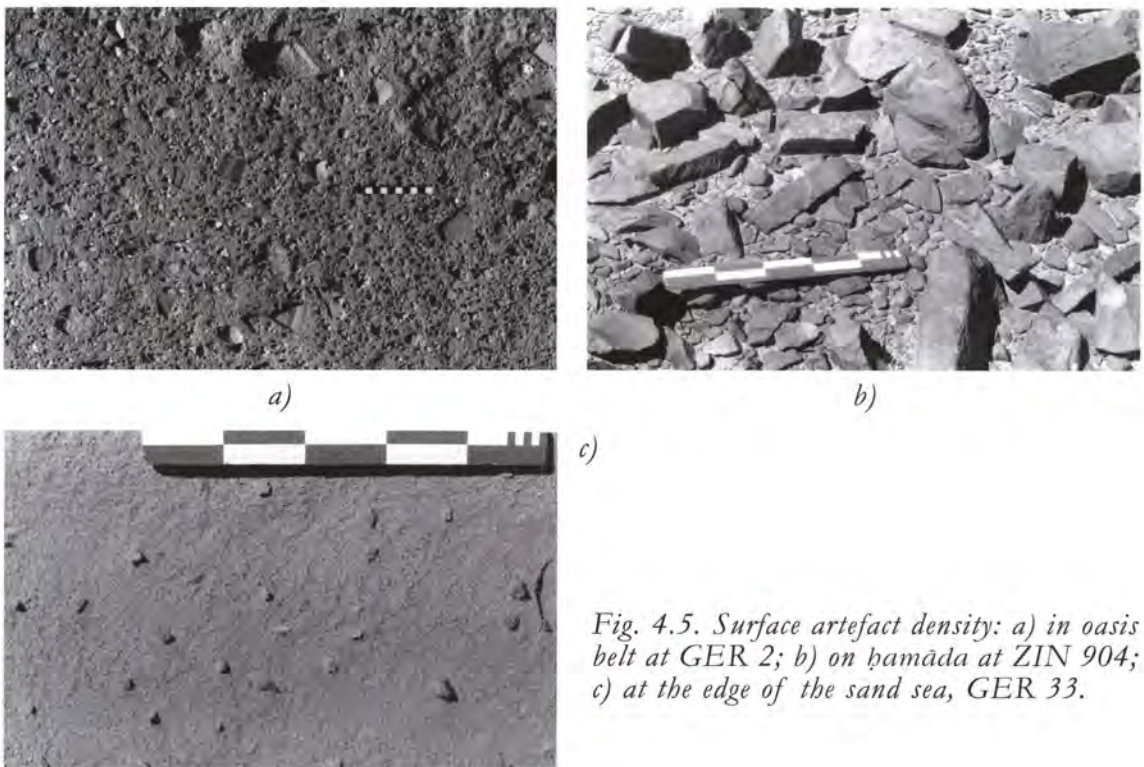


Fig. 4.5. Surface artefact density: a) in oasis belt at GER 2; b) on ḥamāda at ZIN 904; c) at the edge of the sand sea, GER 33.

Site	Glass	Glass bead	Glass bangle	Faience	Faience bead	Ostrich eggshell	Ostrich egg bead	Carnelian fragment	Carnelian bead	Amazonite fragment	Amazonite bead	Other stone fragment	Other stone bead	Other stone bangle	Bead polisher	Non-Metalliferous residue	Iron slag	Iron artefact	Copper alloy fragment	Copper alloy ring	Copper alloy bead	Coin	Spindle whorl/loomweights	Querns, rubbers, punders
TAB 31																								1
ITF 12																			1					2
TIN 16						2																		
TAG 12	1	1				1																		1
TAG 20						1												1						
ELH 1																	19	1						
ELH 2																	12	2						2
ELH 3															1									1
ELH 5	2		1	1		2						1						5						2
ELH 6	1					3		1	1															6
ELH 8																	2	1						1
ZIN 2			1																					1
UAT 8	1																							
UAT 9	1																							
GSC 8													1											1
GSC 38	1																							
GER 1		2	3			1			1								7					1		6
GER 2	187	45	7	4	18	238	112	408	7	38	7	15	2		48	7	251	10	198	5	2	9	3	19
GER 4	2	1				1																		
GER 10																			1					
GER 11													1					1						
GER 15	1	1	1			1	1											1						1
GER 16	16	2	2		1			2		3		3			1	1	11	2	8					2
GER 26																								1
GER 27		1					1					2			1				2					3
GER 30																								3
GER 31						3																		8
GER 32						4																		
GER 33						26	14																	7
GER 35						1																		
GER 36						8																		
GER 38						17																		
TWE 26														1										
TWE 27																			1					
TWE 28	1																36	4						
TWE 29	2																10	3						1
TWE 44						1	10																	1
CHA 1	1																		1	1				
CHA 24		1																	1	2	1			
CHA 26/27						1				1		1							1					
CHA 30																								
GRA 2																								1
TEK 10																								2
FJJ 1						1																		8
FJJ 42						1																		
FJJ 45							1																	
GDB 1	14																8	3						
MAR 1						1																		1
MAR 10																								
SCH 20																								4
ZUL 7			1			1														2				
ZUK 10		2	1																					
EDU 14																								1
EDU 15						8																		
EDU 16						49	1																	2
EDU 18						22																		
EDU 20						4																		1
EDU 22						72																		1
EDU 23						1																		1
EDU 24						4																		
EDU 26																								1
EDU 28						11																		
Total	231	57	16	5	19	485	141	411	8	43	7	24	2	1	51	160	291	17	215	5	2	10	3	93
Total Excl. GER 2	44	12	9	1	1	247	29	3	1	5	0	9	0	1	3	153	40	7	17	0	0	1	0	74

Table 4.3 Small finds recorded in fieldwalking 1997-2001 (grids, line-walking and reconnaissance) ($n = 2296$).

activity, though this seems to be convincing evidence for the fact that ancient Garama did not extend beyond the northern and western limits of the medieval town.

Of the other low pottery scores, GER 18 was selected for grid walking as a lithic scatter and the low sherd count was to be expected. On the other hand, the sherd counts for the group of al-Ḥaṭīya settlements are all artificially low, as a result of poor artefact visibility caused by blown sand in many grid squares. Although we recorded information in the field on visibility and on potential post-depositional bias from factors such as blown sand, we have not attempted in our analyses to compensate the actual figures of artefacts collected. But it is clear that these sites yielded lower totals of artefacts as a result of such factors. For example, detailed analysis of the sherd collections at the al-Ḥaṭīya sites shows that the squares with highest visibility produced results that are much more comparable with totals from other sites.

Despite, this variability in visibility, the contrast between sites: off-site locations appears to be reflected by a number of significant differences in density and type of archaeological material. First, in comparison to the low background noise (as exemplified by GER 3), the density values of >50 sherds/grid square are a significant occurrence of surface sherds (equivalent to >200 sherds/0.1 ha). Second, the actual numbers of sherds counted/collected at these sites amount to hundreds or low thousands. Since the sample being recorded in the grid walk is 10 percent of the total area of the site, this implies that these sites have thousands or even tens of thousands of sherds on the surface at any one time. Third, many of the sites also produced structural evidence in the form of visible mudbrick wall lines at the surface or areas of decayed mudbrick from collapsed structures. Finally, the range of other finds recovered also suggests the presence of distinctive signatures of settlement sites of Garamantian date.

Other finds from survey sites.

Table 4.3 summarises the categories and numbers of small finds collected during the 1997-2000 fieldwork, by site code. The principal categories are glass, copper-alloy artefacts and fragments, beads of various materials and rough fragments of those materials collected for working. Grooved stones used for shaping and polishing beads have been found on several sites, along with iron fragments and slag, indicating smithing activity, non-metallurgical residues believed to be a by-product of salt refining are present at a number of sites. The glass consists of both vessel glass and beads/bracelets, alongside a smaller quantity of faience. There are beads of ostrich eggshell, and the semi-precious red carnelian stone, the turquoise 'amazonite' and various other desert stones. Fragments (mostly small chips) of rough carnelian and amazonite are frequent finds and are important manuports (non-local materials brought to the site by human action) to be connected with the trade in these materials and the manufacture of beads and other artefacts from them. The very large numbers recovered from the site of Sāniat Jibril (GER 2), equivalent to 72 percent of the total small finds from the entire survey work, reflect in part at least the intensive manufacturing activity at this site. But other factors have also contributed to the unusually high totals. For instance, the excavations carried out here and the erosion of the spoil heaps have left artefacts highly concentrated at the surface. Surface visibility was also exceptionally good at this site, and more intensive survey methods employed, along with repeat grid survey and numerous additional grab collections, all further inflated the apparent disparity between this site and the others surveyed. In normal survey conditions, small beads are extremely difficult to spot and the presence of even small numbers, often associated with small fragments of unworked semi-precious stone and, in the case of ELH 3, GER 16 and GER 27, with bead polishers, suggests that the type of craft activity so clearly attested at GER 2 was also followed at other Garamantian sites.

Lithics sites

Conventional grid collections in 50 × 50 m squares recorded lithic density in the wider landscape (Table 4.4). This was mostly very low within the oasis zone, but a few sites revealed a significant occurrence of lithics (particularly notable at GER 16 and GER 18 with densities in excess of 140 lithics/0.1 ha and 240/0.1 ha respectively, but with densities of 20-50/0.1 ha also recorded at GER 15, TWE 26/27, 28, CHA 26/27). Although post-depositional processes had clearly had a series of impacts on the integrity of this material, it is apparent that there are concentrations of holocene lithics within the oasis band and that some at least of these may provide hints as to the whereabouts of settlements or campsites as well as activity sites of late Pastoral date.

A different category of grid-walked sites comprises the lithics sites identified on the ḥamāda top (GSC 52-53), escarpment (ZIN 903-904) or pediment (TWE 34-35), and along the sand plinth of the Dahān Ubārī (GER 31-35). These sites were explored using 5 × 5 m grid boxes, with detailed recording of 10 sites, covering 78 5 × 5 m boxes (0.195 ha). Although the actual numbers of lithics recorded in these boxes was very high (each 5 × 5 m box might contain 100s of pieces), when calculated out as density values, these sites in general register in the scale 500-1500 lithics/0.1 ha.

Reconnaissance survey

Reconnaissance survey in 1997-2001 and the line survey in 2000 covered an extensive area both east and west of Jarma, and recorded numerous new sites, though without subjecting them to detailed gridded pick-up (for example, TAG 20; GER 4, GER 9, GER 10, TWE 29, CHA 30). In the four seasons, well over 100 'sites' were identified through the variety of fieldwalking methods and, had greater emphasis been placed on reconnaissance survey, as against grid-walking a sample of the discovered sites, the total new sites would undoubtedly have been very much higher indeed. We are confident that the results achieved in the Jarma area could be replicated in other parts of the al-Ajāl, subject only to the local conditions of surface visibility.

Site	No. grid sq.	Total lithic counts	Average no. lithics per grid square	(Average no. lithics per 0.1 ha)
CHA 26/27	9	74	8.22	(32.88)
ELH 1	6	0	0	(0)
ELH 3/4	46	2	0.04	(0.17)
ELH 5	52	21	0.4	(1.6)
ELH 6	17	5	0.29	(1.16)
ELH 8	30	97	3.23	(12.92)
GER 2 (Sâniat Jibril) (1997/98)	51	4	0.07	(0.3)
GER 3 (Old Jarma area)	194	1	0.01	(0.04)
GER 11	15	20	1.33	(5.32)
GER 15	14	101	7.21	(28.84)
GER 16 (1998)	20	702	35.1	(140.4)
GER 16 (1999)	48	227	4.73	(18.92)
GER 18	14	840	60	(240)
GER 26	1	3	3	(12)
GER 27	12	25	2.08	(8.32)
TWE 28	6	65	10.83	(43.32)
TWE 26/27	7	84	12	(48)
Totals	542	2271	4.2	(16.76)

Table 4.4 Lithic densities from sites explored by 50 × 50 m grid collections/counts.

INTERPRETATION OF THE ARTEFACT SCATTERS

It does not automatically follow, of course, that a high potsherd density equals a settlement site. Many other aspects of human behaviour might generate surface scatters of potsherds (for example, industrial activity, rubbish disposal or agricultural practices such as manuring). Similarly lithic scatters can result from various activities, including one or more stages of reduction of the raw materials selected for tool production. Nevertheless, in the context of the Jarma region of the Wādī al-Ajāl, where observed background surface artefact densities were low, higher concentrations of potsherds, usually observed alongside possible structural remains, probably denote settlements or cemeteries. Final interpretation combines the fullest range of artefactual evidence with consideration of artefact density and surface traces of structures. All lithic concentrations that rise perceptibly above the background threshold levels are potentially of interest as loci of past human activity.

Fieldwalking in 50 × 50 m grids: the Jarma area

The Jarma area was a particular focus for the fieldwalking programme, with a large complex of sites located and grid-walked (Fig. 4.3). The area of the two known Garamantian settlements of Sāniat Jibril (GER 2) and old Jarma (GER 1) was intensively covered and GER 2 will be discussed as a particular case study below. A further important group of sites was discovered in the oasis belt to the east of Old Jarma. GER 16 was a large settlement site with traces of mudbrick structures c.3 km east of Jarma. There is also evidence of dense lithics from parts of this settlement, suggesting an underlying Late Pastoral site. GER 11, 15, 18, 27 lie between GER 16 and GER 1 and GER 2. This group of sites was covered by a series of near contiguous, but separate, grid surveys in 1998-1999 (Figure 4.3). GER 11 (c.1.86 km east of Old Jarma) is the known cemetery of Sāniat bin Huwaydī, whilst GER 27 is the probably associated settlement of Sāniat Sulaymān Krayda c.300 m to the north-west. A mudbrick *qaṣr* (GER 14) is situated about 600 m east-south-east of GER 11 and a second group of grids was established in its vicinity, with an extensive sherd scatter on its east and north-east side recorded as GER 15, and a lithics scatter on its west side as GER 18. The eastern limits of GER 15 approach to within a few 100 m of the west side of GER 16. Finally, GER 26 was a single grid laid over a compact scatter of pottery and mudbrick immediately west of GER 18 by the main modern access track towards Sāniat bin Huwaydī.

A further group of suspected sites was examined a short distance to the east of GER 16. Examination of a large well (TWE 25) and a standing mudbrick *qaṣr* (TWE 26) just to the north-west of Tuwash village revealed a dense sherd scatter in the immediate vicinity and this was grid walked as TWE 27, though some of the material may relate to the *qaṣr*. The site is 3.69 km east of Old Jarma and 700 m south-west of the TWE 1 cemetery. The assemblage contains both Garamantian/Roman pottery and later Islamic material. The latter is probably associated with the standing *qaṣr*, while the latter strongly suggests an underlying Garamantian settlement here. Lithics collected suggest the presence of a later prehistoric site below the Garamantian site.

TWE 28, situated in the oasis about 300 m north-west of TWE 26 and 500 m east of GER 16, was identified as a possible settlement site by reconnaissance survey in 1999. It comprises an area of decayed mud brick structures and associated sherds spread over at least 1 ha. The site is ringed with hearth-like features, comprising ashy deposits and non-metallurgical slag, possibly linked to salt manufacture. Once again, lithics recorded were above average density for an oasis-centre site and hint at underlying late prehistoric activity.

GER 2 = Sāniat Jibrīl (1997 and 2000)

Sāniat Jibrīl was selected for our first survey as it was already known to be a Garamantian settlement following CMD's excavations, and it was hoped that surface collection might provide a set of 'signatures' for similar settlements elsewhere in the Wādī. The results of the grid walking in 1997 and 2000 can be superimposed on the overall plan of the excavated area, with the surface evidence of additional buildings mapped in 2000 (Figs 4.6-4.8, 4.10-4.14).

The number of potsherds recorded per grid square in 1997 shows a marked variation between totals, ranging from 0-780 potsherds. Some of the highest figures corresponded with the areas immediately north and south of CMD's excavation, and seem to represent concentrations of finds eroding out of spoil heaps deflated by aeolian action. An area to the south-west of the excavations also yielded large numbers of potsherds beyond the area of surface traces and where fragments of human bone were recovered, perhaps indicating that there may have been a cemetery located between Old Jarma and Sāniat Jibrīl, rather than a continuously built up zone extending between the two. Topographic survey defined a clear core of mudbrick buildings visible at the surface to the north and immediately west of the excavated complex (Fig. 4.6). An envelope of grids established around the core of the site all proved to be low density and provided supporting evidence that GER 2 was a separate satellite settlement, not simply an extension of the urban site of Jarma (Fig. 4.7).

The higher resolution (25 × 25 m) grid survey used at Sāniat Jibrīl in 2000 covered a smaller area of the settlement more intensively and was designed to assess evidence for manufacturing activity in particular (Fig. 4.8). The number of small finds collected during the 2000 survey was outstanding: c.350 small finds numbers were allocated, accounting for c.550 individual pieces (many bead finds were recorded in groups). The collected finds included potsherds, lithic materials, silver- and copper-alloy Roman coins, fragments of fibulae, very large numbers of copper-alloy fragments, iron slag and non-metalliferous industrial residues (probably from salt refining), glass vessel fragments, carnelian and other semi-precious stone fragments, grooved stones used for

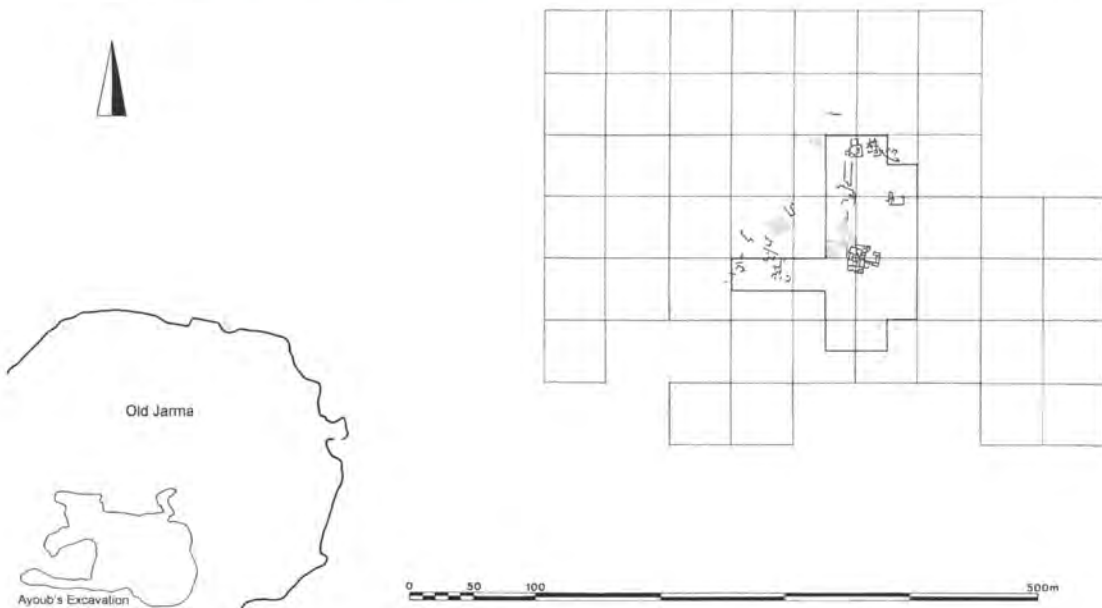


Fig. 4.6. GER 2 (Sāniat Jibrīl) showing relationship of 50 × 50 m (light outline) and 25 × 25 m (heavy outline) grids with details from the topographic survey. Solid lines indicate visible mudbrick walls and stippled patches are spreads of collapsed mudbrick.

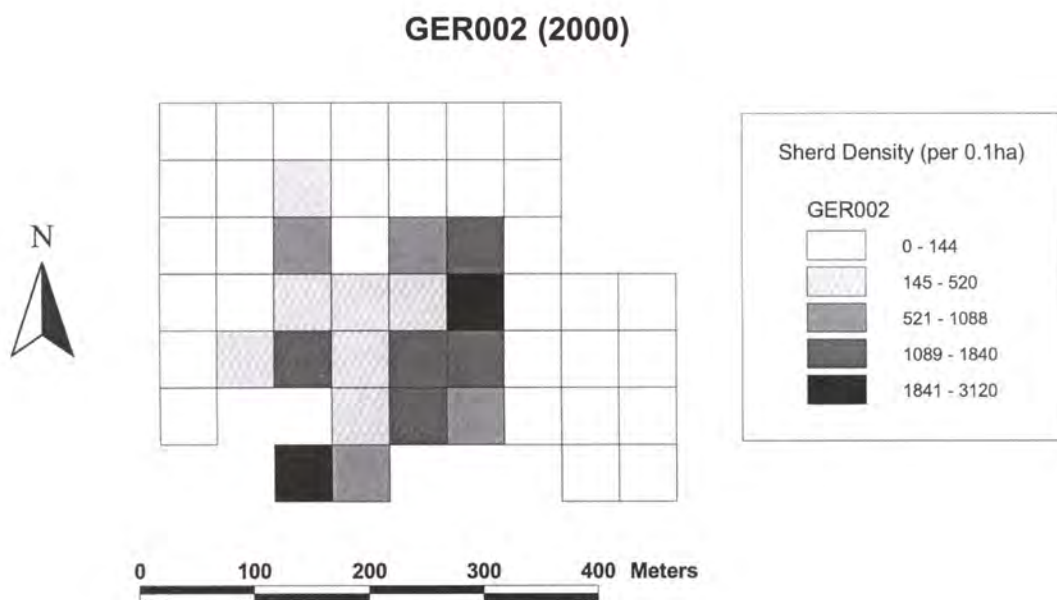


Fig. 4.7. GER 2, Pottery density in 50 × 50 m grids.

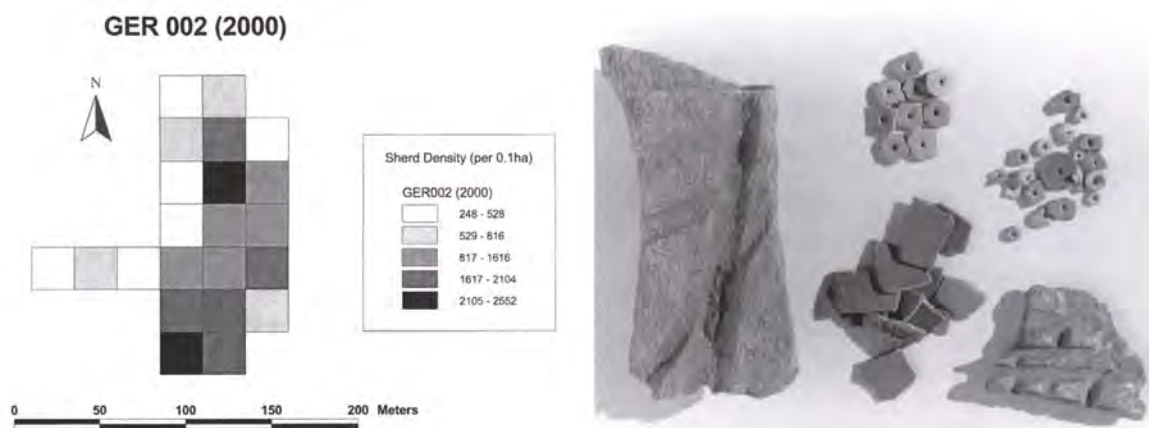


Fig. 4.8. GER 2, Pottery density in 25 × 25 m grids.

Fig. 4.9. GER 2, typical bead-making assemblage, showing grooved sandstone bead polishers and ostrich eggshell blanks, pierced blanks and as shaped/semi-finished beads.

shaping and polishing beads and beads made from spun glass, faience, ostrich eggshell, carnelian and other decorative stone, such as the turquoise stone amazonite (Fig. 4.9; for Catalogue, see *Archaeology of Fazzān 2*).

We should note that the absolute density of finds is highest in those grid squares that overlie excavation spoil heaps, but significant numbers of finds were also discovered in squares some distance away from the previous excavation trenches, suggesting that manufacturing was widespread and intensive at the site.

The finer ceramic wares collected from the two surveys date to between the 1st century BC and 5th century AD. The coarse wares are less distinctive and lack a precise chronology, but in general support this dating (see also *Archaeology of Fazzān 3*, for the Sāniat Jibril report).

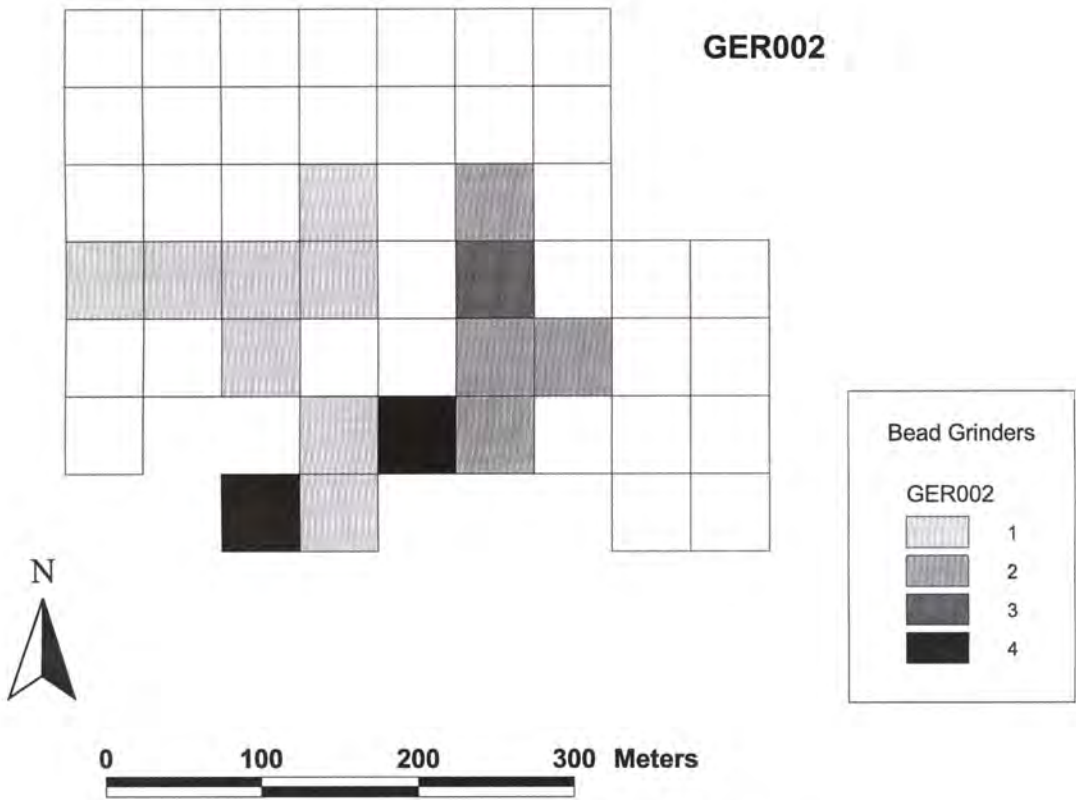


Fig. 4.10. GER 2, Distribution of bead polishers in 50 × 50 m grids.

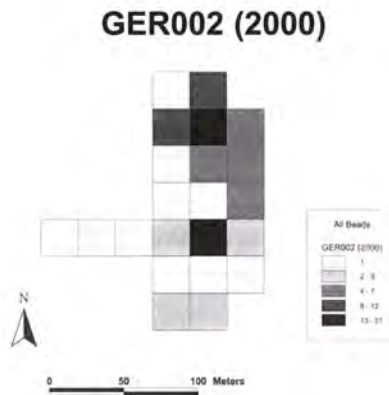


Fig. 4.11. GER 2, Distribution of all beads (glass, faience, carnelian, amazonite, other stone, ostrich eggshell).

Although potsherds were predominant, a range of other artefacts was collected. These included grooved stones used in bead manufacture (Fig. 4.10) – in addition to the 48 recorded by survey, 105 were recovered from CMD’s excavations of Garamantian buildings. Beads were a major category of small find, along with the raw materials from which they were produced (Figs 4.11-4.12). Over 100 ostrich eggshell beads were collected, in varying stages of the production process, averaging *c.*3 mm in diameter. Seven carnelian and seven amazonite beads were also found (some evidently broken in course of perforation or finishing), along with abundant rough chips of both stones (almost 400 carnelian chips and 40 amazonite) and two other stone beads

GER002 (2000)

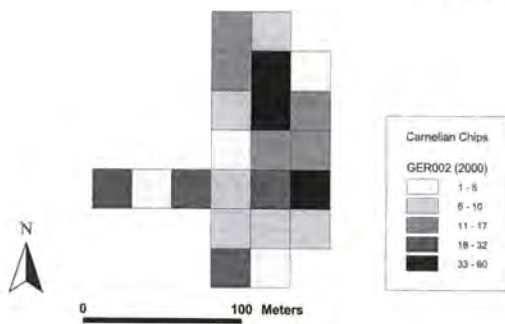


Fig. 4.12. GER 2, Distribution of carnelian chips (production waste?).

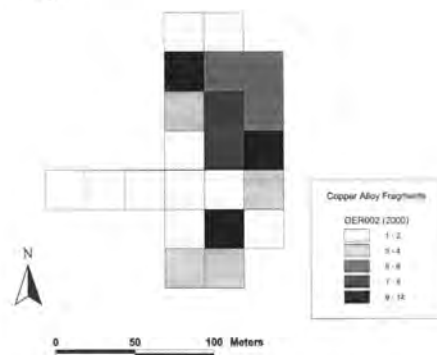


Fig. 4.13. GER 2, Distribution of copper-alloy jewellery and fragments.

and 15 fragments of other unusual stone or semi-precious stones. Over 60 glass or paste beads (faience) beads were also recovered, along with several fragments of glass bangles. There is evidence to suggest that some of the glass beads were manufactured here and one explanation for the large number of fragments of vessel glass at the site is that broken material was deliberately gathered up for recycling. Another major category of finds comprises almost 170 fragments of copper alloy and a range of copper-alloy artefacts (coins, rings, beads and bracelets) (Fig. 4.13). Many of the small copper-alloy fragments appeared to have been parts of broken artefacts, perhaps collected as scrap for reworking. Metallurgy seems to have been another specialist activity here, with iron slag (from smithing activity) collected in survey and the large number of copper-alloy fragments suggesting copper working in addition. Additional survey in 2001 located over 70 distinctive ashy patches scattered over the site, some evidently external to the visible buildings, some within what were presumably specialised workshops (Fig. 4.14). Investigation of one of these patches revealed an underlying hearth, probably used for both iron- and copper-alloy working (Fig. 9.20). Fragments of hearth bottoms and crucibles from the site reveal evidence for both processes, and though no certain evidence has yet been recorded it is conceivable that the same multi-purpose hearths could also have been used for glass- and silver-alloy working, which is also suspected at the site. Given the overall high density of glass, ostrich eggshell, carnelian and other materials that can be worked in the production of jewellery, it is suggested that at least part of the Sāniat Jibril site comprised a range of specialist handicraft workshops making jewellery.

GER 3, Old Jarma environs (1998)

By way of comparison with GER 2, the total potsherd count for the extensive (44.25 ha) field-walked area north and west of Old Jarma was extremely low: 177 potsherds were counted across 194 50 × 50 m grid squares; an average density of 0.9 potsherds per grid square (<40/ha). The contrast with the adjoining area around GER 2 on the eastern side is striking.

The al-Hatiya oasis zone

In 1998, three discrete sectors were field-walked close to the al-Ḥatiya pyramid cemeteries (ELH 1-2), with the aim of establishing the nature of suspected settlement sites in the vicinity of these major cemeteries (Fig. 4.4). The first area covered the smaller pyramid cemetery ELH 1 and an associated settlement site, comprising a substantial

central mudbrick fortified structure (or *qasr*) ELH 6, set within a larger area of mudbrick structures ELH 5. Another *qasr* and settlement site, situated ≈ 1 km E, was recorded as ELH 3, with gridding extending as far as a small cemetery ELH 4 to the south-east. The final area concerned a further suspected settlement site ELH 8, located due north of the second pyramid cemetery ELH 2 and ≈ 1 km west of ELH 5. The fieldwalking data are supplemented here by topographic survey of ELH 1/5/6, ELH 2 and ELH 3 and air photography at ELH 2 and 6 (Figs 4.15, 4.18).

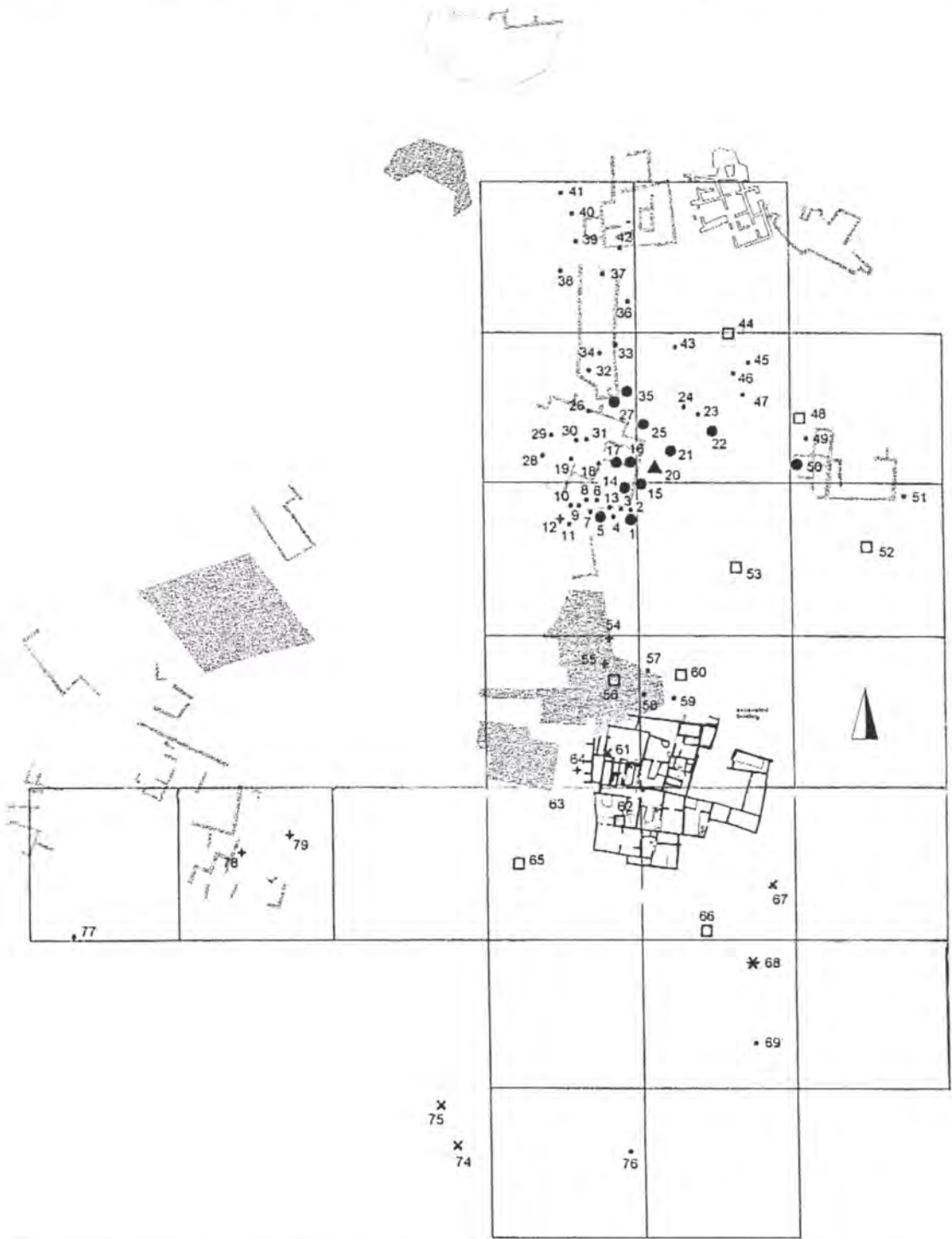


Fig. 4.14. GER 2, Distribution of ashy patches believed to represent surface traces of industrial hearths.

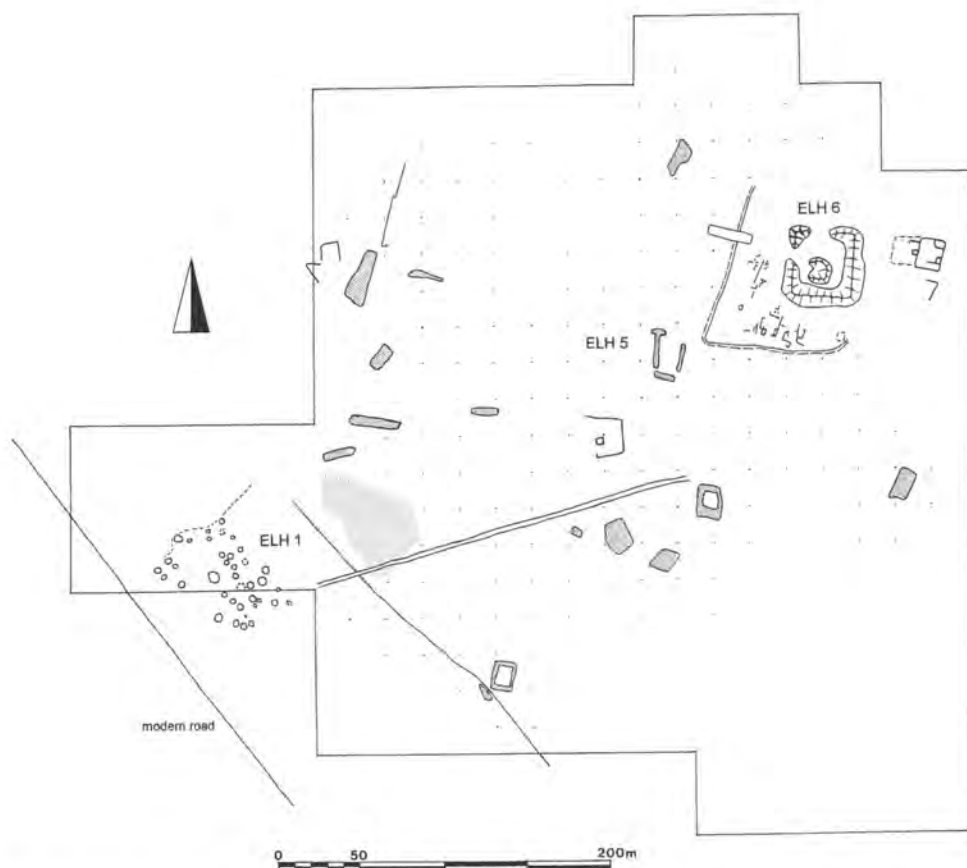


Fig. 4.15. ELH 1/5/6, showing topographic survey and outline of 50×50 m grids. Solid lines indicate visible mudbrick walls/surface features, stipple patches are spreads of collapsed mudbrick.

ELH 1/5/6 (1998)

The combined sherd count across 75 50×50 m grid squares (18.75 ha) laid out over ELH 1/5/6 was 1,830; an average potsherd density of only 24.4/grid (97.6/0.1 ha), though 20 grid squares (corresponding to 26.7 percent of the surveyed area) contained no visible artifacts (Fig. 4.16). This illustrates a problem specific to this area of the Wādī al-Ajāl, where there is a substantial amount of blown sand across the landscape and a fairly low level of modern cultivation. Although a high proportion of the ground is visible, the effect of the sand cover is to mask the distribution of surface artefacts. There is no doubt that far larger collections of material were made in grid squares where the sand cover was less (61 percent of sherds came from just 16 percent of the area examined - Table 4.5). All the density values for the al-Ḥaṭīya sites must be treated with caution as they are certainly artificially depressed by this visibility problem.

Topographic survey suggests a dense core of mudbrick buildings clustered around the *qaṣr* ELH 6, with a more dispersed pattern of outlying buildings ELH 5 (Fig. 4.15). However, the fieldwalking notes reveal the presence of a larger number of structures and mudbrick walls in the outer area than the surveyors had spotted, indicating that the overall size of the site exceeded 5 ha (Fig. 4.17). Once again, the presence of blown sand is responsible for some of these disparities.

The block of grids can be broken down into three groups corresponding broadly to the three site numbers allocated here. ELH 1 had a low density of finds, but was particularly affected by sand cover. ELH 5 had a variable density, reflecting differing levels of sand cover, whilst ELH 6 comprised the clearest area of the site, where many

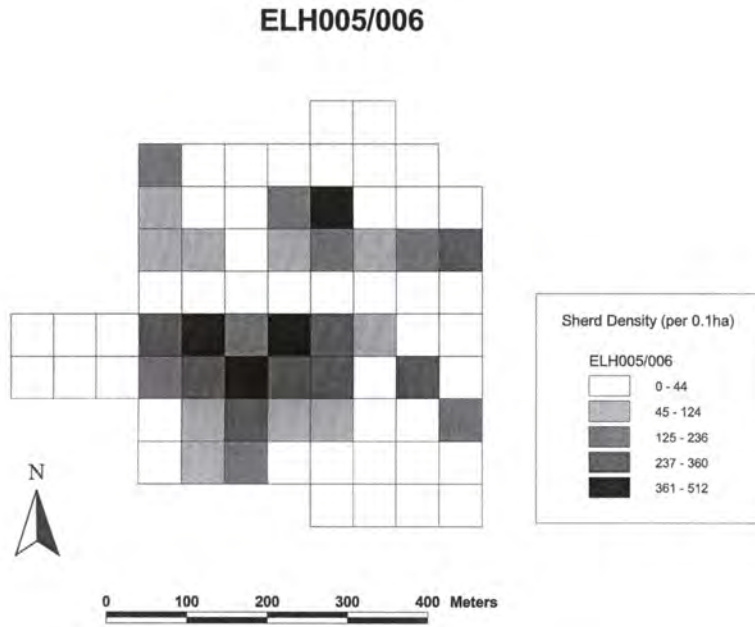


Fig. 4.16. ELH 1/5/6, Pottery density.

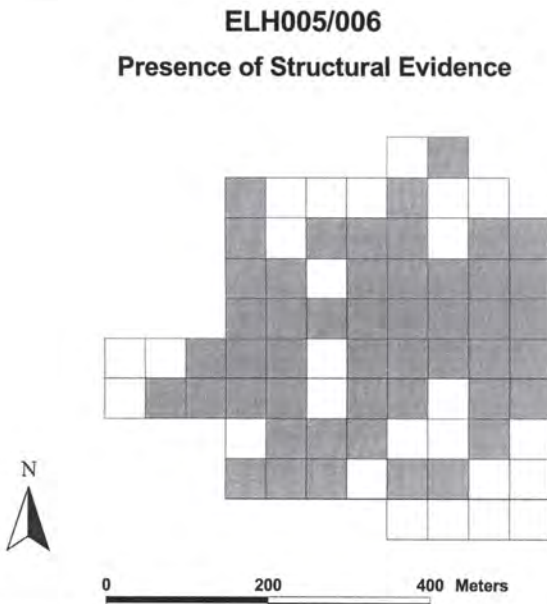


Fig. 4.17. ELH 1/5/6, Structural evidence.

Number of potsherds	Number of grid squares	Sherd counts	(% of total sherds count)	Average sherds per grid square
0-29	54	320	(17.5%)	5.92
30-69	9	392	(21.5%)	43.56
70-99	8	668	(36.5%)	83.5
100-128	4	450	(24.5%)	112.5

Table 4.5 ELH 1/5/6 Pottery density (N=75 grids).



Fig. 4.18. ELH 5/6 Kite air photograph of mudbrick building complex covering *c.* 50 × 30 m area just south of *qaṣr* ELH 6 (*cf.* Fig. 4.15).

mudbrick walls were visible as moisture lines at the surface (Fig. 4.18). In all areas, the greatest concentrations of sherds appear to correlate with areas of visible walls/structural features (though these are also the grids least encumbered with sand cover).

The highest density of artefacts was counted from an area centred on the *qaṣr* ELH 6 and the area to its south. Moreover, this cluster provides the bulk of the diagnostic 'Roman' wares, dated broadly to the 1st to 6th centuries AD (Fig. 4.16).

An interesting range of small finds was collected from the different parts of this settlement/cemetery complex, including several quern fragments, small quantities of vessel glass and faience, ostrich eggshell, carnelian chips and one bead, along with non-metalliferous residues and iron slag. As at GER 2, we appear to have a large settlement that was certainly engaged to some extent in manufacturing activity.

ELH 3 and 4

Comparatively few potsherds were counted across the 46 50 × 50 m grid squares (11.5 ha) at ELH 3/4 on account of the dense wind-blown sand cover over much of the site (Figs 4.19-20, Table 4.6). The total count was 251 potsherds (ave. 5.46 sherds/ grid, 21.84/0.1 ha), but as 19 grid squares (4.75 ha) contained no potsherds, and another 19 grids under 10 sherds, the density figures for the remaining 8 grids give a truer impression of the occurrence of material in areas less affected by sand cover (22.88 sherds/grid, 91.5/0.1 ha). Topographic survey indicates that there were structures underlying the north and west parts of the surveyed area (Fig. 5.21 covers the north-western grid squares), with isolated structures to the north-east and the south-east – the latter being a small cemetery area recorded as ELH 4 (Fig. 4.20, *cf.* 4.4). The total area of the site with visible structures covers 250 × 200 m (*c.* 5 ha). There was a large empty area between ELH 4 and the main settlement.

ELH003/004
Presence of Structural Evidence

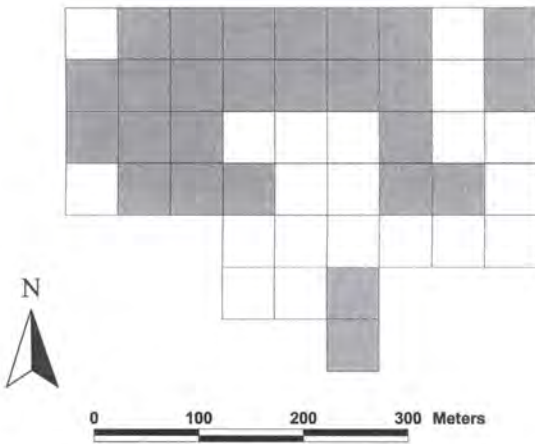


Fig. 4.19. ELH 3/4, 50 × 50 m grids, with an indication of structural evidence noted in fieldwalking.

ELH 003/004

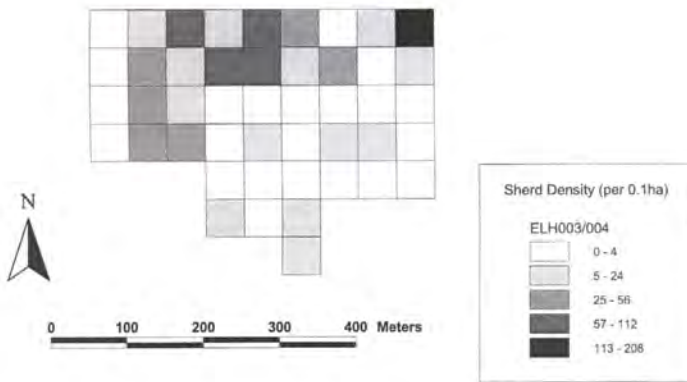


Fig. 4.20. ELH 3/4, Pottery density.

Diagnostic pottery among the collected sherds consists of Roman-period wares, mainly datable to the 1st-2nd centuries AD, but with at least one 2nd-3rd centuries sherd. A fragment of a probable bead grinder was also recovered.

This site is clearly another large Garamanian settlement or village, comprising a central *qaṣr*-like structure, surrounded by other buildings set within a series of enclosures, which define a number of roads or alleys (see further Chapter 5, below).

ELH 8

Structural remains and higher potsherd densities confirm the presence of a further settlement site near the ELH 2 cemetery. The grid squares with higher sherd densities cluster towards the west and north-west sides of the area surveyed. The south-west and west limits of the site have been cut by the modern main road and by earthmoving, but the sherd distribution suggests that the site was at least 3 ha in extent.

There were few worked lithics recorded at ELH 1/5/6 or 3/4 (see above Table 4.4). However, at ELH 8, 117 worked lithics were

Number of potsherds	Number of grid squares	Sherd counts	(% of total sherds count)	Average sherds per grid square	Density/0.1 ha
0	19	0	(0%)	0	0
1-9	19	68	(27%)	3.58	14.32
10-20	4	54	(21.5%)	13.5	54
21-30	3	77	(30.7%)	25.66	102.66
31+	1	52	(20.7%)	52	208

Table 4.6. ELH 3/4 Pottery density (N=46 grids).

recorded in 12 of the 30 grid squares (density of 9.75/grid, 39/0.1 ha) and the vast majority formed a cluster in five grid squares, accounting for 86.3 percent of the lithics counted (density in these squares 20.2/grid, 80.8/0.1 ha). The material comprises a worn biface fragment and numerous flakes and blades, some very worn, representing a palimpsest of Holocene and Pleistocene materials. This hints at the possibility of an underlying late prehistoric site here.

Thus, both at al-Ḥaṭīya and in the Jarma area, intensive fieldwalking was able to demonstrate the existence of oasis-centre sites of Garamantian date, with hints at some locations of underlying late prehistoric activity and/or settlements. The observed density of Garamantian sites in these two sectors (Figs 4.3-4.4) is extremely high and suggests that many further sites remain to be discovered throughout the Wādī al-Ajāl. This is a particularly significant conclusion for the future study of Garamantian civilisation.

GRID COLLECTION (5 × 5 m GRIDS) OF LITHIC SITES

Ḥamāda and Zinkekrā (Lithics)–GSC 52-53 and ZIN 904-905

In 1998, lithics survey focused on primary extraction sites and processing areas on the south side of the Wādī al-Ajāl (Mattingly *et al.* 1998b, 136-137). Scatters of lithic artefacts and débitage were examined on the ḥamāda plateau and on the intermontane ledges and slopes around Zinkekrā (Fig. 4.21). A number of sources of the lithics materials on the ḥamāda was identified. At the first site tested GSC 52, an outcropping yellow- and red-banded quartzite was being exploited to manufacture bifaces and blades and to rough out smaller core forms (particularly disc and Levallois types). Within the transect outside the survey box, the roughed-out cores were themselves

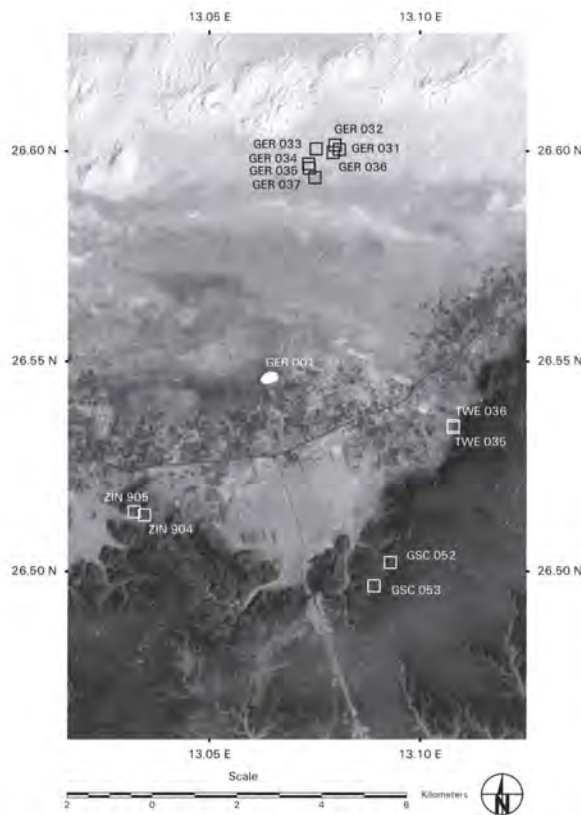


Fig. 4.21. Location of gridded collections from lithic sites in Jarma area.

being reduced to produce blanks, which had been removed for use or further reduction elsewhere. The second site GSC 53 was similar to GSC 52. Here a larger quartzite outcrop was exploited. In this case, two clear knapping areas were identified (Fig. 4.22). One was for roughing out cores, the second for producing and then reworking smaller cores. These two areas were adjacent and took the form of two stone-lined bare patches surrounded by debris. The integrity of the site is high, with many of the roughed-out pieces refitting. Some 15 m south of GSC 53 a coarser brown quartzite outcrops and this was used to produce large (> 20 cm long) blades (GSC 54).

Survey around the projecting spur of Zinkekrā identified two sites located on the slopes of the outcrop. ZIN 904 lay on a low ridge joining the ḥamāda to the Zinkekrā massif. This site was a 'basic' reduction area, exploiting a coarse-grained black quartzite. No diagnostic tool-types were present, but, interestingly, pottery of Zinkekrā ware type was associated. ZIN 905 was situated on the terrace south of Zinkekrā (that is, between the massif and the ḥamāda). A brown silcrete and fossil wood outcrops from the sandstone. Both materials were exploited for basic blank manufacture. A double burin and an endscraper were also recovered.

Two sites were examined on the pediment at the foot of the escarpment near Tuwash, TWE 34-35. These comprised near adjacent grids. TWE 34 comprised a scatter of flakes and blades, along with a biface of Acheulean type, lying on a sloping terrace disturbed by gullying. TWE 35 was a core reduction area of probably Mousterian date, although the only tool was a cleaver. Both sites were exploiting quartzite blocks in the talus debris and can be regarded as extraction sites.

Sand-plain Palaeolake sites

In 1999 the search was extended to the northern edge of the valley, on the rising ground (plinth) at the foot of the first dunes of the Dahān Ubārī. Here, close to a duricrust deposit, believed to represent a dried up lake or marsh, a series of Holocene lithic concentrations was located.

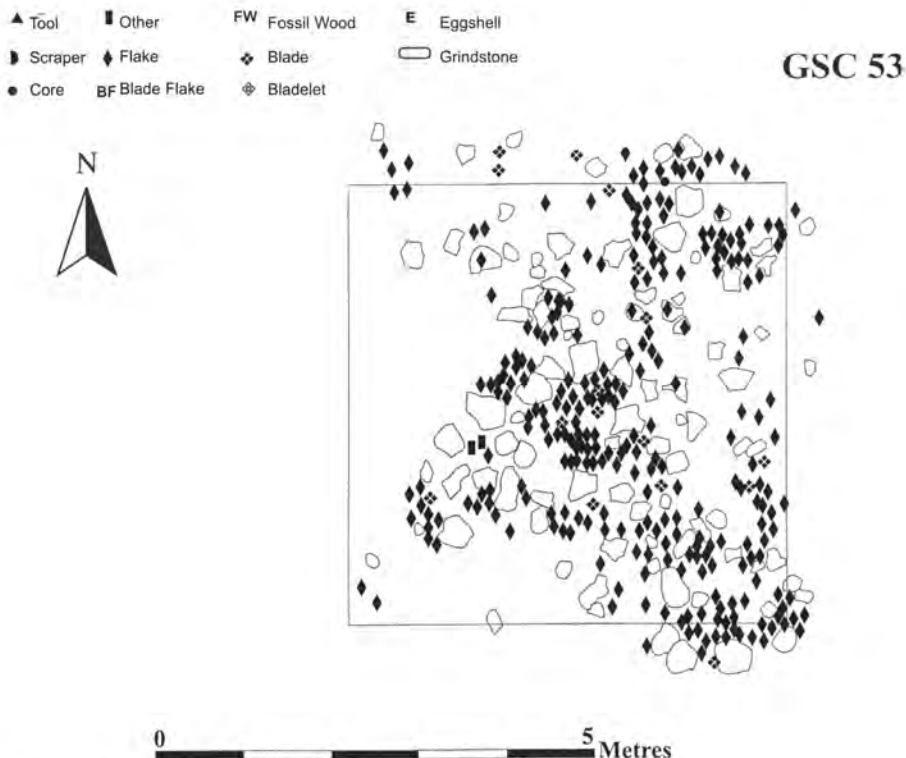


Fig. 4.22. GSC 53, plot of lithics 5 × 5 m grid collection.

The material from all the sites was similar (Fig. 4.2c): a background of Levallois-Mousterian pieces (no tanged artefacts or bifacial foliates were observed ruling out the presence of Aterian lithics – though see the results of line survey below), overlain by a mid-Holocene industry with bladelets, flake perforators, projectile points (mostly bifacially worked and tanged but also including a bifacial foliate point) and microliths. The microliths comprise two bladelet-based segments and an obliquely blunted point. There were few other tool-types, the occasional flake-based scraper and backed blade making up these. No burins were identified. There were also a significant number of (often quite small) fragments of grinding stones. A small number of potsherds in a dense, oxidised fabric was associated with the lithics at GER 32. All sites yielded fragments of ostrich eggshell and at GER 32 a number of complete beads and eggshell fragments broken during perforation indicated that bead-making had been practised. It is likely that bead manufacture was a component of all the sites so far analysed. The raw materials exploited are dominated by those from the ḥamāda – quartzite, silcrete and silicified wood – but there is a fine-grained brown flint with black speckles, which must derive from some distance away. The age of this industry would be from the 6th millennium BP. In 2000, many more sites with similar holocene lithic assemblages were located by line-walking and reconnaissance survey along the sand plinth in several parts of the Wādī. These were not grid-collected, but are thought to be of similar age and type to those explored in 1999.

A total of six sites was studied intensively by gridded pick-up (GER 31, GER 32, GER 33, GER 34, GER 35, GER 37). All of these sites are located on the northern edge of the depression, on the edge of the sand sea (Fig. 4.21). It is a location comparable to some of those reported by the Italo-Libyan survey and the evidence is similar (Cremaschi and Di Lernia 1998b, 253-61). There are a series of small to medium sized lithic scatters, mostly on deflating surfaces of sand, along the edge of long-dried-out lakes (cf. Fig. 2.9b, 2.17). A single case study will suffice to demonstrate the general nature of all these sites.

GER 33

An area 35 × 5 m was collected in 5 m square boxes. A total of 374 flaked pieces was recovered. It is likely that this collection represents a series of small short stays by pastoralist groups. Pastoral phase pottery and ostrich eggshell were present, as were many small fragments of grinding stones (Fig. 4.23). Two perforators were recovered



Fig. 4.23. GER 33, photograph of part of the collected assemblage.

that fit with the fragments of ostrich eggshell, suggesting in situ manufacture of eggshell beads. Additionally, there were four microliths (steeply backed blade/bladelets) two segments and a tanged projectile point. This appears to have early Holocene and Early/Middle Pastoralist elements. There is also a truncated flake, a flake knife, and two scrapers. Finally, the collection also includes a Mousterian sidescraper. A total of 14 cores, all for the production of flakes and all made of quartzite was recovered in the gridded and grab samples. There was a mixture of regular single platform and direction cores, opposed platform cores and irregular cores.

GER 34

This site comprises two contiguous areas of scatter on a deflation surface associated with a palaeolake. One area is 25×15 m and the other is 30×15 m (Fig. 4.24). The total counts for each area are 412 for the former and 245 for the latter, excluding the grab samples around each. A significant number of tools was recovered, including a Mousterian sidescraper. The Holocene tool inventory comprises a number of projectile points of 6th millennium date; there are also a number of backed blades and a microlithic point that could all be earlier. The presence of two burin spalls shows that burins were manufactured on site, possibly allowing the inference that bone working also took place. The presence of a flake from a polished stone axe indicates a possible Late Pastoral presence. The lack of any other polished pieces shows that the broken axe was being curated possibly as a core that was removed from the site. The frequency of projectile points suggests an element of retooling taking place, with the removal of old points and their replacement by new ones. Burins often accompany this activity and may be used in the creation of hafts (Barton 1992). A number

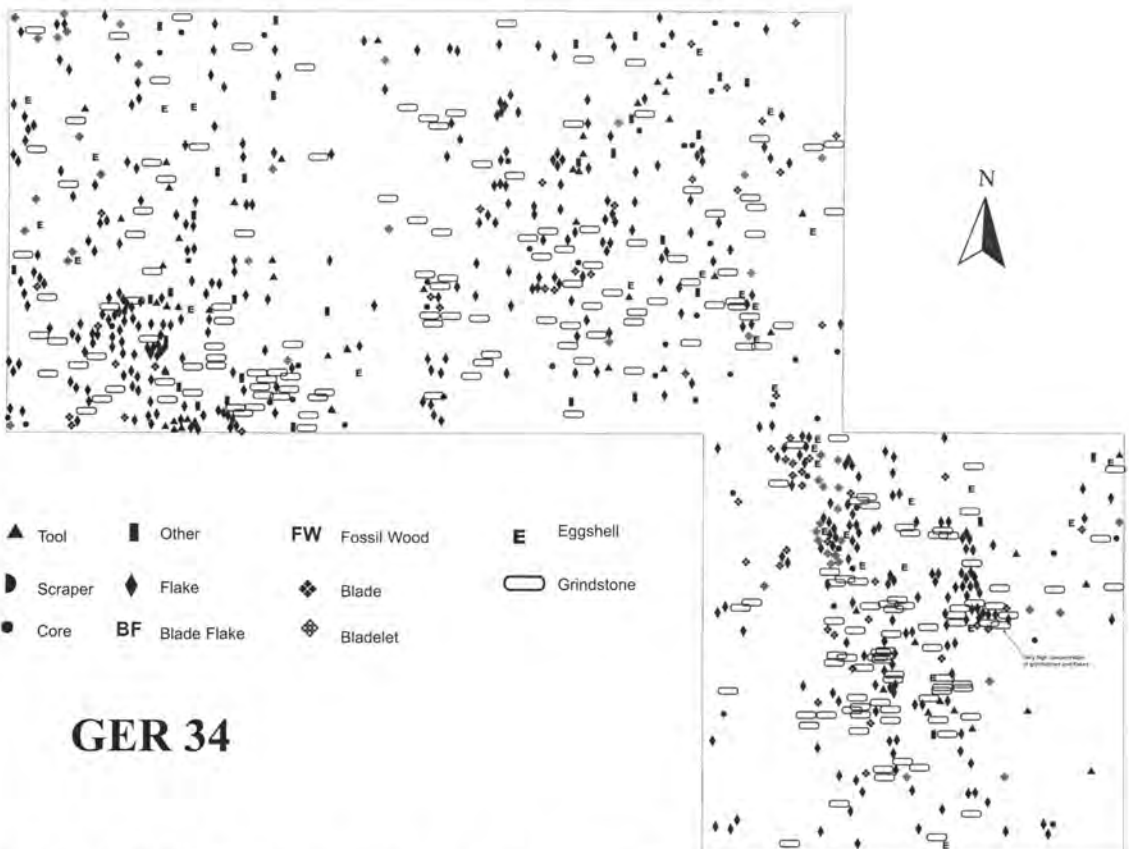


Fig. 4.24. GER 34, plot of lithics and other artefacts collected in 5×5 m grids.

of perforators again suggests the *in situ* manufacture of ostrich eggshell beads. No pottery was recovered but ostrich eggshell and grinding stone fragments were collected. Seventeen cores were recovered, three were of flint, the rest were quartzite. There were three opposed platform cores, two for blades and one for flakes. One of the opposed platform cores was in flint (for flakes) and the rest were in quartzite. There were ten single platform and direction cores, all quartzite and mostly for producing flakes although a few had been used to make blades and bladelets. There was a single disc core, made on quartzite and used to produce flakes. This site is probably a palimpsest of material from at least two and probably several visits by Pastoralists between the 7th and 4th millennia BC.

RESULTS OF LINE-WALKING AND RECONNAISSANCE SURVEY

Line surveys (2000)

The line surveys carried out in 2000 were designed to traverse a representative cross-section of the landscape units in the Wādī, in order to provide complementary data to the targeted grid survey. Following an examination of air-photos, drawn maps and satellite images, seven survey lines were selected that gave a representative topographic coverage of the Jarma region of the Wādī al-Ajāl (Fig. 4.25).

Two lines were walked north-south from the edge of the Dahān Ubārī to the escarpment slope (FP2000-01 and FP2000-02); one line was tracked by vehicle north from the main (Jarma–Ubārī) road and then west-east along the edge of the Dahān Ubārī (FP2000-03); two further lines were walked exclusively west-east along the edge of the Dahān Ubārī (FP2000-04 and FP2000-06); one line was walked north-south from the main (Jarma–Sabhā) asphalted road and then east-west tracing the contours of an escarpment embayment (FP2000-05); and one line was walked through a Wādī beginning in the region of Takarkība tracking a south-eastly arc meeting up with the main (Wādī al-Ajāl–Murzuq) road.

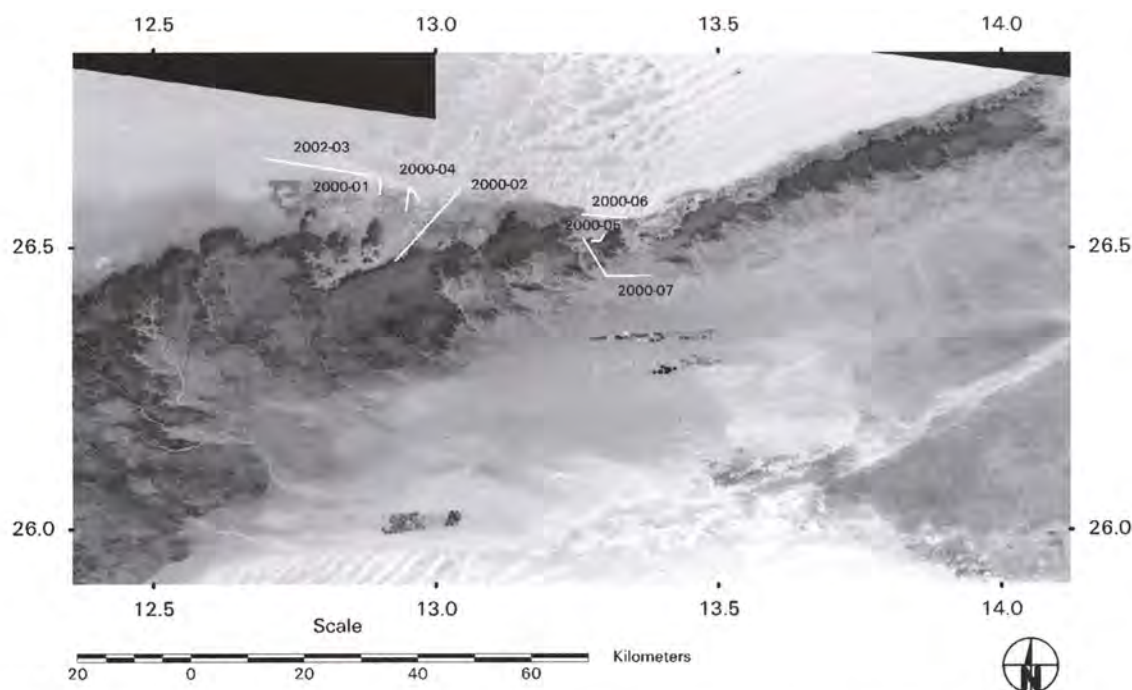


Fig. 4.25. Location of the line-walking transects within the western Wādī al-Ajāl valley.

Line FP2000-01

The line was walked for c.14 km north-south from the edge of the Dahān Ubārī to the steep slopes of the escarpment in the Tāqallit area. Six discrete lithics sites were identified: three close to the edge of the Dahān Ubārī contained Holocene lithic materials in the form of flakes and core fragments (TAG 28-29, 31); three near the escarpment slope (TAG 33, 35, 37).

Line FP2000-02

This north-east-south-west 20 km line, in the al-Ghrayf area, encountered a similar spatial distribution of finds to line FP2000-01 and identified 16 sites (LGR 10-25). On the north side of the valley, the spread of Holocene lithics materials was almost continuous, though rarely discrete, and continued south to the start of vegetation, oasis cultivation and other activities, where it was interrupted (or at any rate not visible). To south of the oasis, a background scatter of Holocene lithics and the occasional potsherds resumed. Towards the escarpment slope, in terrain marked by gullies, the density of Mousterian lithics increased, especially near to quartzite outcrops.

Line FP2000-03

The line was tracked north from Ubari until the edge of the sand sea, then by vehicle for c.12 km following a generally west-east bearing along the sand plinth on the southern edge of the Dahān Ubārī. Six sites were identified (TIN 29 [with more than 30 late Acheulean bifaces in two discrete clusters], TIN 30, EDS 14-16).

Line FP2000-04

This line, in the ad-Dīsa area, was walked south-north from the main (Jarma-Ubārī) asphalted road for c.3 km and then east for a further c.5 km. The context for finds was similar to line FP2000-03, and seven discrete clusters of lithic materials were identified (EDS 17-23).

Line FP2000-05

Initially, the line was walked for c.2 km south from Qaṣr al-Fjayj (FJJ 56) to the escarpment slope, with a total of nine sites recorded (FJJ 30-38). At the escarpment, the line was turned through 90° west for c.3 km across the gravel plain in front of an escarpment embayment. At the far side, the embayment was traced back towards the east. Across the valley floor, few lithics were identified and none constituted a discrete site scatter.

Line FP2000-06

The line was walked for c.7 km east-west along the sand plinth towards Qaṣr Takarkība (TEK 010), with 11 sites being identified (FJJ 39-48, 55). The results reinforce the suspected spatial distribution of middle Holocene lithics, ostrich egg-shell fragments and beads as well as prehistoric pottery in association with palaeolake sediments along the sand plinth on the north side of the Wādī.

Line FP2000-07

The final line walked during the 2000 season passed through a wādī corridor in the ḥamāda south-south-west of Takarkība and on to the main Wādī al-Ajāl to Murzuq asphalt road. The line was walked for c.17 km and six sites were identified (FJJ 49-54).

Other Reconnaissance survey

The line walking was complemented by similar fieldwork conducted by members of the team on behalf of two oil companies working in the area to the west and

south-west of Ubārī. This revealed a similar pattern to the landscape placement of lithic scatters of different phases. In all phases the ḥamāda plateau of the Massāk Ṣaṭṭafat was the main procurement zone for the raw materials (quartzites, silicified sandstones and mudstones, other fine-grained stone, even petrified wood). The upper surface of the plateau (and especially where fine-textured rock outcrops) is coated with abundant débitage, flakes, blades and tools, mainly of Pleistocene age. The slopes of the escarpment and the pediment slopes at its foot are also preferential locations for finding primary lithic reduction waste. Holocene material is present near the escarpment, though generally in smaller amounts and thus somewhat masked by the Pleistocene lithics.

Line-walking has proved rather inefficient at locating Holocene lithics within the oasis, where it is heavily disturbed by later cultural and agricultural activities. As we have shown from intensive grid survey in this area, there are some larger concentrations of material in this zone that hint at more intense activity or even settlement sites, perhaps adjacent to ancient pools or springs in the lower part of the valley floor. But this material is heavily masked and disturbed by subsequent settlements and intensive agriculture in the valley centre. The most abundant and impressive Holocene assemblages discovered to date are located along the fringes of and just within the Ubārī sand sea, where they can be related to the existence of numerous small, shallow lakes or marshy pools in the mid-Holocene period. The occurrence of numerous tools, evidence of bead making and abundant grindstone fragments at these sites suggest that they represent at least seasonal encampments. There are also some important palaeolithic assemblages from the same area, including a small amount of Aterian material.

Reconnaissance survey located additional lithics sites in various parts of the study area and these broadly fitted into the topographic pattern outlined above. Of particular note are a number of sites from palaeolakes further into the Dahān Ubārī, of both Holocene and Pleistocene date (see above, Chapter 2).

CONCLUSIONS

The surface collection of artefacts has complemented the emerging delineation of sites in the Wādī al-Ajāl, especially so in relation to the identification of settlement sites close to the well-known cemeteries of al-Ḥaṭīya (ELH 1-2), Sāniat bin Huwaydī (GER 11), Tuwash (TWE 1) and al-Kharāʿiq (CHA 1). As a result of the fieldwalking we can now confirm that there were substantial nucleated settlements (villages) in the immediate environs of these sites (ELH 3, 5/6, 8, GER 27, TWE 26/27, TWE 28 and CHA 26/27, 30). This represents a major breakthrough in the study of Garamantian period archaeology. Gridded survey at GER 15, 16, and 26 has identified what appear to be further settlements, whilst reconnaissance survey within the oasis areas has added a significant number of other certain or probable sites (for example, TAG 11, 20, GER 4, 5, 6, 7, 9, 10/28, 17, 21, TWE 29, CHA 30 – see Fig. 4.3 for some of these). The sites are generally quite large, many in excess of 1 ha, and were evidently nucleated centres. All these sites have been located within the oasis band of a relatively restricted area of the Wādī, and large sectors remain unsearched. Wider reconnaissance work suggests that a similar pattern of nucleated centres, some of urban scale, existed in other parts of the Garamantian heartlands (GBD 1, SCH 20). Moreover, it is clear from the survey data that these were not simply agricultural villages, though that was undoubtedly an important function of most settlements, but were also centres of manufacturing or craft activity, and of consumption of traded and manufactured goods. The consequences of these results for our understanding of Garamantian and post-Garamantian settlement history will be discussed in the next chapter.

In relation to the scarcity of finds collected on the northern and western sides of Old Jarma and the distribution of artefacts in the Wādī in general, the important thing to note is that it shows that background artefact densities in the oasis are not high and that where higher concentrations are encountered they are likely to have cultural significance.

These remarks have been broadly borne out by detailed analysis of the grid-walking results and by the line-walking carried out in 2000. Where a sufficiently large envelope has been walked around the edge of a 'site', as at GER 2, it is clear that artefact density decreases fairly rapidly as one moves away from the core of the site. Beyond a 'halo' of sherds within a 100 m or so, the density often falls to negligible levels. However, it is clear, in the context of the Wādī al-Ajāl, that variance in artefact distribution and densities is also likely to be dependent on specific natural landscape processes. For instance, the differential rates of sand deposition and erosion, the formation of rills and gullies, and the accretion of 'spring mounds' all have their effects on artefact visibility. Land-use practices and vegetation will also play their part. There is no doubt that artefact scatters are much harder to spot, define and characterise in the most intensively cultivated parts of the oasis.

The huge numbers of small finds collected from GER 2 in 25 × 25 m grid collections demonstrates the potential value of more intensive survey. The technique could undoubtedly be used to good effect at other sites identified by initial fieldwalking as likely settlements. Future work should also involve detailed topographic planning at a larger number of these sites, to enable surface scatters to be related more closely to traces of buildings and roadways. There is also a need for limited sub-surface examinations of the sites and landscape features to supplement and inform our interpretation of surface characteristics (that is, the artefact densities, building structures and topographic features). However, future investigations should not be carried out entirely at Garamantian settlements such as GER 16 – an obvious candidate with its visible archaeology. Investigations should also encompass the taphonomy of lithic scatters and should examine seemingly 'undisturbed' sediments at the foot of the escarpment of the ḥamāda and in the wide 'gullies' that fan out from it (such as to the rear, i.e. south, of Zinkekrā). Accordingly, natural processes may be better understood, specific depositional and erosion assumptions may be challenged or upheld, and an area of activity showing 'tangible' archaeological events may be brought to light. There is a high correlation of potsherd density and grid squares containing suspected structural features at a number of the sites examined. This is true to the extent that in many instances, traces of mudbrick structures have been noted in the areas where larger concentrations of sherds were recognised. It is a strong argument in favour of interpreting our sherd scatters as sites of settlements and cemeteries, rather than as evidence of rubbish dumping or manuring. However, in areas where wind-deposited sand overlies residual structures and artefacts, as in parts of the al-Ḥatīya area, the association is harder to demonstrate conclusively because it is only in grids where sand cover is less dense that either artefacts or structures tend to be visible. On the other hand, the line-walking transects across the valley have indicated quite clearly that the overall distribution (the 'background noise') of potsherds in the landscape is low. Where greater numbers are encountered, careful searching has in most cases revealed evidence of structural features.

The distribution of lithic materials primarily reflects aspects of exposure. Small scatters are to be found along the eroding edges of palaeolakes, on exposed platforms and ridges along the ḥamāda edge and where the main valley floor has been disturbed (for example, at cemetery and foggara sites and by the Sāniat Jibrīl excavations). The surface of the ḥamāda is littered with material, some of which is clearly associated with the reduction of outcropping quartzite, whilst there is a background of material

of various ages with no clear context. Although little evidence was recovered in the FP fieldwork for systematic use of the ḥamāda during the Holocene, more detailed work within the Massāk in connection with oil exploration has revealed significant traces of Holocene lithics and structures, to complement the long-known abundant rock-art of that area (on the rock art, see further, Chapter 8 below).

It remains clear that the range of materials and their distribution is a reasonable representation of the pre-Garamantian exploitation of the Wādī. This comprises the campsites of mobile hunters and gatherers during the Pleistocene who used the area not just for the game and plant resources available at palaeolakes, but also for systematic exploitation of the available lithic raw materials. It also shows use of the Wādī by mid-Holocene pastoralists, camping by the lake shores and also at probable small stands of exploitable vegetation within the centre of the depression (as at GER 16). The ḥamāda will have been another significant focus for these pastoral groups. It is likely that the observed pattern is an extension of that documented in the Tadrart Akākūs, with groups based in the initially more favorable highlands, then exploiting the lakes and Wādī floor during or after seasonal rains.

The crucial importance of this Chapter has been to demonstrate the potential of intensive and systematic methods of field survey to produce significant data on Pastoral and Garamantian settlement in the study area. The results have transformed our understanding of mid-late Pastoral activity of the Wādī al-Ajāl and of the density, nature and pattern of Garamantian settlement. The approach could usefully be replicated in other parts of Fazzān.

CHAPTER 5 FORTIFICATIONS, SETTLEMENT AND DOMESTIC ARCHITECTURE

By David Mattingly

INTRODUCTION

The combined survey results of the CMD and FP work provide an impressive dossier on the settlements of Fazzān. Several key themes can be identified in these data. First, there is a clear contrast between pastoral habitation sites – often transient and ephemeral campsites – and the settlements of the sedentary farmers. A second aspect concerns the extent to which the layout of sites has been affected by concerns about security. As we have noted already (Chapter 3, above), Fazzān has at times had a turbulent history and this is fully reflected in its settlement morphology. In particular, the region is noted for its *qsur* (literally ‘castles’), though the term conflates a multiplicity of types of structures of vastly differing morphology and date. The third, and possibly most significant theme, is the early date for the adoption of urban settlements here. Fazzān provides some of the earliest evidence in Libya for towns and, unlike the Mediterranean littoral where urbanisation was linked to Phoenician, Greek and Roman activity, this was an independent evolution of early Libyan society. Linked as it is to the rise of the Garamantian state, which may have exerted an important influence on other parts of the central Sahara and sub-Saharan Africa, the significance of this development cannot be over-emphasised.

Few detailed studies exist of Islamic domestic architecture in the Sahara/sub-Saharan zones (Denyer 1978; el-Mahmudi 1997; Gaudio 1993; Insoll 1996a; Micara 2000). The accurate dating of mudbrick structures and settlements is frequently problematic, given the state of artefact studies for the post-Classical period. The use of radiocarbon dating is not without limitations, caused by the longevity and residuality of material used in buildings and as fossil fuel (Schild *et al.* 1996). Despite this, AMS dates offer a best way forward from the current situation of undated buildings and a first suite of dates from Fazzān has been obtained as part of the FP (see Mattingly *et al.* 2002; *Archaeology of Fazzān* 2, Appendix 1).

FORTIFIED SITES

Defences of hillforts and escarpment sites

The earliest dated sites associated with the Garamantes are located on the escarpment along the southern side of the al-Ajāl valley (Fig. 5.1). The type site is provided by CMD’s work at Zinkekrā (ZIN 1-3) (Fig. 5.2; cf. Fig. 1.15). This comprises a classic hillfort site, constructed on a narrow peninsula and accessible up a steep zig-zag path (Daniels 1968; 1970b). The site was located on the northern edge of a semi-detached outlier of the ḥamāda escarpment proper, so could not be approached easily from the south. The earliest structures on the top of the hill appear to have been late Pastoral in date (early 1st millennium BC), but the space available was very limited. Subsequently, as the size of the population expanded, occupation spread down the steep escarpments also, utilising every potential terrace site. The site had strong natural defences but these were augmented by the addition of a number of fortifications. A series of embankments were eventually constructed around the base of the hill, enclosing an area of c.35 ha. A sequence of fortifications was constructed on the top of the hillfort also (ZIN 900), both cutting across the neck of the peninsula (making the site a classic *éperon barré*) and on the higher plateau that lay south of the main site (Figs 5.2-5.4). Several of the walls on the plateau are well preserved and reveal a number of

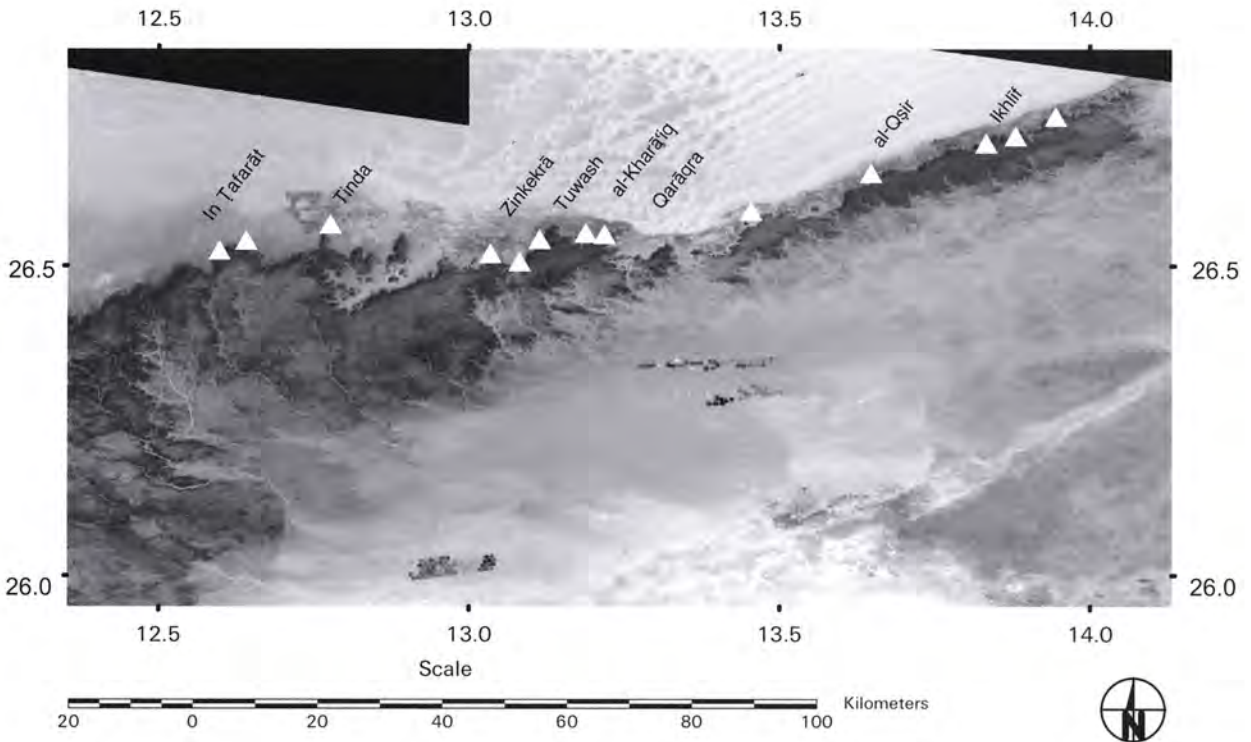


Fig. 5.1. The distribution of escarpment sites in the Wādī al-Ajāl.

distinctive features, such as the presence of inturned buttresses at their outer limits (Walls 900.1 and 900.4) or of rampart walkways (Walls 900.1, 900.3, 900.4). They were massive constructions (up to 4 m wide and preserved to over 3 m in height), of two-faced, carefully-coursed build (Fig. 5.3). Wall 900.3 is over 400 m long, dividing off a substantial part of the upper plateau. Gates are generally poorly preserved, but appear to have been either narrow gaps (900.3), or tight corridors around the end of the wall on the edge of the precipice (900.4, and perhaps 900.1). The date of these walls is far from certain, and to some extent they must represent an evolution over a period of time. For instance, it is thought that the high wall blocking the peninsula (900.1) replaced an earlier wall and rock-cut ditch (900.0), and that 900.4 replaced 900.5, which lay only a short distance to the east and appears to have been quarried for materials when the former was built. The quality of construction of some of the stone walls on the plateau suggests that these features represent a relatively late phase in the main occupation of the site. The phasing of the excavated buildings and of deposits behind and below one of the lower embankment walls (site ZIN 2.13) suggests that the latest phase of intensive occupation dated to the latter centuries BC.

The function of the various Zinkekrā ‘defences’ is not clearcut. The lower embankments (900.6-10) would have impeded, rather than held back, determined assailants, and may have functioned as much for low-level security and for containing stock brought within the site at night. The natural defences of the occupied peninsula site were strong apart from the direction of the larger plateau to the west and south. The walls on the upper plateau (900.3-5) and in the gully leading up to it (900.2) would have served to increase the available area of the upper site for use as a refuge for animals or people, and also to provide a more rational basis for defence against an attacking force ascending the Zinkekrā massif from the south. The labour involved in constructing these walls was substantial.

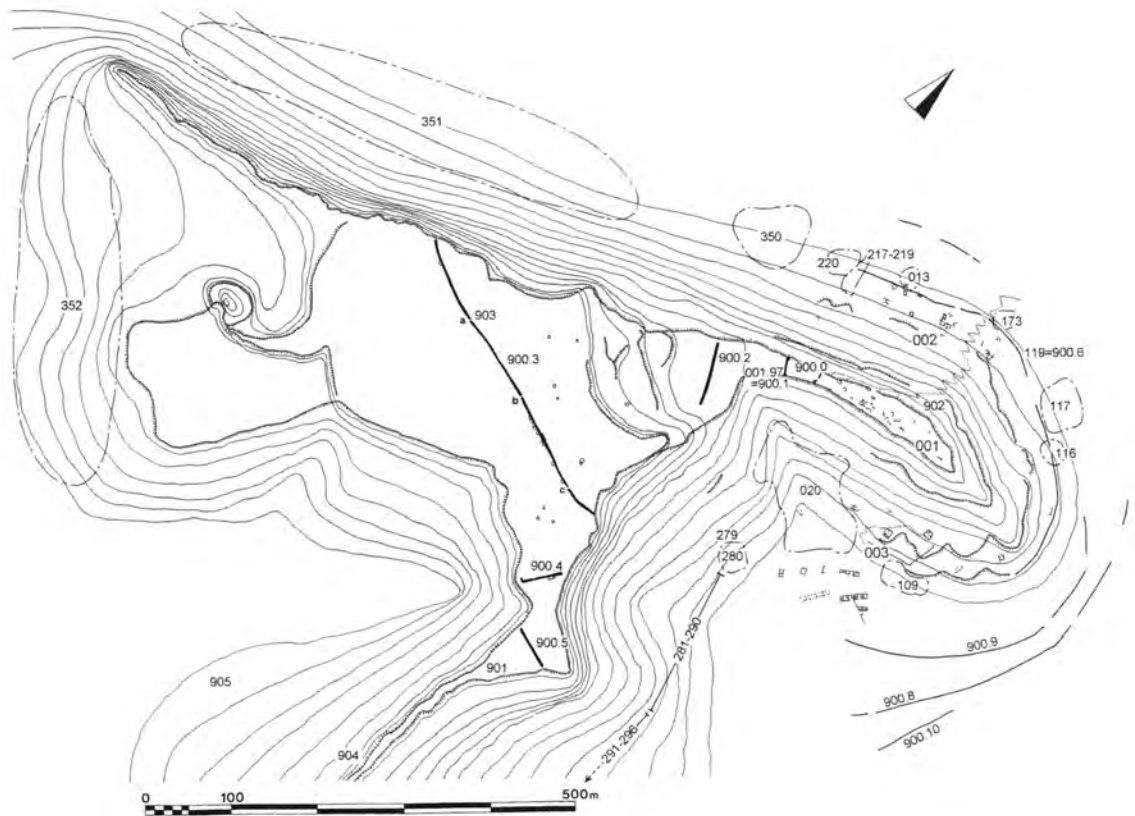


Fig. 5.2. Zinkekrā, overall plan, showing relationship between main settlement areas ZIN 1-3, with upper plateau and its defensive walls (ZIN 900.2-5). The perimeters of various cemeteries are also marked around the foot of the hill.

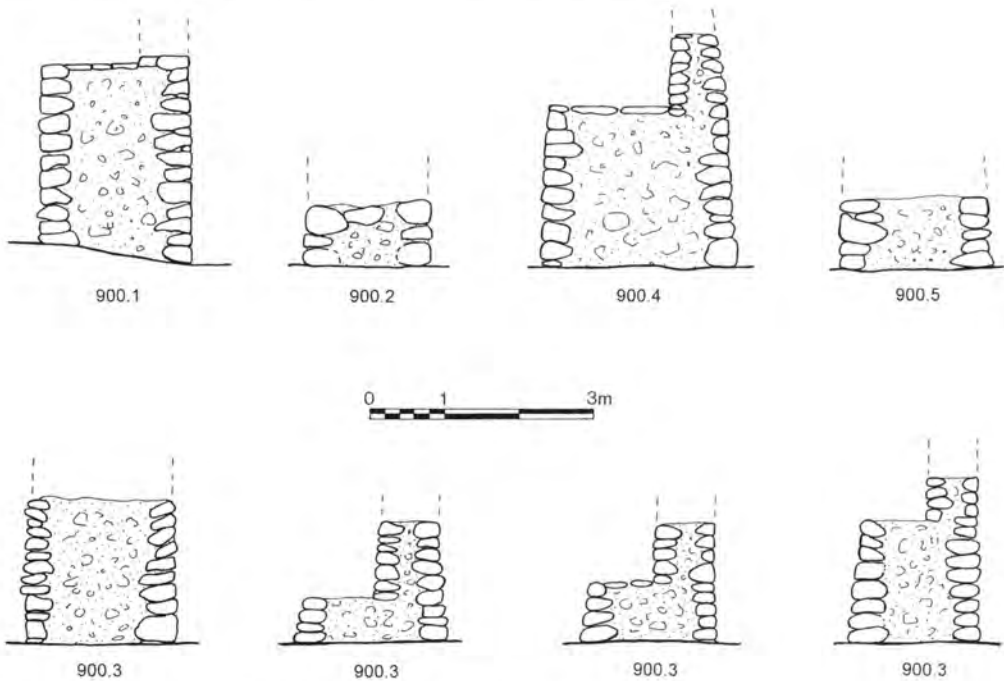


Fig. 5.3. Sections across Zinkekrā walls (ZIN 900).

A number of other hillforts identified in the Wādī al-Ajāl corresponds to elements of the Zinkekrā model (Figs 5.1, 5.5). Tuwash (TWE 21) is intervisible with Zinkekrā across the Jarma embayment and comprises a high promontory connected to the main ḥamāda plateau by a narrow peninsula, which was defended by the construction of two walls across it. The interior of the site contains traces of over fifty buildings, though there is no evidence in this case for occupation around the foot of the slopes below. Al-Kharāʿiq (CHA 3-7) is an isolated hill, with evidence of occupation on the summit and also a lower enclosure wall. It faces another similar site a few km to the east by Qrāqra (GRA 2). Al-Qṣīr (LEK 1) is a prominent steep-sided headland, with occupation on the top and around the lower slopes, though no traces have been noted of built defences there. In the Ikhliḥ area there are two defended hilltop sites, with traces of occupation on the top and at the base of the slopes. One of these (CLF 1-2) was thought by CMD to be of relatively recent date, but the other is certainly of great antiquity (CLF 8-9). The base of the hill was enclosed by stone banks very similar to the lower embankments at Zinkekrā, delimiting an area of intensive occupation (Fig. 1.16). The flat top of the almost detached outlier from the ḥamāda was also covered in buildings. Its natural defences seem to have obviated the need for additional defensive works in this case.

A different type of escarpment site is represented by Tinda (TIN 1), located just to the south of Ubārī. This occupies a relict hillslope in front of the main escarpment (a classic ‘flatiron’), with steep slopes into deep gullies to either side. The Garamantian settlement is terraced down the sloping area from south to north. Stone walls were constructed around the east, west and north sides of the site (with a major east-west terrace within the site dividing the interior into upper and lower enclosures). At the rear (south) of the site, a narrow land bridge connects the flatiron to the present escarpment slope. An additional wall was built across this isthmus, with a controlled gate and a large tower-like platform. Once again, particular care appears to have been taken to counter the possibility of attack from this direction. A very similar site, though somewhat simpler in detail, has been noted at In Ṭafarāt (ITF 1), where another flatiron formation has been occupied, though in this case only the northern side of the site, facing the wādī, was provided with a wall across its width.

All the escarpment sites that have been dated show occupation in the first millennium BC, but only limited and possibly changing use thereafter (such as for funerary areas). A principal weakness of all these escarpment sites concerns water sources – there was certainly none on the plateau tops, though it is possible that some springs still functioned at the start of the first millennium BC along the escarpment, and wells could have been sunk at its base. If besieged, water would quickly have become a problem, but the expectation may well have been that potential enemies would be deterred by defences from attempting an outright assault and would not have the resources or forces to mount a full-scale siege. A second problem is that for agricultural communities, as these clearly were to judge from botanical remains at Zinkekrā, Tinda and Ikhliḥ, the location of the settlements along the escarpment was potentially some distance away from the prime zone of cultivation. In the longer term, the evolution of oasis-centre sites is no surprise.

The hillforts clearly could have served as excellent refuges against the threat of small mobile bands of attackers (and may well have continued to serve this function in more recent times). They could also have served in the period of evolving Garamantian society as power bases for competing or rival sub-fractions. The emergence of Jarma as the Garamantian capital may not have been foreshadowed by the earliest phases of activity at Zinkekrā, Tinda, Ikhliḥ, etc., but the scale and nature of the upper defensive walls at Zinkekrā do seem to indicate a degree of difference opening up before the final supplanting of the escarpment settlements.



a)



c)



d)



b)



e)

Fig. 5.4. Details of Zinkekrā walls: a) Collapsed wall ZIN 900.2; b) wall ZIN 900.3; c) wall ZIN 900.4, showing internal buttress and parapet walkway; d) detail of coursing of ZIN 900.4; e) detail of coursing of ZIN 900.1.

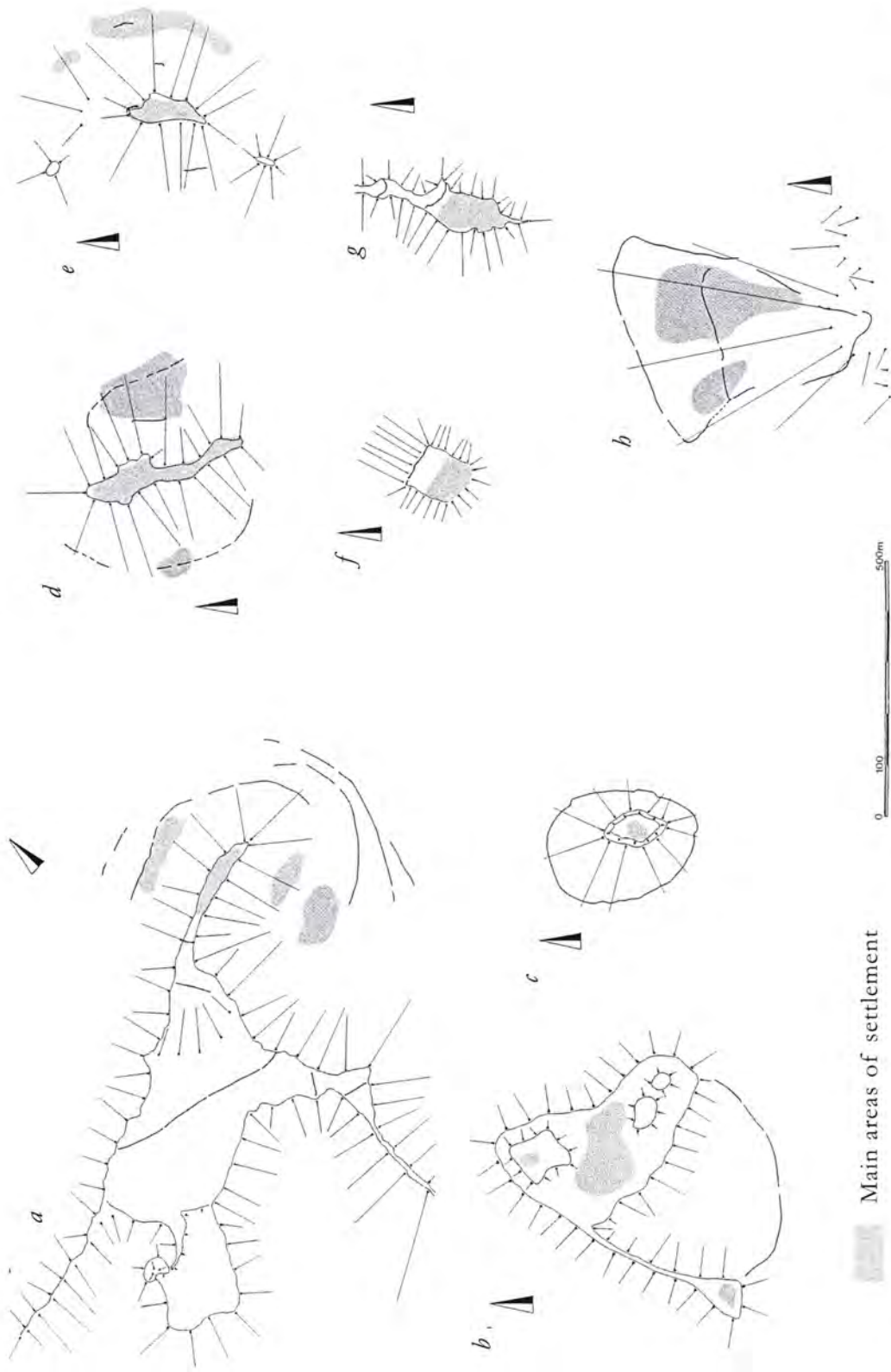


Fig. 5.5. Comparative plans of Garamantian hillforts/escarpment sites (stippling indicates the major habitation areas at each site): a) Zinkekrā (ZIN 1); b) Al-Kharā'iq (CHA 3-7); c) Ikkhīf 1 (CLF 1-2); d) Ikkhīf 2 (CLF 8-9); e) al-Qšīr (LEK 1); f) In Taḡarāt (ITF 1); g) Tumasb (TWE 21); h) Tinda (TIN 1).

At present, we lack parallels for the Garamantian escarpment sites for other regions of Fazzān, though at least two important sites in the Wādī ash-Shāṭī were built in ‘perched’ positions on isolated hills (Idrī and Tmissān). These sites may have originated as early Garamantian hillforts. Similar sorts of sites are also known in other parts of the Libyan desert (Barker *et al.* 1996a, 116-18; Mattingly 1995, 41-49).

Walls in defiles

The 2nd-century AD geographer Ptolemy talked of the Garamantian defile (*fauces*) and this has plausibly been identified with the Wādī al-Ajāl (Daniels 1970a, 27-35). However, an examination of the satellite imagery shows that by no means all of the depression matches this characterisation. The separation between sand sea and escarpment across the Jarma embayment is very broad (more than 15 km), while the sector west of Jarma becomes an increasingly wide plain (even more notably so beyond Ubārī). Although the Wādī ash-Sharqī is generally quite narrow (less than 5 km), neither the dunes nor the escarpment are as high here as in the Wādī al-Gharbī. The sector that comes closest to matching Ptolemy’s description is that between the al-Fūgār promontory, that marks the eastern edge of the Jarma embayment, and the village of Takarkiba, where the escarpment and sand sea converge and meet. Takarkiba is the classic control point of people moving along the valley and in the 19th century was one of the most frequently cited points of division between the east and west sectors of the Wādī. Where the modern road crosses through the lowest point in the escarpment as it curves north to meet the sand, CMD recorded evidence of a wall (TEK 8) having been built at some date. This was a substantial barrier (5 m wide, surviving 2 m high, built in mudbrick on a stone foundation and with traces of a stone face on the (outer) eastern side). It is plausible to suggest that at some date this served as a control or defensive wall against people entering the Wādī al-Gharbī from the east or south-east. A possibly similar wall has been recorded at the al-Fūgār promontory (FUG 16), cutting north from the base of the escarpment towards the sand. This is certainly an equivalent position where control of movement along the al-Ajāl could be attempted. Neither wall can be dated and both have now been destroyed.

Urban defences (Jarma, Murzuq, Zuwīla, Qaşr bin Dughba)

Defence appears to have been an important element of settlement morphology in both Garamantian and later times. This was sometimes manifested by the construction of defensive buildings or enclosures at the heart of settlements (see below, *qaşr*). But a number of sites show evidence of being enclosed by walls, some of a considerable scale and sometimes with bastion towers attached. In the early modern period, town walls have been restricted to a small number of sites (Murzuq, Zuwīla, Jarma, Trāghan, Sabhā, the oases of the al-Jufra – Waddān, Hūn and Sūkna).

It is not clear whether the main urban centres of the Garamantes, Jarma and Qaşr ash-Sharrāba, were provided with town walls. Certainly the visible remains at the latter site contain no hint of a perimeter enceinte, though a number of fortified structures lay at the heart of the site (see below). It is possible that Jarma did have a walled circuit, now buried beneath the later defences and buildings of the medieval town (Fig. 5.6). For instance, along the southern rampart, there is a hint of a wall founded on a stone footing in front of and below the medieval walls and this could represent a Garamantian enceinte. A large (2 m wide) wall, cutting north-south across the excavated area in the centre of the site (GER 1.5) has in the past been proposed as an urban defence of late antique date, though the original extent of the work is hard to reconstruct from the surviving remains (Fig. 5.19). It seems more likely that this was the wall of a fort-like *qaşr* built near the centre of the city, rather than a wall that surrounded a large part of the urban core. For one thing, the interior of the wall lay

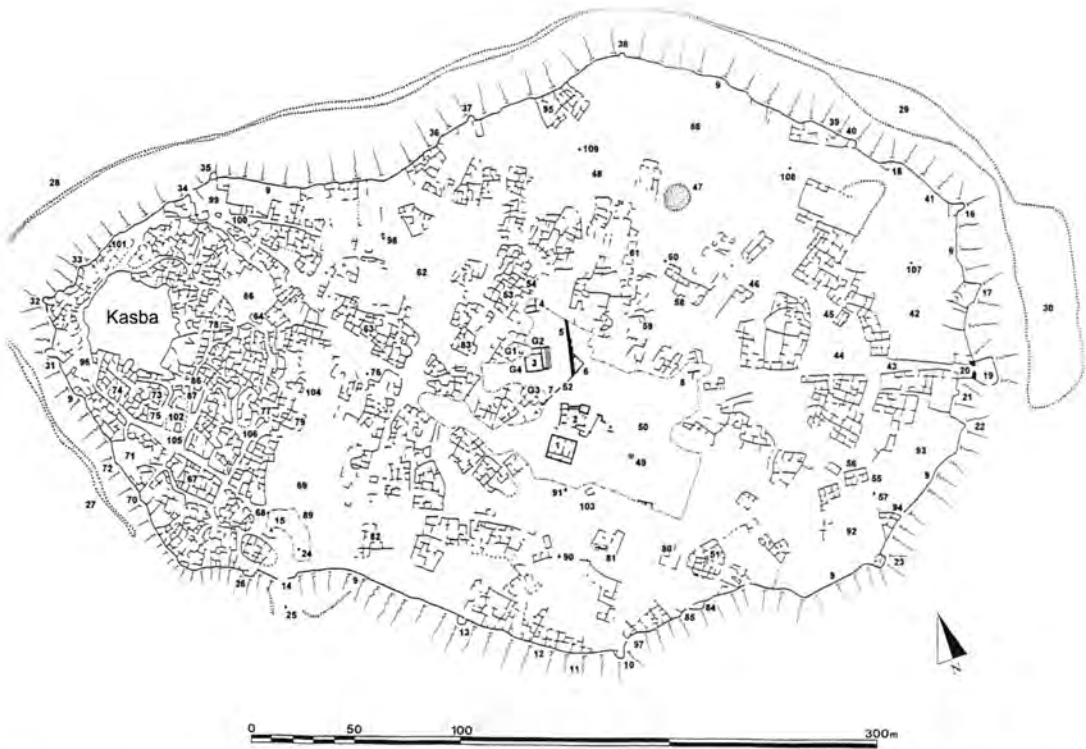


Fig. 5.6. Overall plan of Jarma (GER 1), the late medieval/early modern town, showing assigned structure numbers.

to the east (as indicated by the trace of a tower and a stair on that side), and it thus excluded the temple and probably other stone footed buildings in the central area. The date of this wall appears to be mid/late Garamantian (probably post-2nd century AD) on the basis of AMS dates taken from underlying strata.

A Garamantian date for urban defences can be demonstrated for the large (c.4 ha) Garamantian settlement at Qaṣr bin Dughba (GBD 1) (Fig. 5.7). This site was surrounded by a substantial oval mudbrick wall and at least 19 flanking towers (the circumference is c.700 m long). An AMS date of 1614 ± 35 BP has been obtained from the mudbrick outer wall, indicating a date range between the late 4th-6th centuries AD. There was also a prominent *qaṣr* in the southern part of the site with its own quadrangular towers, again dated to the late Garamantian period by an AMS date (1560 ± 45 BP).

In the medieval period, the main urban centres were commonly walled, though one of the earliest Arab accounts of Zuwila, states that it was unwalled in the 11th century (al-Bakrī). At a later (unknown) date, Zuwila obtained substantial walls of pisé (formed of sections of rammed mud and gravel), enclosing an area c.250 × 180 m, or 4.5 ha (Fig. 5.8; cf. Fig. 3.11*b*). These walls differ markedly from other examples of medieval fortifications and it is highly desirable to try and ascertain a date for them. The medieval walls of Trāghan were also apparently unusual, comprising a circular enceinte (120 m diam., 1.13 ha) and possibly dating to the period of Kānimī rule in the 12th-13th centuries (Despois 1946, 58-59). Modern development has obliterated much of the evidence of old Trāghan. The two best preserved medieval town enceintes are at Murzuq and Jarma. Historical records for Murzuq at least give some clues as to phases of building and rebuilding (for example, the recommissioning of the walls in the mid 18th century after the slighting of the defences by Muḥammad Bek in 1732-33). An interesting aspect of the walls at both Jarma and Murzuq is that they appear

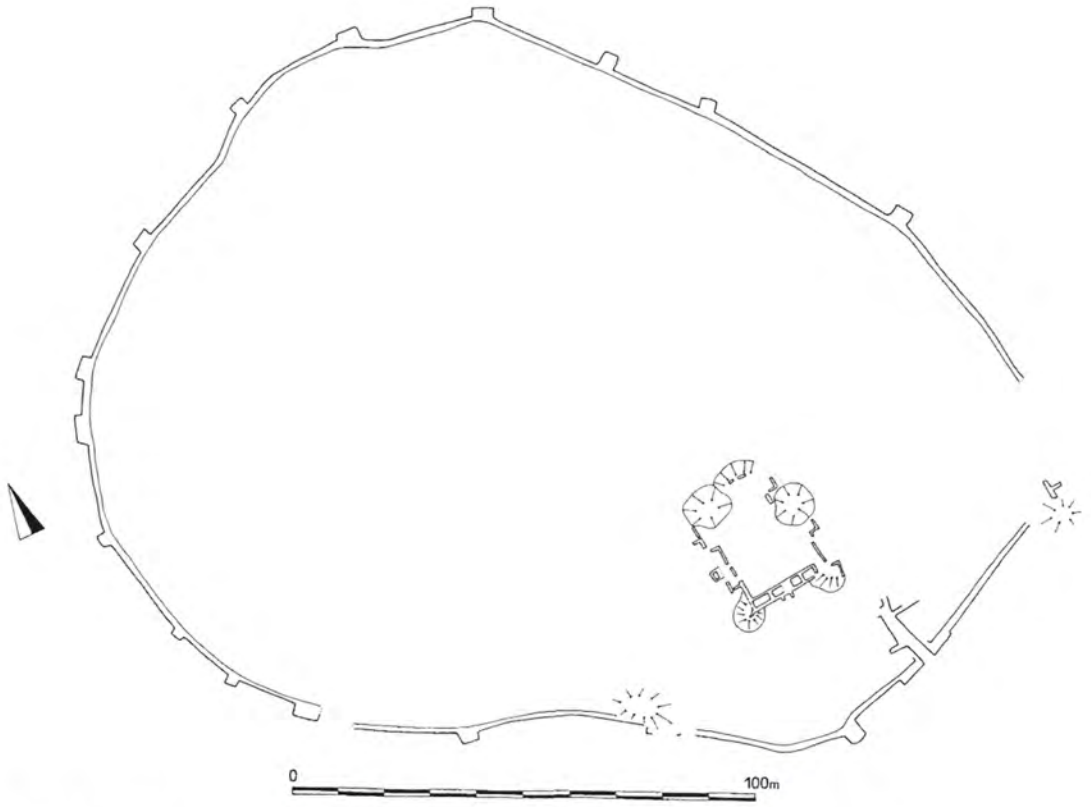


Fig. 5.7. Plan of the Garamantian town at Qaşr bin Dughba (GBD 1).

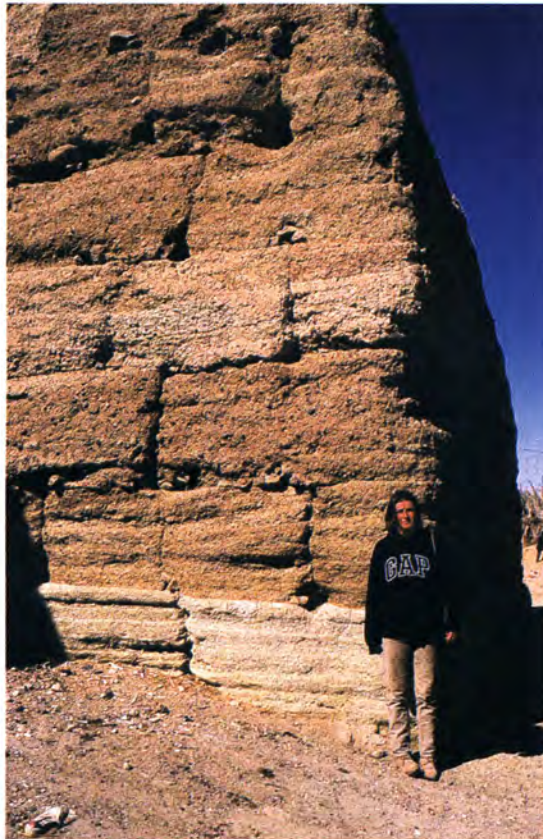


Fig. 5.8. Detail of the pisé walls of Zuwila (ZUL 1).

to show two phases of development in their towers, from simple square (and at Jarma also triangular) projections, created by minor adjustments in the alignment of the wall, to large projecting D-shaped towers.

The dating of the Jarma defences is now in part feasible as a result of a series of AMS dates. Two dates relate to the medieval walled circuit. The first, from an organic inclusion in a mudbrick, suggests a date before AD 1000, which, whilst not beyond the bounds of possibility, seems rather early. It may be the result of the incorporation of earlier material in the brick. At any rate it confirms continuing occupation/activity at Jarma in the post-Garamantian period before AD 1000. The second sample relates to a D-shaped tower added at a secondary stage to the wall circuit and suggests a date between the late 15th and late 17th centuries. Material from the kasba gives a consistent date centred on the 14th-early 15th centuries. Given the close structural similarity between the kasba and the town wall and the spatial relationship between the two, it is probable that the visible town wall, using the hard salt-rich mudbrick, should be dated to the 14th-15th centuries, with later modifications to its towers in the late 15th-17th centuries. The urban defences at Murzuq share many characteristics with those at Jarma and may well have a similar date, though as Murzuq was the capital of Fazzān from the 16th century onwards, it is likely that they underwent numerous modifications and renovations. In the early 18th century Murzuq withstood a series of sieges by Qaramānli forces before being taken in 1733. Murzuq, Trāghan, Zuwīla and Jarma all contained forts (kasbas) within their walled area, reflecting the importance of these sites as major garrison points of the rulers of Fazzān.

The provision of full-scale urban defences at a select number of sites in Fazzān is a sign of the regional importance of these centres. Although Jarma may not feature much in the historical sources for the late medieval/early modern period, it was evidently still a regional centre of considerable importance. Yet by the early 19th century when the first European travellers visited, it was a decrepit town, with many abandoned houses and the kasba used simply as a store for the Sultan of Murzuq's dates (Bruce-Lockhart and Wright 2000, 89).

Defended Villages

In early modern times, many villages used the external walls of the outermost buildings to form a perimeter, with limited points of access into the heart of the settlement (a classic example is Tuwash) (Fig. 5.9). The feature is characteristic of many villages in the Wādī ash-Shāṭī (Ward 1968,



Fig. 5.9. Tuwash – an example of an early modern fortified village.

60-61), the Wādī al-Ajāl and in the oases of the Wādī Ḥikma (al-Qaṭrūn, Tajirhī, etc.). In the ash-Shāṭi, the most common form of fortified villages is circular, whilst in the al-Ajāl and the southern oases a rectangular plan is more common, though by no means universal (Despois 1946, 99-105; Scarin 1934, 192-93).

This may well be an ancient characteristic also, as the presence of perimeter enclosures at Garamantian villages such as ELH 3, TAG 12 suggests (cf. Fig. 5.21). In both these cases, the settlement is divided into a series of enclosures, each with a solid, though not massive, perimeter. Such walls will have provided low-level security to a greater degree than defence.

Some medieval/early modern villages had a better constructed enceinte, as is the case with an important series of stone-built sites in the eastern Wādī al-Ajāl (GEL 2, GEL 4, GEL 5; ZOU 15) (Fig. 5.10). One example (ZOU 15) has yielded an AMS date of 279 ± 32 BP, indicating construction probably in the 16th-17th centuries.

Many villages and hamlets lacked perimeter defences of any kind and relied for security instead on fortified buildings at their centre or on their fringes.

The qṣur – dating and interpretational problems

The Fazzān in general, and Wādī al-Ajāl in particular, is reknowned for the number of fortified buildings (generally referred to as *qṣur*, singular *qṣar*). Lethielleux (1948, 13, n. 28) refers to 50 *qṣur* in the Wādī al-Ajāl alone. The *qṣur* occur in a number of distinctive contexts (Figs 5.11-12). Some of the larger structures are veritable forts and were constructed along main routes, notably along the Wādī al-Ajāl. Others are more

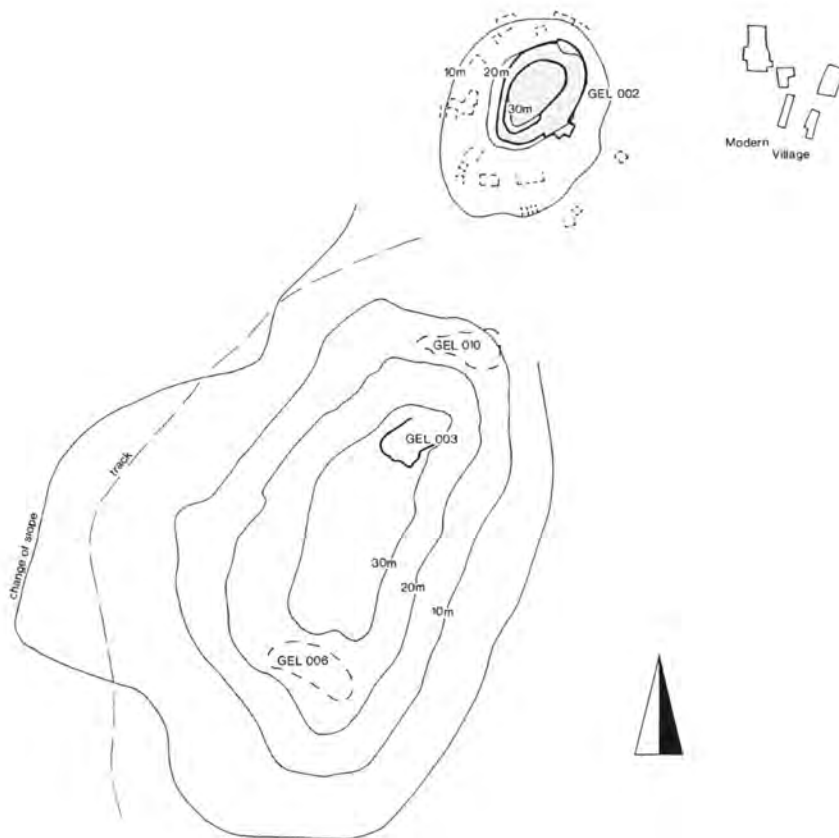


Fig. 5.10. Plan of late medieval/early modern stone village GEL 2 in the eastern Wādī al-Ajāl.

akin to small castles and sit on the edge or at the centre of village type settlements. A third group comprises isolated rural *qsur* of small size, perhaps serving as blockhouses and watchtowers, or as refuges in isolated areas, remote from the nearest towns. The main problems concerning these structures are that hitherto few have been recorded in any detail and it has been impossible to date them at all accurately.

An interesting aspect of the *qsur* is that by the 19th century few of them were either in use or had a detailed history attached to them. One local tradition ascribed them to the Khurmān and their abandonment to the imposition of Awlād Muḥammad power in the Wādī al-Ajāl (el-Hesnawī 1990, 50-52, citing Duveyrier). Despois (1946, 59-60) also recorded the local Fazzānī tradition that the *qsur* and foggaras were the work of the 'Rūm' and concluded that they were constructed from late antiquity into early Islamic times, with their ruin and abandonment being the result of invasions and subjection of the region by either the Arab tribes, the kingdom of Kānimī or the Awlād Muḥammad between the 11th and 16th centuries. Lethielleux (1948, 48-50) believed that some at least of the *qsur* were of much more recent date, even suggesting that one of the largest, Sīdī Dāwud (LEK 17), was 19th century. Some *qsur*, with angle towers, appear to be depicted in the latest phase (Cameline) rock-art in the Tāssilī (Orloff 1993, 402).

The plans of some of the *qsur* can be divided into groups of shared characteristics, though it is apparent that certain constructional features span a considerable time period. A good example of this concerns the large rectangular forts and small rectangular *qsur* with external square angle towers at the corners and sometimes in the centres of each side. The form is reminiscent of the late Roman military *quadriburgus* (though the form is also found in late antique civilian contexts in Tripolitania: Barker *et al.* 1996a, 116; Mattingly 1995, 192-94). The earliest occurrence of the form in Fazzān is likely to be the 3rd century AD or later, though the type may well run through

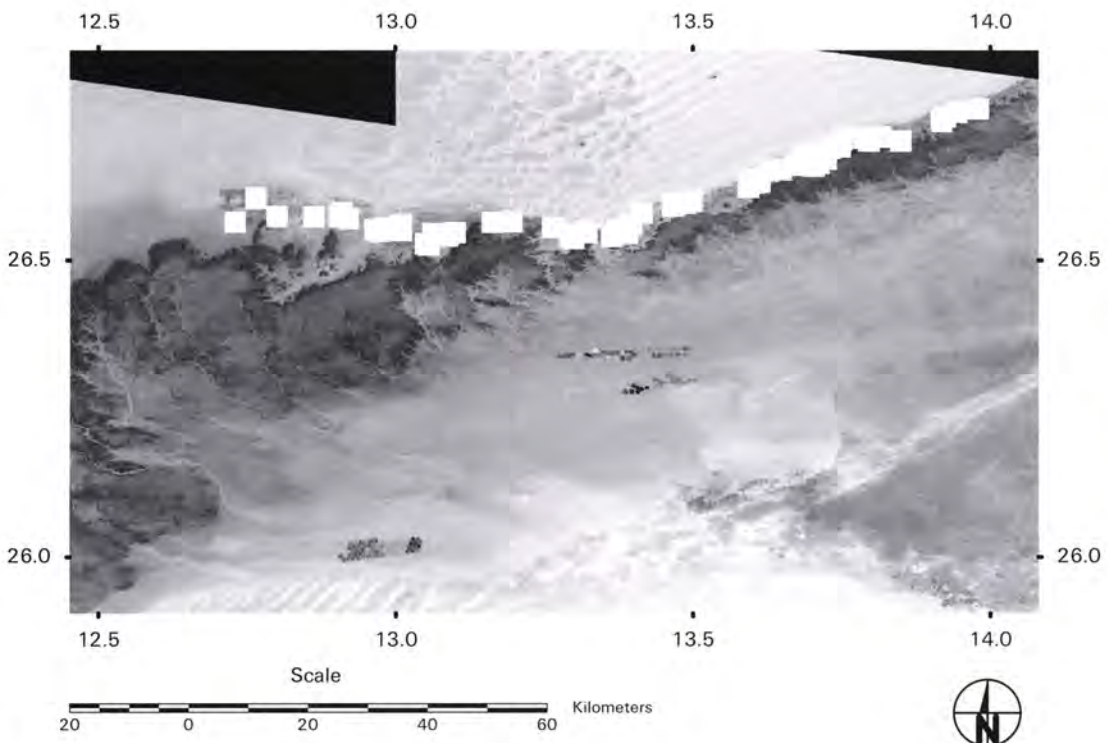


Fig. 5.11. The distribution of *qsur* in the Wādī al-Ajāl.

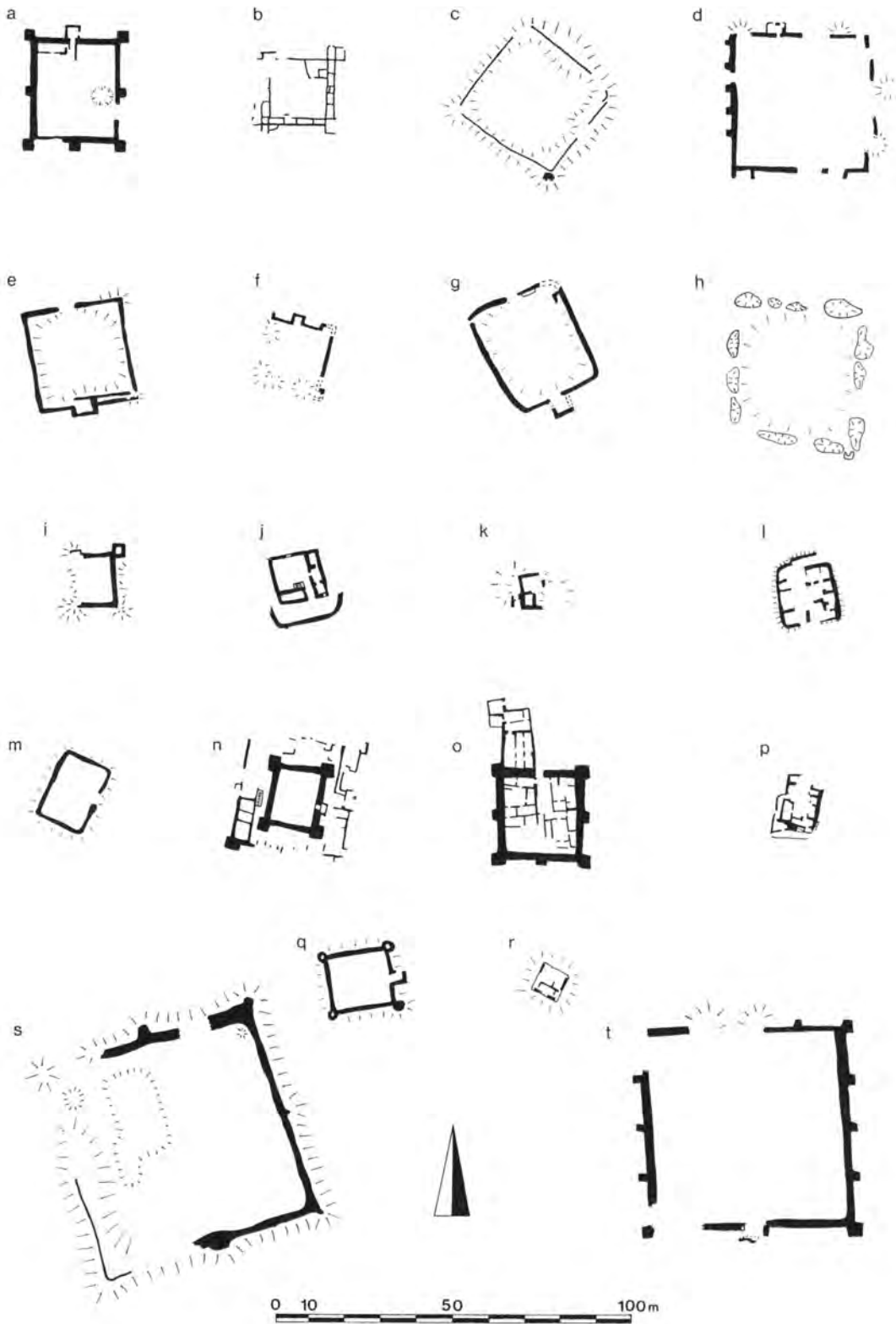


Fig. 5.12. Comparative plans of qsur: a) GRE 15; b) LAR 1; c) ELH 3; d) CLF 26; e) GBD 19; f) GBD 9; g) GBD 10; h) GBD 8; i) GBD 7; j) BBA 13; k) RUG 24; l) RUG 23; m) RUG 16; n) FJJ 56; o) TEK 10; p) LEK 18; q) TAG 11; r) MAR 1; s) GDD 5; t) LEK 17.

to much later in the medieval and early modern period. For example, Qaşr al-Fjayi (FJJ 56) appears to have loopholes for musketry in its outer wall. The preliminary attempt to classify these buildings below is based on two main criteria: size and the presence or absence of external towers.

A first set of AMS dates from a number of *qaşur* in the Wādī al-Ajāl and Wādī Barjūj/‘Utba region has shown that the origins of the *qaşur* are indeed in the Garamantian period (see Mattingly *et al* 2002; *Archaeology of Fazzān* 2, appendix 1). Whilst it remains a possibility that earlier organic material could have been incorporated into a mudbrick made at a later date, the cumulative evidence is impressive. Several of these AMS dates relate to sites identified on the basis of surface pottery as being Garamantian, for instance the urban sites of Qaşr bin Dughba (GBD 1) in the eastern Wādī al-Ajāl and Qaşr ash-Sharrāba (SHA 20) in the Wādī ‘Utba. The AMS dates from the mudbrick outer wall and *qaşr* at the former and from one of the *qaşur* within the urban area at the latter indicate that the fortified elements at these sites almost certainly date to the late Garamantian period (Fig. 5.7). At Qaşr ash-Sharrāba (Fig. 5.13), the series of three dates from different contexts span the late Garamantian and early Islamic phases and confirms the impression gained from visual inspection of the site that occupation continued there into the post-Garamantian period. The latest of the three dates (11th to early 13th centuries AD) provides possible confirmation that this site is the town known to al-Idrīsī in the 12th century as Tsāwa (the modern village of that name is now 15 km distant with the retreat to the east of the oasis zone). Close to Qaşr ash-Sharrāba is the site of Qaşr Māra, with a stone-footed mudbrick tower showing signs of modification over time (Fig. 5.14). The sample from a mudbrick gives a date in the late 4th-late 6th centuries.

Several other *qaşr* sites have provided dates in the late Garamantian period, though, in view of the excellent preservation of some of these structures, an Islamic date had been anticipated in at least one case. TAG 11 is a Garamantian village with central *qaşr*, though the very early date from a mudbrick sample (3rd century BC-1st century AD) suggests the possibility of inclusion of earlier organic matter. Qaşr Būdrinna (GBD 2), and two other *qaşur* in the region of al-Qşīr and Būdrinna (LEK 21 and GBD 7) have all yielded dates similar to Qaşr Māra in the 3rd-6th centuries AD (though the morphology of LEK 21 would suggest a later date for that site). Taken at face value, these add to the impression that the late Garamantian period was characterised by an increasing concern for the construction of defensive structures on their settlement sites. Several other Garamantian settlement sites are known with the remains of *qaşur* at their centre (notably ELH 3, ELH 5/6 and FJJ 20). In light of the AMS dates just discussed from similar structures, there seems to be every justification for considering that these *qaşur* are also Garamantian in date.

A further group of dates relates to *qaşur* and other structures of unquestionably later date. LEK 18 and TEK 10 were selected as examples of *qaşur* within settlements with mosques. The former site appears to date to the 15th-17th centuries, whilst the latter has yielded a post-Garamantian date (860-1020 AD), a date that provides a *terminus post quem* for the *qaşr* and a rare indication of early Islamic-date activity in the Wādī. Towards the east end of the Wādī there is a group of stone-built villages and *qaşur* (for example ZOU 15, BNH 5) and dates from two of these confirm the comparatively recent origins of these sites (16th-17th centuries and 14th-15th centuries).

A number of other sites in Fazzān have the same style of construction using crude salt-hardened mud blocks that we find at Old Jarma and Murzuq (for example, FUG 22 - Tawiwa, CHA 23, MZQ 8). It is reasonable to assume that the broad dating of this style of construction at Jarma (15th-17th centuries and later) would also apply to these other examples.

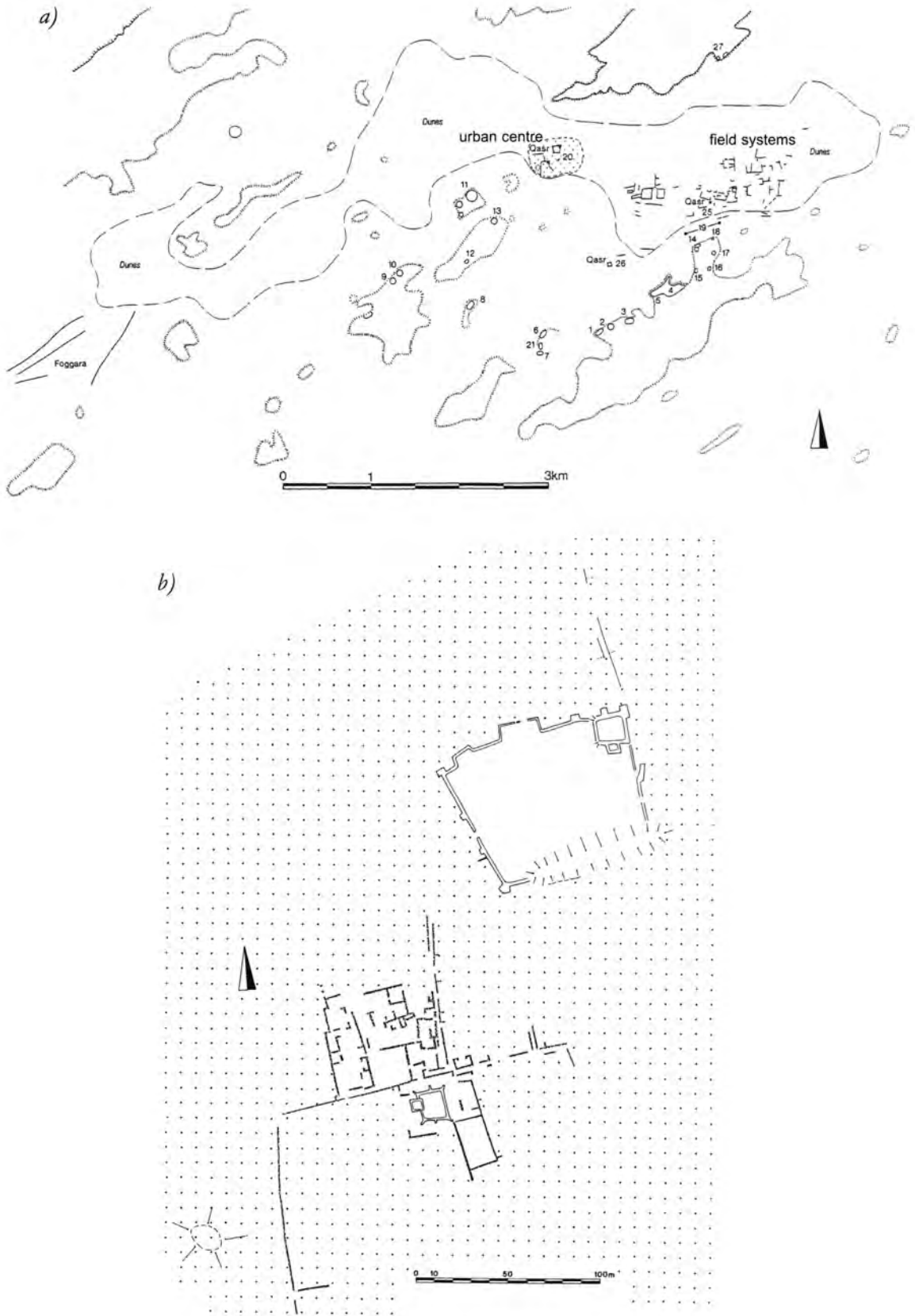


Fig. 5.13. a) Qaṣr ash-Sharrāba showing location of the urban centre (stippled) in relation to zone of fields to its east, foggaras and cemeteries; b) detailed plan of western part of Qaṣr ash-Sharrāba (SCH 20), showing area of the fort and the two qṣur.

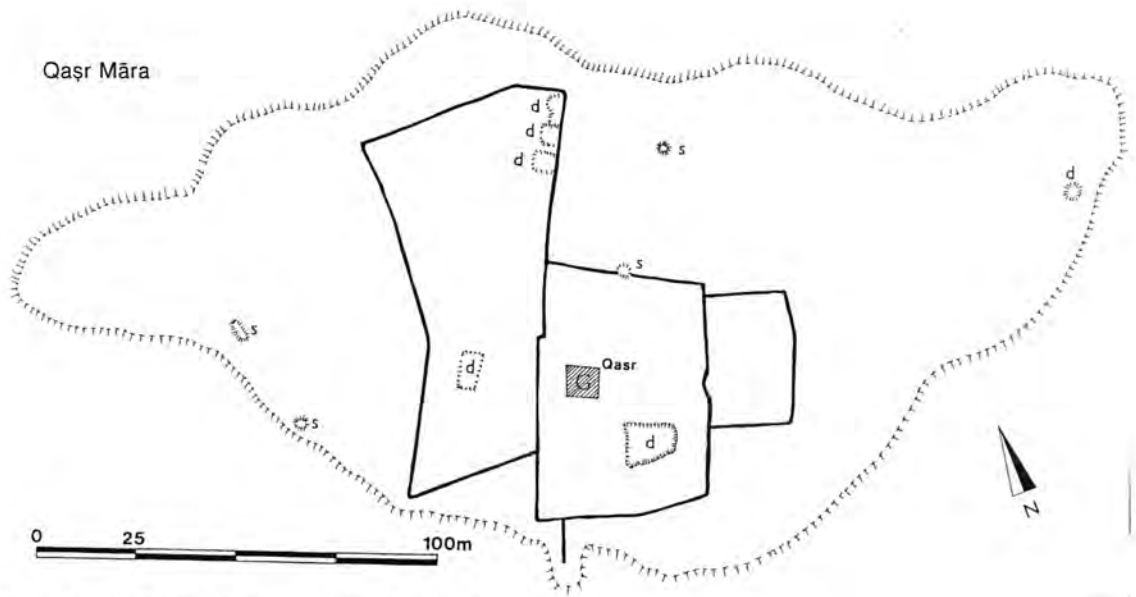


Fig. 5.14. Plan of Qaşr Māra (MAR 1).

The following broad classification scheme is proposed for *qaşr*:

Rectangular forts (>1000 m²) with projecting angle towers. The type site for the larger mudbrick rectangular fort is Qaşr Sidi Dāwud (LEK 17), with a squarish plan of ≈ 65 m side and towers preserved to a height of up to 10 m (Figs 5.12*t*, 5.15*b*). A number of other sites appear to have been of a similar construction and also of large size (CLF 26, GRE 15, GER 4). The lack of diagnostic Garamantian finds from these sites, the preservation of the walls and the nature of the mudbricks employed suggest a medieval date for these sites, though, in the absence of an AMS date, greater precision is not possible at present. The substantial fort-like enceinte at the heart of the Qaşr ash-Sharrāba site, of presumed Garamantian date, is less regular in form than these, but is built on an equally impressive scale ($\approx 100 \times 70$ m).

Irregular forts (>1000 m²). The fortification excavated by Liverani at Aghram Nadarif (Liverani 2000*b*, 25; 2000*d*, 33-38) is an example of an irregular fort of Garamantian date. Built in stone, close to the southern approach to the oasis of Ghāt, it is one of a series of Garamantian outposts in the vicinity of the Akākūs (Fig. 5.16). The site measures 140×55 m (≈ 0.6 - 0.7 ha).

Medium rectangular enceintes (500-1000 m²) with a single projecting tower. Several sites in the Qaşr bin Dughba area share a common type of plan, having a rectangular form with a single projecting tower in the wall opposite the apparent entrance into the *qaşr*. The walls of these structures are thick (≈ 2 m) and high (above 4 m) (GBD 2, GBD 10, GBD 19). Qaşr Būdrinna (GBD 2) has yielded an AMS date of the late Garamantian period, though this should perhaps be considered a *terminus post quem*.

Plain rectangular enceinte – no evidence of towers. Several sites have a rectangular defensive enclosure, but lack any surviving evidence of projecting towers, though the enclosed areas varies markedly from one example to another (GEL 29; RUG 16).

Small rectangular enceintes (<1000 sq m) with projecting towers. One of the most common forms of *qaşr* in Fazzān comprises a square or rectangular structure of less than 30 m per side, with square projecting towers at the corners and, not infrequently, in the centre of each side also. One of the most impressive examples of this type is the stone-built Qaşr Lārkū (Larocco, LAR 1), with parts of its curtain wall still standing 8 m high (Figs 5.12*b*; 5.15*e*, 5.17). There is no reason to doubt the Garamantian



a)



d)



b)



e)



c)

Fig. 5.15. Qṣur in the Wādī al-Ajāl region: a) Qaṣr Māra (MAR 1); b) large qaṣr at Sīdī Dāwud (LEK 17); c) western village of al-Fjajj (TEK 10); d) tower qaṣr of probable late medieval date (GER 14); e) stone walls of Qaṣr Lārku (LAR 1).

date of this structure suggested by surface pottery, not least because the fine tooling of the stonework recalls the Garamantian dressed blocks at Jarma. A Garamantian date for a number of other examples built in mudbrick has been suggested by AMS dating (GBD 1, SCH 20, GBD 7, TAG 11) or by surface pottery (ELH 3; ELH 6). AMS dates from one of the Sharrāba *qṣur* suggest a construction date in the late Garamantian period and continued activity to the 11th-12th centuries (1721 ±39 BP; 1431 ±33 BP; 918 ±32 BP).

Although examples have been noted with circular corner towers (TAG 11), by far the more common pattern is for square towers. Examples of this type of relatively recent date, with associated mosques (TEK 10) or with loopholes for musketry (FJJ 56) are equally common in the Wādī and this seems to be one of the most long-lived of forms of defensive enceinte (Figs 5.12*a*; 5.15*d*). Many structures of this type have ranges of rooms built around the inside of the enceinte wall (cf. the plans of Garamantian GBD 1 and Islamic TEK 10). Some sites show evidence of the main entrance having been made through a dog-leg passage in one of the central towers.

A significant group of *qṣur* of this type is reported from the Wādī Ḥikma along the route south from Zuwila to Tajirhi and beyond (Despois 1946, 57-58; Thiry 1995, 91-93).



Fig. 5.16. The fort of *Agbram Nadarif* (centre), seen across the *wādī* from its associated cemetery of drum tombs.



Fig. 5.17. Stone-built *Qaṣr Larkū* (LAR 1), showing standing 6 m high stone tower.

Small tower-like fortified structures. The tower *qaṣr* is a very common form, especially in smaller or remote rural settlements. In the vicinity of Jarma, there are a number of isolated towers in good-quality yellow mudbrick, standing up to 8 m high (GER 9, 14; TWE 26) (Fig. 5.15*d*). In general these structures are ≈ 15 -20 m per side and contained accommodation on two or three storeys, often arranged around a central court or light-well (cf. the common forms of *qṣur* in the Libyan Valleys Survey: Barker *et al.* 1996a, 127-34). Some examples of the type are undoubtedly of Garamantian date, an AMS date of 1600 ± 40 BP confirming the impression gained from the stone foundations and abundant Roman-period ceramics at *Qaṣr Māra* (MAR 1). LEK 21 has also yielded a late Garamantian date, though the preservation of this structure in the *Wādī al-Ajāl* suggests a more recent date for the extant remains. Many more recent towers seem to incorporate additional skirts of sloping mudbrick (batter) against their outer walls

(TIN 16; LEK 18; RUG 24?), a feature paralleled by late *qsur* in the Libyan Valleys also (Barker *et al.* 1996a, 132-33). LEK 18 appears to date to the 15th-16th centuries on the basis of an AMS date. Some of the medieval stone villages and stone defensive structures in the eastern Wādī are constructed around tower-like *qsur* (BNH 5; GEL 4) and two AMS dates suggest a chronology in the range 14th-17th centuries for these.

In order to improve on knowledge of the *qsur* in Fazzān, more surface sharding and detailed structural recording are required, along with additional AMS dates. This should provide clarification of the dating of localised groups with shared characteristics. However, a start has been made and at least for a number of sites there is a greater degree of precision.

SETTLEMENT MORPHOLOGY

Mid-Late Pastoral settlement

In the absence of well-preserved settlement structures of Holocene date, it is not possible to comment in a meaningful way about settlement morphology at this period. Nonetheless, several tentative comments can be made, taking account of the available evidence from field survey, excavations of rock shelters in the Tadrart Akākūs and from rock-art. It is likely that most people were still fairly mobile in the mid-Pastoral period. There is plentiful evidence of rock shelters in the Massāk Ṣaṭṭafat and Akākūs zones (Cremaschi and Di Lernia 1998a) and excavations have shown that the depth of stratigraphy within these can be substantial (as at Wān Muhūjjāi). The rock-art from the Sahara contains a number of depictions of huts or tents (Khan Majilis 1978), though these are unlikely to leave any direct trace in the archaeological record. The best indicators of the locations of campsites of mobile groups are piles of burnt stones representing hearths and concentrations of artefacts, and so indicating human activity over a period of time. Numerous hearths of Pastoral date have been recorded in the Italian survey of the Akākūs and Wādī Tanzzūft zone in the extreme south-west corner of Libya. Similar features have been observed also in the plain of the Wādī Irāwan to west of Ubārī, though they have not yet been recorded systematically. The reconnaissance and gridded survey work on the edge of and within the Dahān Ubārī has revealed evidence of numerous campsites and hearths around duricrusts (representing lakes/water sources). These are very similar to examples recorded in the ‘Arq Wān Kāsā and the Dahān Murzuq (Cremaschi and Di Lernia 1998a, 37-44). Most of these sites are revealed by scatters of fine lithics, fragments of portable grindstones, occasional sherds of early pottery, detritus from ostrich eggshell bead-making, and occasional fragments of weathered animal bone. A particular characteristic is the presence of numerous piles of small burnt stones, representing fireplaces (Gabriel 1976; 1978; cf. Cremaschi and Di Lernia 1998a, 255-57). The lack of other structural evidence strongly suggests that these sites were characterised by the use of tents or simple brush huts.

The latest dating of the lake encampments is uncertain, but the climatic and environmental changes after *c.* 5000 BP will have entailed a refocusing of settlement in the late Pastoral phase. Human activity in the Sand Seas, on the ḥamāda and along the main depressions will have increasingly become more focused on key areas of water availability. Fieldwalking in the oasis centre of the Wādī al-Ajāl has revealed assemblages of abraded Holocene lithics below or close to settlements of later date. The evidence is hard to interpret, but suggests that some mid-late Pastoral settlements were located close by water sources (shallow wells or residual lakes) in the floor of the Wādī al-Ajāl depression. At some point, however, there was a move from the loosely-organised open campsites to more permanent and defensible settlements on the southern side of the valley.

Hilltop and escarpment sites of early date

As noted above, the principal evidence for settlement sites of the 1st millennium BC concerns the escarpment-edge defensive sites. These ‘hillforts’ and terraced settlement sites display varied characteristics reflecting their diverse topography and the slopes negotiated. However, there are elements of their layout that are suggestive of social organisation. The construction of major terrace walls, as at Tinda and Zinkekrā, indicates the mobilisation of a substantial labour force in order to maximise the available living-space. At Zinkekrā, oval and circular huts (Fig. 5.18) were later supplemented by larger rectilinear buildings, some incorporating mudbrick laid on dressed stone foundations. The date of these structures (Caputo’s so-called ‘villas’) is uncertain, though they may have originated earlier than the 1st-century AD date advanced by Caputo, perhaps as early as the 3rd century BC.

Nucleated sites (towns and villages)

For social and geographical reasons, Fazzān is a region of nucleated settlements. In the 19th century, European explorers were commonly informed of the existence of 100 villages in Fazzān (for example, Nachtigal 1974, 166), a figure repeated in the 1940s by Lethielleux (1948, 25). The true total depends on the basis of the count. Using census data, Despois (1946, 7) reports 80-90 villages and hamlets, while Scarin (1934, 95-96) gives the total as 91, but maps only 84. On the other hand, some of the place names cover two or more hamlets, so the old tradition has some validity.

The evidence from the recent past of villages strung out along the length of the Wādī al-Ajāl makes sense because of the twin needs of security and living close to one’s garden plots (Fig. 1.4). Similar factors may have favoured a pattern of small nucleated centres in other historical phases. In 1989, CMD speculated on the existence of numerous oasis-centre settlements (Daniels 1989, 49); the recent survey work has confirmed this (see above, Chapter 4). Between Tinda and al-Fjayj (essentially the Wādī al-Gharbi), a total of 28 wādī-centre settlement sites have now yielded evidence of Garamantian activity. Most of these are believed to represent settlements of village- or hamlet-type. The actual total is likely to have been far higher, since survey has not been



Fig. 5.18. Zinkekrā top (ZIN 1), detail of the ‘village’ of oval buildings.

systematic throughout this area, and some modern villages probably overlie (and mask) ancient sites. Intensive survey work has focused on the environs of Jarma (Fig. 4.3), where, in addition to the urban centre GER 1 (Fig. 5.19), no less than 14 certain or probable Garamantian settlements are now known in a stretch of only 5 km.

An important element of the morphology of these Garamantian oasis settlements appears to be a degree of regularity in their layout and planning. Several sites demonstrate considerable consistency in the orientation of buildings (GER 1, GER 2), while some have partial street-grids (SCH 20, GBD 1). One of the roads at Old Jarma (GER 1) excavated by Ayoub may have been colonnaded (Ayoub 1967a, 26). At the heart of Jarma, there was a zone of major stone-footed buildings, several of them of a public rather than private nature to judge from their scale and architecture (Fig. 5.19, 5.25*b*). There are good reasons to identify this as the civic centre of the Garamantian capital, though the area lying immediately to the west appears (from excavations completed in 2001) to have been a residential zone. Clearly, further excavation of Garamantian settlements is needed to clarify the picture, but the evidence from Jarma, supplemented by the surveys of Qaşr ash-Sharrāba (SCH 20) and Qaşr bin Dughba (GBD 1), suggests that Garamantian towns were well-organised, planned settlements, displaying signs of deliberate zoning (Figs 5.13*b*, 5.20). They possessed well-defined streets and alleys, public buildings and monumental structures. Similar characteristics may have applied to smaller village sites also, judging by the evidence of alleyways and regular enclosures at sites such as ELH 3 and TAG 11, or the regular layout of buildings close to the *qaşr* at ELH 5/6. As noted already, many villages/hamlets were clustered around a central *qaşr* (Fig. 5.21), though the process of fortification may have been a feature of the later Garamantian period (the 3rd century AD and later). It would appear, then, that oasis towns and villages have been a key feature of the settlement pattern from Garamantian times onwards. The picture is clear for the Wādī al-Ajāl, with some air photographic and reconnaissance evidence from other areas (Qaşr ash-Sharrāba in the Wādī ‘Utba, Zuwīla in the ash-Sharqiyāt; see Edwards 2001).

For the morphology of the later medieval and early modern settlements of Fazzān, the work of Scarin (1934) is still fundamental. One basic distinction made by Scarin is the predominance of mudbrick over *zarība* (palm frond) construction (or vice versa), and this varied between the various regions of Fazzān (Fig. 5.22). Mudbrick construction indicates relative wealth/status, whilst *zarība* construction is a sign of poverty.

In the 19th to early 20th centuries there were few settlements worthy of the epithet ‘town’. The exceptions were al-Jadīd (Sabhā), Birgīn, Maḥrūga and Brāk in the Wādī ash-Shāṭi, Murzuq, Trāghan and Umm al-Arānib in the Murzuq-Ḥufra region, though even in these cases the highest population totals only just topped 1000 and several of the main sites had fallen to between 500 and 1000. Most of the other settlements recorded in the 1930s census had less than 500 people. The Wādī al-Ajāl in its entirety contained less than 5,000 people (of whom 3,000 were in the Wādī al-Gharbī) out of a total population of Fazzān that at that date numbered less than 28,000 (Sahara Italiano 1937, 406-7). The 1931-1936 census data, following on from the prolonged military struggle between the Italians and the Libyans, undoubtedly marks a low point in the regional demography. However, many of the traditional villages in the Wādī al-Ajāl and elsewhere were quite small complexes and do not appear to have been designed to accommodate more than a few hundred souls.

Scarin distinguished (1934, 192-93) five main types of villages:

- 1) Densely nucleated villages of circular or elliptical plans, with houses built against each other, and narrow winding lanes (often covered). There is generally a central piazza to serve as a market place and often a *qaşr*. The settlement is often surrounded by a wall, broken for only 2-3 gates, though the wall may simply comprise the outer walls of the exterior rank of houses. This type is common in the ash-Shāṭi and also attested in Ḥufra and Ḥikma.

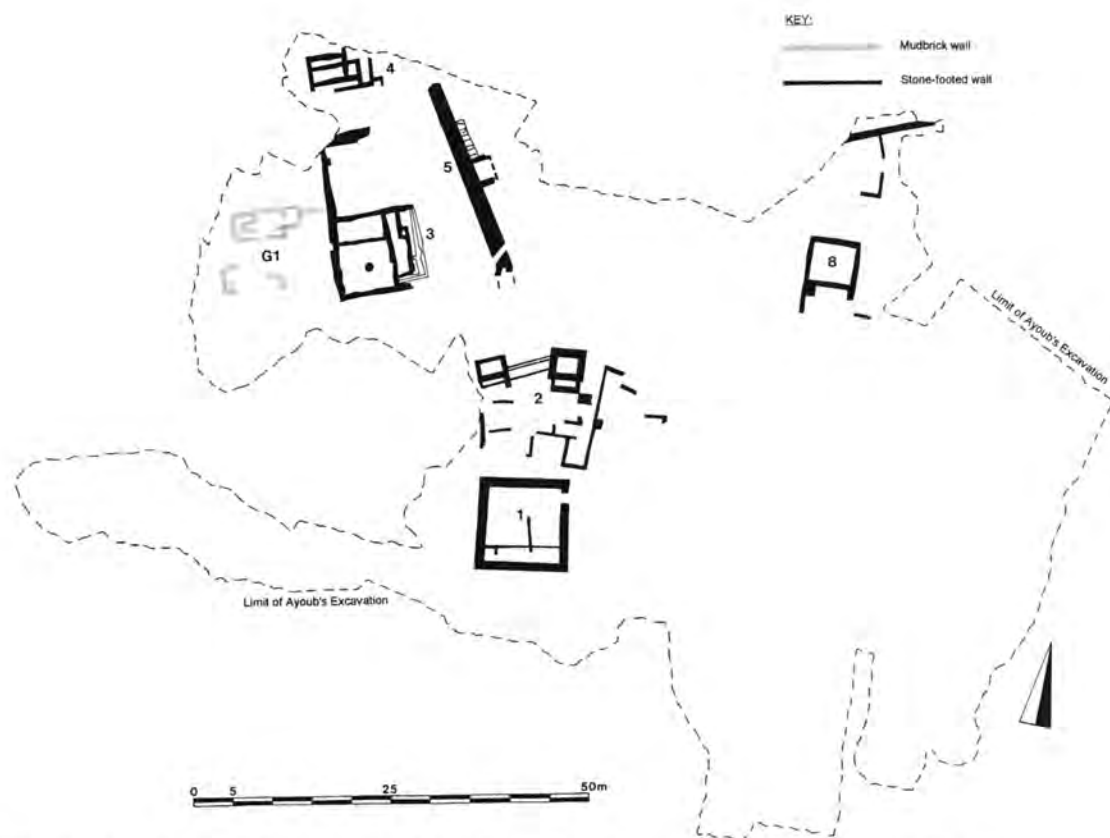


Fig. 5.19. Plan of Garamantian buildings at the centre of Old Jarma (GER 1).

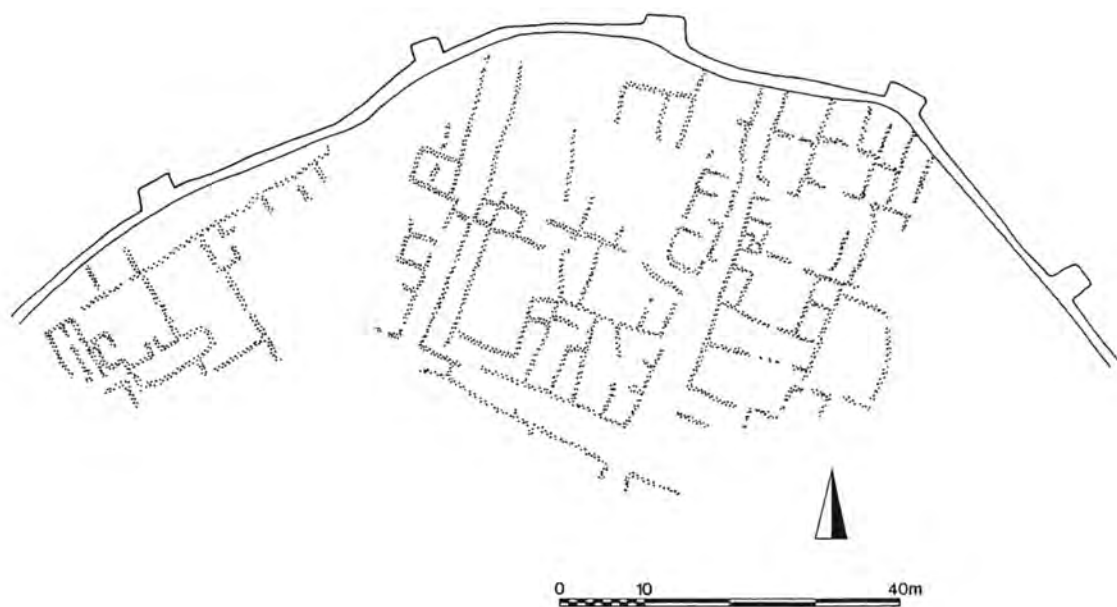


Fig. 5.20. Layout of mudbrick buildings on the northern part of Qaşr bin Dughba (GBD 1).

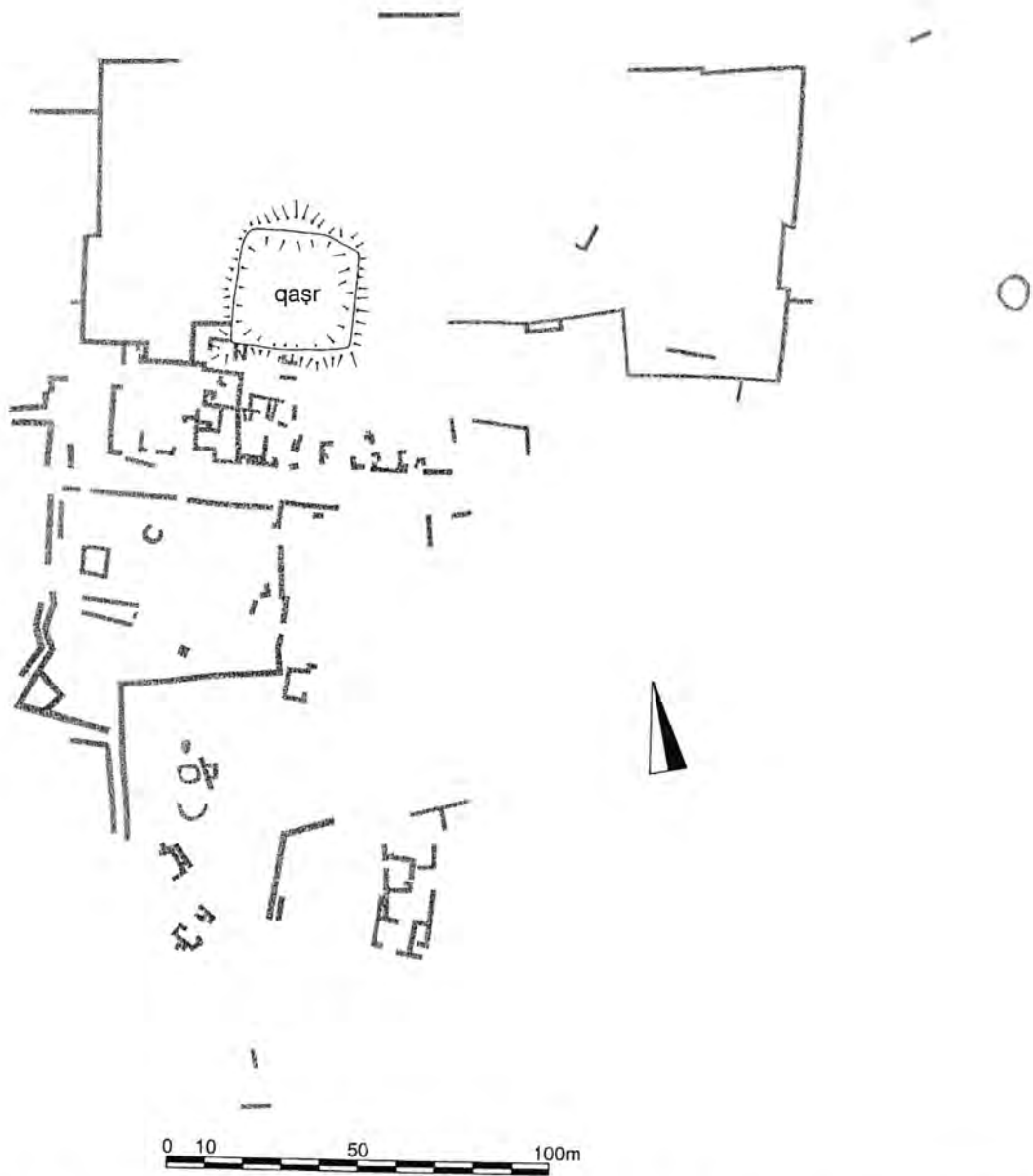


Fig. 5.21. One of several Garamantian villages and qasr in the al-Ḥaṭīya area (ELH 3).

- 2) Densely nucleated villages of quadrangular or trapezoidal in plan, with a high encircling wall. The internal layout of streets and lanes is somewhat regular and there is a large rectangular main piazza. In a few rare cases there is a *qasr* associated. This is the type most commonly encountered in the Wādī al-Ajāl.
- 3) Dispersed hamlets comprising groups of habitations spread out over some distance.
- 4) Dispersed villages, comprising several distinct quarters in a loose-knit structure. The type often reflects the sedentarisation of nomadic groups, as at al-Ghrayf in the al-Ajāl. These settlements often develop around an original core.
- 5) Villages consisting entirely of *zariba* construction, often indicating settlements of freed slaves or dependent labour; these are essentially poor settlements. Scarin's map shows that these are rare in the ash-Shāṭi, existed alongside the mudbrick villages of the al-Ajāl, but outnumber mudbrick settlements in the 'Utba, Murzuq and Ḥufra basins.



Fig. 5.22. Traditional *zariba* type hut, Sardalas.

Despois (1946, 99-121) employs similar criteria, based on the degree of nucleation or dispersion and on the presence or absence of a *qaṣr*. With regard to the layout of the less nucleated or dispersed villages, he makes the point that these are most commonly settlements where *zariba* construction dominates and that fear of fire is a strong motivation behind the physical separation of buildings (1946, 118).

An interesting phenomenon observable at several locations is the abandonment of a village and its relocation on a new site in the vicinity. Ibrayk, just to the east of Jarma, is a good example, with no less than four distinct phases on different sites all in close proximity: according to Despois the reasons for the moves included flood damage and scorpion infestation (1946, 97; Scarin 1934, 93 for a plan). The process of migration of a settlement across the landscape (taking a traditional name with it) is also well illustrated by the history of Jarma in the 19th-20th centuries. Early European travellers knew the site as New Jarma (to distinguish it from the abandoned site of Old Jarma or *Qaṣr Waṭwāt* nearby - GER4). When the Italians moved the last inhabitants out in the 1930s, the abandoned town became known in turn as Old Jarma, with the population resettled in two small hamlets (Agif and *Tūshka*), known collectively as Jarma. These have in turn been abandoned since the 1970s, following the arrival of the tarmac road a kilometre or so to the south and the progressive migration of the population to new houses along the road frontage (Fig. 4.3).

Another slightly different aspect concerns the use of a name to indicate a series of smaller, linked, oasis villages. A good example here is *Sabhā*, which until its massive expansion in the later 20th century comprised three distinct principal villages (*al-Jadīd*, *Ḥajāra*, *al-Qurḍa*, see Despois 1946, 221-22). *Brāk* in the *Wādī ash-Shāṭi* comprised four separate 'quarters' or villages linked to a series of springs (Despois 1946, 116-18; Scarin 1934, 40-41). In a similar way, many of the main villages of the *Wādī al-Ajāl* (and other districts) had smaller satellite settlements or hamlets in close proximity to them. Ibrayk near Jarma had two dependent hamlets, *al-Fakhfākha* and *al-Fūgār*, *Ikhliḥ* had three hamlets of *zariba* huts, *Bintbaya* two (Despois 1946, 106-08). In a number of cases, especially in villages lacking defences, the central village may be almost indistinguishable from the hamlets that cluster around it (as at *at-Tanāḥma*: Despois 1946, 114-15). The plan of *al-Ghrayf* in the 1930s reflects an extreme pattern of segregation (Despois 1946, 114; Scarin 1934, 90-91; Howells 1960). Here the village was divided into three discreet zones, several hundred metres apart, one consisting entirely of mudbrick houses, one entirely of *zaribas* and the third of a mixture of the two. Each quarter was assigned to a separate group of migrants who had come to the area from outside the *Wādī al-Ajāl*.

Isolated rural sites

There are numerous small isolated buildings in the countryside today, mostly representing small farms or shacks adjacent to gardens and wells, where people reside either permanently or on a temporary basis to tend their crops. Some are occupied by labour brought in from outside the region for this purpose. The remains of abandoned small mudbrick buildings within the oasis suggest that this is part of a longer term tradition and much evidence has not survived. Earlier accounts of the region make it clear that less permanent forms of construction, notably the *zariba* huts of palm fronds, were once far more common in the landscape, both within the villages and in the oasis belt. Again, these seem to have traditionally been the habitations of poorer people in the countryside, who typically served as labour in the gardens and performed water-raising duties (Despois 1946, 80-87; Scarin 1934, 110-12).

Transhumant pastoral sites of historic date

The Fazzān has three main groups of modern pastoralists: the Tuareg in the west, with some more permanent settlements in the Ubārī-Jarma area, Arab nomads in the Wādī ash-Shāṭī, and the Tubu in the south-east, especially in the Wādī Ḥikma area (Despois 1946, 185-208). The distinctive habitations of these three groups, though rare today, were still an important feature of the landscape in the early 20th century. Scarin (1934, 110-14; 1937a, 518-34) describes the various fixed and temporary structures built by Tuareg, Tubu and Arab nomads, whilst Despois (1946, 85) gives an account of the huts of the Tubu (see Fig. 5.31 below).

DOMESTIC ARCHITECTURE*Materials*

The different types of habitation constructed in Fazzān reflect to a considerable extent the materials employed (Despois 1946, 86-90). Preferred materials for permanent and semi-permanent settlements were mudbrick and palm, though pisé, stone, blocks of gypsum from dried-up lake crusts, and salt-rich muds from sabkhas are also attested (see below, Fig. 5.30). Mudbrick is the dominant material for built walls, though it varies in quality and appearance quite markedly, from regular, flattish square or rectangular sun-dried bricks, to roughly-coursed irregular lumps of salt-hardened mud (Scarin 1937a, 535). In general stone construction has been very rare, though it is occasionally incorporated in foundations. One reason for this is that lime is generally scarce in Fazzān, so buildings are mostly bonded with mud-mortar and plastered with mud-washes (Despois 1946, 86-87; Richardson 1848, 337, attributed the low use of whitewashing the exterior of buildings in Fazzān to the shortage of lime). Cost is also a factor and the ‘popularity’ of the *zariba* hut in the early 20th century reflects the overall poverty of the area. Although quick and cheap to erect, these palm houses, even in their more complex forms, were generally considered a ‘poor man’s dwelling’ (Despois 1946, 85). Leather and textiles were used for tents of mobile pastoralists, whilst the distinctive *bouchi* huts of the Tubu were also designed for ease of erection on palm branches covered with palm-leaf matting.

The eventual publication of the FP excavations at Jarma (*Archaeology of Fazzān* 4), will involve a more in-depth review of the vernacular architecture at one of the major long-term urban centres in Fazzān. This summary takes account only of the preliminary results of those excavations and the survey of standing buildings at Jarma.

Early Garamantian sites

Our understanding of early Garamantian housing rests on the excavations of CMD at Zinkekrā and Tinda, and limited survey at other suspected early sites (Fig. 5.23). Of these, the work at Zinkekrā is particularly important because of its greater detail and

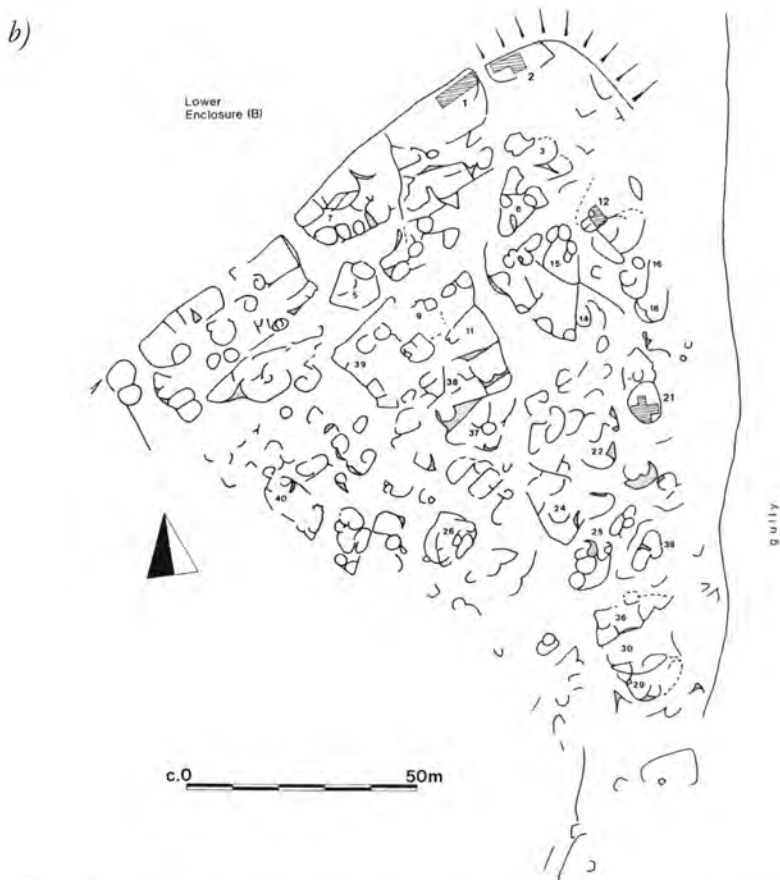
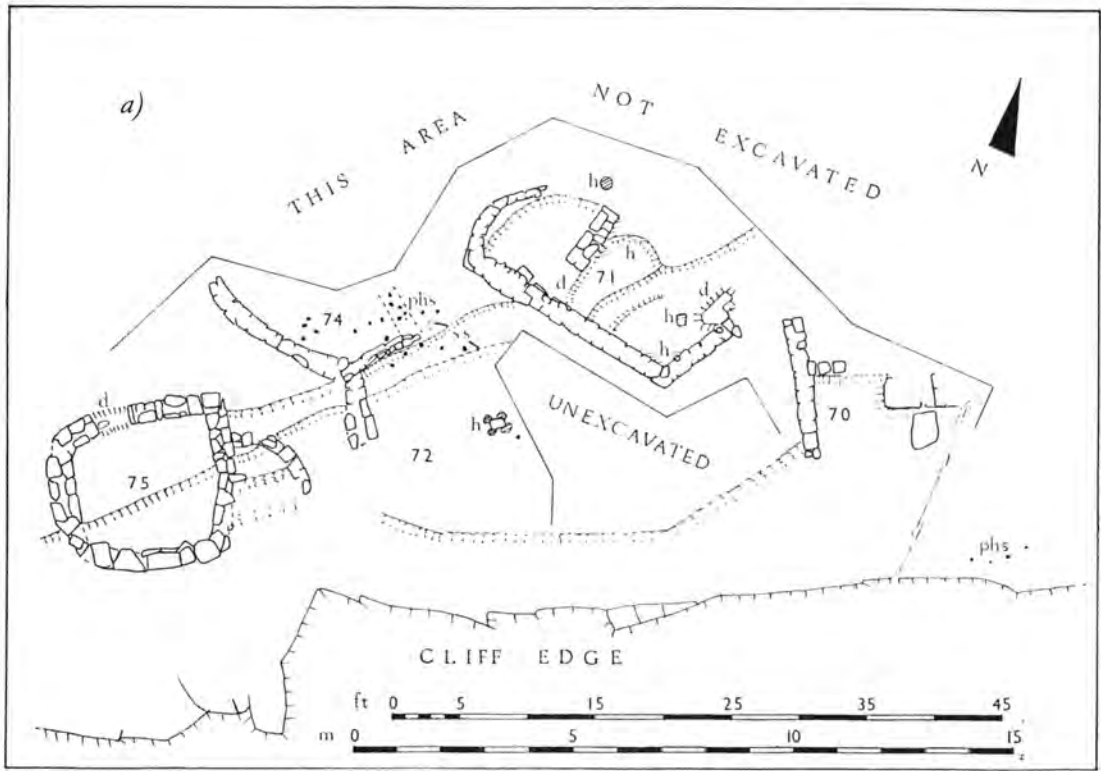


Fig. 5.23. Comparative plans of early Garamantian buildings: a) at Zinkekrā (ZIN 1); b) Tinda (TIN 1).

the fact that some structures are reasonably well dated by radiocarbon samples (see *Archaeology of Fazzān* 3).

There are vestigial hints of the early structures on Zinkekrā, in the form of post-holes, small rock-cut slots and hearths underlying the earliest preserved buildings whose plans can be reasonably inferred (see for example ZIN 1.37-39). These may be the traces of simple huts and wind-breaks erected in the early 1st millennium BC. The earliest surviving structures on Zinkekrā are the complex of small houses or huts on the top of the plateau (ZIN 1). Most of these comprised one- or two-room units of small oval or sub-rectangular spaces, delineated by low walls of unmortared rubble (building ZIN 1.075 is a typical oval hut of 2.75 × 2.5 m, with walls preserved to a maximum height of 43 cm). Some of the structures had curving attached walls, probably delineating small courts or unroofed spaces. At first glance these structures might appear to have been entirely stone-built complexes. However, there is not enough rubble to have had walls built up to roof level in stone. In a number of cases, rock-cut post-holes were noted, and it is clear that timber played an important part in the superstructure of these buildings. Most of the interiors of the buildings were filled with dense layers of organic debris, in part resulting from occupation by humans and animals, in part probably deriving from the degradation *in situ* of the superstructure and roof materials. Excavations of the organic occupation debris revealed the presence of abundant palm fronds, palm branches and loops of knotted twine – all suggestive of extensive use of these materials in the upper walls and roofs of the huts (van der Veen 1992, 9 and 33). Most of the excavated buildings provided evidence of at least one internal hearth, commonly located against one of the external walls. Structures with multiple hearths probably represent successive phases of use, given the relatively small spaces involved (for example, structure ZIN 1.34, with three hearths in a two-roomed hut).

The evidence from Tinda (TIN 1) closely parallels the early buildings at Zinkekrā, though larger curving enclosures are preserved in some cases, defining clusters of small huts and rooms, up to about six in number. The ground-plans of many of these simple houses of Zinkekrā and Tinda resemble closely those of the traditional palm-frond *zaribas* of the recent past (cf. Figs 5.23 and 5.31. See also Despois 1946, 80-85; Scarin 1934, 110-112, for plans of *zaribas*). The *zaribas* give one possible impression of their superstructure. However, CMD himself seems to have favoured the idea that the terraced buildings at both Zinkekrā and Tinda had upper walls of mud, drawing parallels with the Dogon of Mali (Lefèvre 1972, for detailed illustrations). Indeed the steeply terraced sites of the early hillforts are very similar in location to the classic Dogon cliff villages (Murray 1981, 129 for Dogon houses, cf. 80-81 for other traditional mudwalled buildings; also Hollybrook and van Beek 2001, 28-65). Although the slopes at the Garamantian sites have seen active erosion subsequently, the complete removal of all trace of the postulated high mud walls seems unlikely. A compromise solution is that these structures had upper walls of palm fronds coated in mud.

The sinuous shape of the clusters of structures along the terraces at Tinda, apparently dating to the latter centuries BC, stand in contrast to contemporary development at Zinkekrā, where more rectilinear structures are also relatively common, both on the top of the hill and on the steeply-terraced occupation sites down the scarps. These buildings demonstrate greater regularity of layout and greater complexity of plan (ZIN 2.120 consisted of at least four rooms and measured overall c.12 × 10 m). These stone-footed rectilinear buildings presage the evolved mudbrick buildings of the southern slopes (the so-called 'villas' identified by Caputo). The date of the first mudbrick buildings (and indeed of the stone-footed mudbrick 'villas') is far from clear on present evidence. The main occupation at Zinkekrā appears to have ended by the 1st century BC, but the presence of later cemeteries over the lower area

of the site (and in particular in close proximity to the mudbrick buildings) complicates the issue of the precise association of Roman imperial pottery and other finds. Radiocarbon dating by CMD of some material within the mudbrick buildings on the southern side of Zinkekrā suggests that they could be as early as the 3rd century BC. Further scientific dates are called for.

Classic Garamantian sites

Knowledge of the plans of classic Garamantian houses is still based on an inadequate database of excavated examples. However a number of key distinctions emerge from a comparison with the earlier building tradition. The oval, stone-footed buildings revealed at Zinkekrā and Tinda can be contrasted with the more complex rectilinear buildings that typify the classic Garamantian phase (Fig. 5.25). At present, the earliest attested use of mudbrick is at Jarma, where a radiocarbon date of the 4th or 3rd centuries BC has been recorded in association with a mudbrick construction below the later stone-footed Building 4 (GER 1.4). From the later centuries BC, therefore, it would appear that, in the oasis settlements at least, mudbrick had become the normal building material. The characteristic form of Garamantian buildings is rectangular, with 40-60 cm-thick walls of coursed mudbricks (see below). However, at a limited number of sites there is evidence of the use of dressed stone at foundation and lower wall level.

The Garamantian stone buildings at Jarma have hitherto been known essentially on the basis of Ayoub's large-scale clearance operations in the 1960s (GER 1.1, 1.2, 1.4, 1.8), supplemented by a few sondages carried out by CMD to provide a measure of dating evidence (Ayoub 1967a, 23-38; Daniels 1971a, 264-65; 1989, 51-56) (Figs 5.19, 5.24-25, 5.27). The impression from these excavations is of a series of substantial buildings with stone footings, separated one from the next by open ground. There are reasons to doubt that this is a true picture of the pattern of building here, and the large quantity of ashlar or dressed blocks lying out of context within the area of



Fig. 5.24. Aerial view of buildings GER 1.1 and 1.2 (left, top and bottom) and GER 1.3 (right) at Old Jarma (cf. Fig. 5.19).

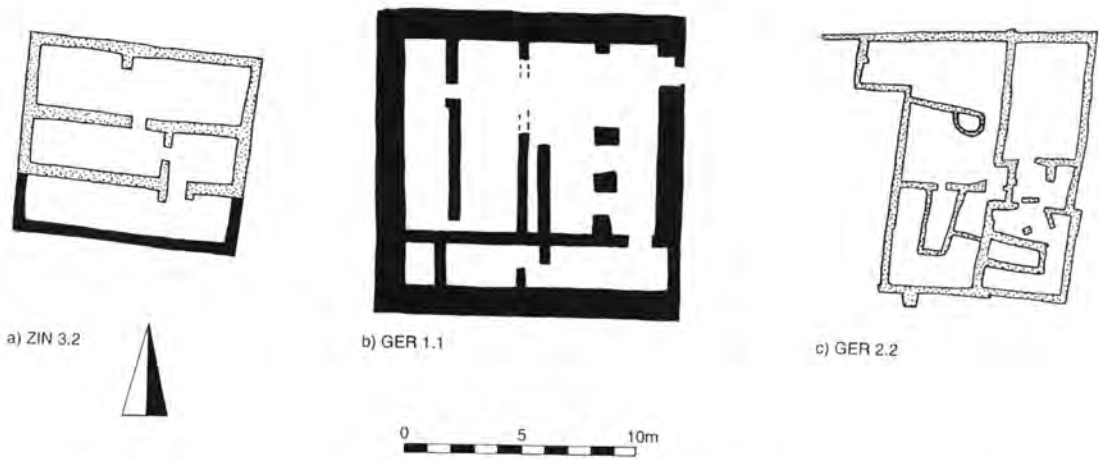


Fig. 5.25. Comparative plans of classic Garamantian buildings: a) one of Caputo's stone-footed 'villa' (ZIN 3.2); b) GER 1.1, ashlar building; c) GER 2 (area 2), mudbrick building.

Ayoub's excavations suggests that there were once many more stone-footed buildings hereabouts. It is also clear that these buildings were not constructed in stone to their full height. Rather they combined stone footings and architectural elements (columns, etc.) with mudbrick upper walls. Finds of fragments of fluted columns fashioned in moulded and painted mud from excavations at Jarma also show that mudbrick architecture in Garamantian times could be highly elaborate.

Ayoub's Building A (GER 1.1) is an ashlar building, interpreted by CMD as a house (Figs 5.19, 5.25b). The entrance in the northern end of the east wall was flanked by pilaster bases (though these appear to have been reused here), and several column bases and fragments of column were recovered in the court that the door opened onto. CMD made some sondages here to clarify the dating and to trace the mudbrick antecedents. The building appears to have had a long life from the late 1st century to the 4th century or later, with at least three main phases of rebuilding. There are at least three phases of underlying mudbrick structures.

Building B (GER 1.2) is an enigmatic structure (or more exactly structures) since it is clear that the features uncovered relate to several phases of buildings (the group of structures are all indicated on Fig. 5.19). Some walls terminate abruptly and appear to have been truncated by the excavation. It is not possible to make full sense of what remains, though it appears to include a structure with two sunken features (tanks?).

Building C/D (GER 1.5/6/7) is another confusion of several unrelated features, including a late Garamantian defensive wall (GER 1.5) and rectangular arcaded building that is now believed to be a mosque of 11th- or 12th-century date (GER 1.6/7).

Not numbered on his plan, GER 1.4 is the last of the buildings excavated by Ayoub. It is not described in any of his interim reports. CMD later carried out extensive excavations on this site, revealing several phases of stone-footed building, preceded by mudbrick phases. The earliest phase of mudbrick here appears to date to the 4th-3rd centuries BC.

Building E (GER 1.3) is a large stone-footed building (c.13 × 13 m), with a stepped façade at its eastern side. There are good reasons for accepting Ayoub's interpretation of this structure as a temple (see Chapter 6 below). CMD and the FP have also carried out some sondages within this structure.

GER 1.8 is a stone-footed building to the east of the main group, also exposed by Ayoub, but not mentioned in his publications. It may equate with the single building

excavated at Jarma by the Italians (Caputo 1951, 240). The overall plan is not clear, as some walls have been truncated and the alignments of the walls suggest that the fragments may represent two separate building phases. The masonry on the western side of the square room bears a number of different tool marks. These are irregular diagonal tooling, vertical irregular tooling, and chip tooling which runs horizontally across the face of the stone (Fig. 5.30*c*).

It is clear that substantial numbers of less solid mudbrick structures have been removed from some of the empty spaces on Ayoub's plan, notably between buildings GER 1.3 and 1.4. The more recent excavations of the FP suggest that the density of buildings was considerably higher here (Figs 5.24, 5.27-28). It is difficult to interpret Ayoub's excavated structures, because of the removal of the majority of their mudbrick walls, internal features and floors, and some of them look more like public structures than dwellings, notably the probable temple (GER 1.3, see next chapter). However, some of these stone-footed buildings may have been private dwellings of the Garamantian elite, and the utilisation of ashlar-quality stone blocks, even if only at foundation level, is a fundamental architectural statement. Moreover, these are large, well-planned buildings, somewhat different to the organic growth and evolution of buildings at Sāniat Jibril (see below).

Numerous finds from the recent excavations behind building GER 1.3 of Roman hypocaust tiles and box flue-tiles, along with fragments of painted wall plaster, hydraulic cement and a piece of marble veneer provide a clear indication that a Roman-style bath-building was constructed at some unknown date in the centre of Jarma. It must have stood close to the excavated area, though its exact location is unknown and all the finds came from secondary rubbish deposits. All the fired brick and tile and the marble veneer must have been imported from the coast 1000 km to the north. Even for a small bath house, the quantity of materials to be transported would have been considerable.

The stone-footed buildings on the lower slopes of the Zinkekrā hill are similar in many respects to the buildings in Jarma, though their dating is uncertain (Fig. 5.25*a*). If they are contemporary with the stone-footed structures at Jarma, then they indicate a late and limited re-occupation of part of the Zinkekrā site in the early centuries AD. Alternatively, they could date to the latter centuries BC and relate to the final phase of occupation at Zinkekrā, when activity overlapped with the development of Jarma. The dating is clearly crucial to the question of from when and from where the Garamantes learnt the techniques of stone dressing. The conventional wisdom, since the time of Caputo, is that the Roman world was the inspiration, if not the provider of the expertise (Caputo 1937, 308; Daniels 1971a, 267-69). An alternative is that contact with the Roman world boosted the use of a technique that was already known in Fazzān earlier and expanded the repertoire of stonemasons to include decorative elements based on the classical orders.

For the moment the ashlar-footed buildings at Old Jarma and Zinkekrā stand out as something almost unique in Fazzān and though a few of the *qṣur* have stone footings, these are more generally large rough blocks rather than dressed stone. Qaṣr ash-Sharrāba (SCH 20) is another site where stone footings seem to have been used on a considerable scale within the urban zone, though the quality of the stone dressing is low. The large stone Qaṣr Larkū (LAR 1) is the only other site where the quality of the stone dressing approaches that at Jarma (Fig. 5.17) and, unusually, the stonework was carried up to the full height of the outer walls of the fortification (though internal buildings were probably constructed in mudbrick). Both Jarma and Larkū are located in the oasis several kilometres from the nearest source of stone and these make the scale of use of dressed stone at these sites all the more noteworthy.

As already stated, mudbrick construction was the more normal form of Garamantian architecture. Sāniat Jibril contains the most extensively excavated area of Garamantian domestic buildings; CMDs trenches cover an area in excess of $c.30 \times 25$ m, with walls comprising large coursed mudbricks (for the full report, see *Archaeology of Fazzān 3*) (Figs 4.6, 5.25c, 5.26). Several phases of construction and settlement evolution were distinguished here. No coherent plans of structures exist for Phase 0 (1st century AD and earlier) though a number of structural features and walls were recovered from beneath the earliest fully elucidated buildings. In Period I (broadly late 1st–mid 2nd centuries), the site seems to have developed as a series of one- or two-room complexes constructed to north and south of an east-west median wall. There appear to have been some open spaces or courts between clusters of these two-room units. Period II (later 2nd–mid 3rd centuries) saw the merging of some of these small properties into larger complexes, with additional rooms butted against some of the existing structure. This process continued in Period III (later 3rd–mid 4th centuries), when there appears to have been only a single consolidated property on each side of the east-west median wall. Period IV (mid-4th century and later) was marked by dramatic shrinkage of the occupied area and of diminished activity. From Period II forwards a distinctive room type appeared, one that may be suspected as being characteristic of Garamantian domestic architecture (Fig. 5.26). This comprises a U-shaped arrangement of low platforms, around a lower area of floor (rooms 2.1, 2.5, 4.4 and 7.16). Superficially the arrangement is not dissimilar to the disposition of the couches in a Roman dining room, but it is highly unlikely that that was the inspiration. No specific indication came from the excavations as to their function, but in view of the wealth of evidence for manufacturing activity recovered from the site, it is possible that they were areas set aside for some sort of craftwork. They may well have been open, or illuminated from the end where the floor was lower. Alternatively, they could have served as primary reception rooms. Several other rooms had specially-built hearths and may have served as separate kitchen areas (for example, 6.4b in Period II



Fig. 5.26. Sāniat Jibril (GER 2), the Phase III buildings.

and III). Other built features, such as a long bench in room 4.3 in Period III, provide further hints at functional designation of specific areas of the Garamantian house. Area 4.1-2 in Period III was a courtyard, where a furnace was located.

Excavations of Garamantian levels at Jarma in 2001 revealed the substantially complete plan of two long rectangular buildings (Figs 5.27-28). The more northerly of these comprised two linked rooms, entered by a door in the southern side of the central unit. This gave access onto a roughly square space with a well in the south-eastern corner and to the west opened directly onto an area with a U-shaped sill running around a central hearth. The form is identical to the U-shaped room fittings recorded by CMD at Sāniat Jibril. Small mudbrick footings in the floor indicated the position of other built settings around the central area. A second smaller room opened off the eastern side of the central lobby area. The more southerly building appears to have had a somewhat similar long rectangular form (though it was cut to the south by Ayoub's excavation and its full extent in that direction could not be discerned). It does not appear to have possessed a well, but consisted of at least two rooms, the more westerly with a well-built hearth towards its western end. The space between appears to have been open ground, perhaps delimited at the east by a low wall. These two small properties appear to have been either houses or small workshop units (or a combination of both) of late Garamantian date. Earlier Garamantian houses excavated on the site comprised only fragmentary plans on account of systematic pitting of underlying strata for rubbish disposal. However, a sequence of at least five mudbrick building phases was determined, extending back perhaps to the 4th century BC.

The only other major excavation of a Garamantian site is Liverani's work at Aghram Nadarif near Ghāt. This is another site where 2/3 room units seem to have predominated. However, surface survey at Qaṣr bin Dughba (GBD 1) and al-Ḥaṭīya (ELH3,



Fig. 5.27. Aerial view of the G1 excavations – north is to the right – showing the Phase 6 houses (late Garamantian), with GER 1.3 (temple) at lower centre and GER 1.4 to the right.

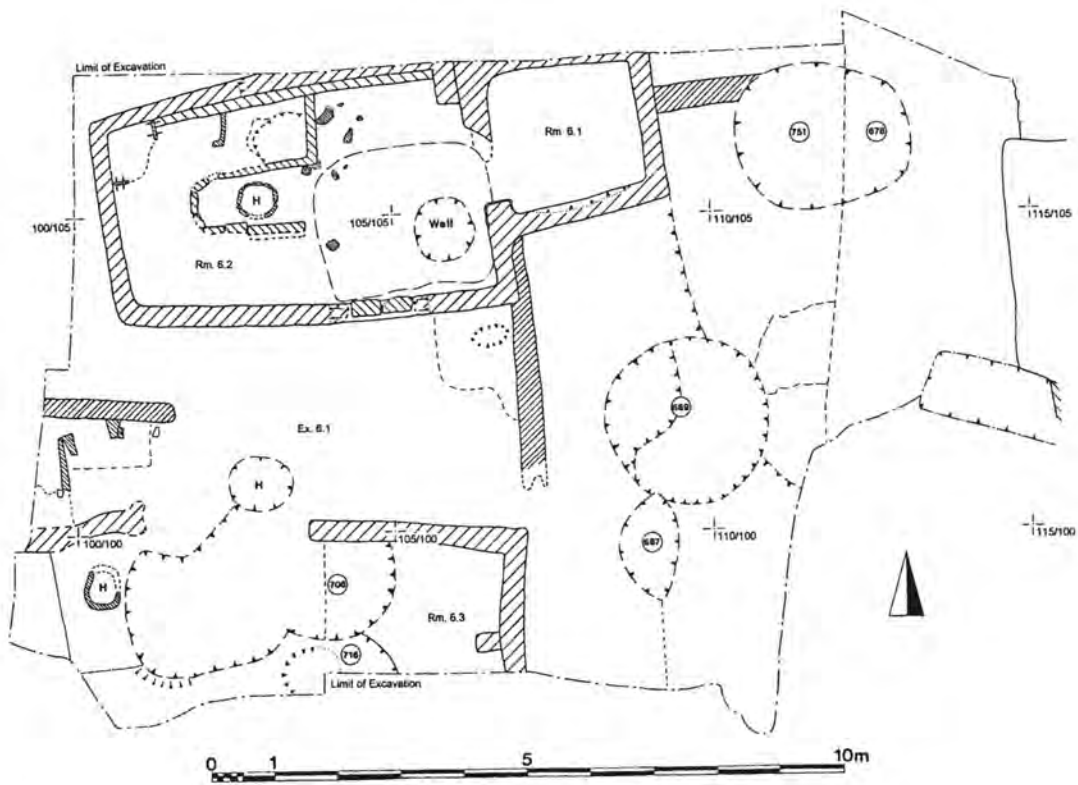


Fig. 5.28. Plan of the G1, Phase 6 houses.

5/6) provides important supplementary data (Figs 5.20-21, 5.29). The buildings at these sites seem to combine simple forms of 2-3 rooms, with a smaller number of larger structures, sometimes with attached or integral courtyards.

On the basis of the limited dossier of information available, it can be suggested that Garamantian architecture reflected social status (the use of stone, the size and number of rooms, the use of architectural embellishments). The most elaborate architectural forms are found in the major centre at Jarma (Fig. 5.30*b-c*), with the other postulated urban sites at Qaşr bin Dughba and Qaşr ash-Sharāba exhibiting some distinctive and large-scale ground plans. The density of finds relating to manufacturing activity at both Sāniat Jibril and Jarma suggests that industrial production (bead-making, jewellery manufacture, metallurgy) and domestic activity (processing of food and wool) took place broadly within the same spaces.

Medieval and early modern housing

The classic accounts of the early modern Fazzān house are those of Despois (1946, 71-80) and Scarin (1934, 104-10; 1937a, 534-45). Despois distinguishes between rural types and an urban-style house, encountered primarily in the major centres such as Murzuq (Fig. 5.31). The houses in most of the villages of Fazzān are essentially variants on the rural type, though those belonging to local leaders could be relatively large. There are significant architectural differences between Fazzān and the western Algerian Sahara (and its Libyan margins – Ghāt and Ghadāmis). In the latter cases, buildings are quite often of several storeys (Micara 2000), whilst most houses in Fazzān are single-storey (or at most two-storied). Scarin, for his part, sees the primary distinction between houses in Fazzān to be one of wealth and status (1937a, 537-45). Of the rich houses, he distinguished diverse influences in different regions – with the largest and more complex plans in the main centres of eastern Fazzān (Sabhā and



a)



b)



c)

Fig. 5.29. Garamantian urban layouts: a) *Qaṣr ash-Sharrāba*; b) and c) *Qaṣr bin Dughba*.



a)



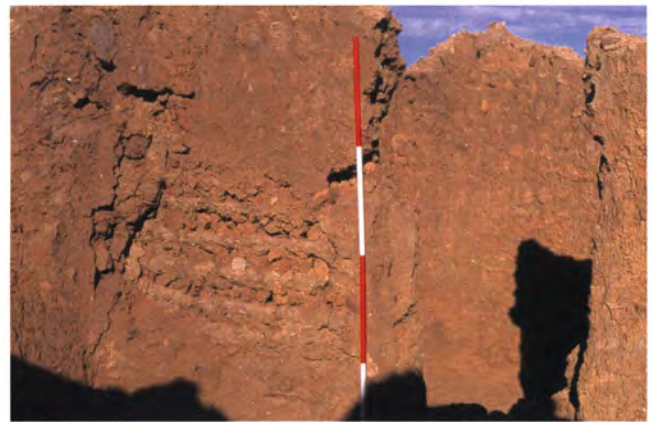
d)



b)



c)



e)



f)

Fig. 5.30. Construction methods in Fazzân: a) stone foundation below mudbrick (MAR 1); b) Asblar masonry and engaged pilasters, GER 1.1; c) stone tooling (GER 1.8); d) flat regular mudbricks (LEK 17); e) irregular, salt-rich mudbrick construction (GER 1); f) mud plaster on interior wall (GER 1).

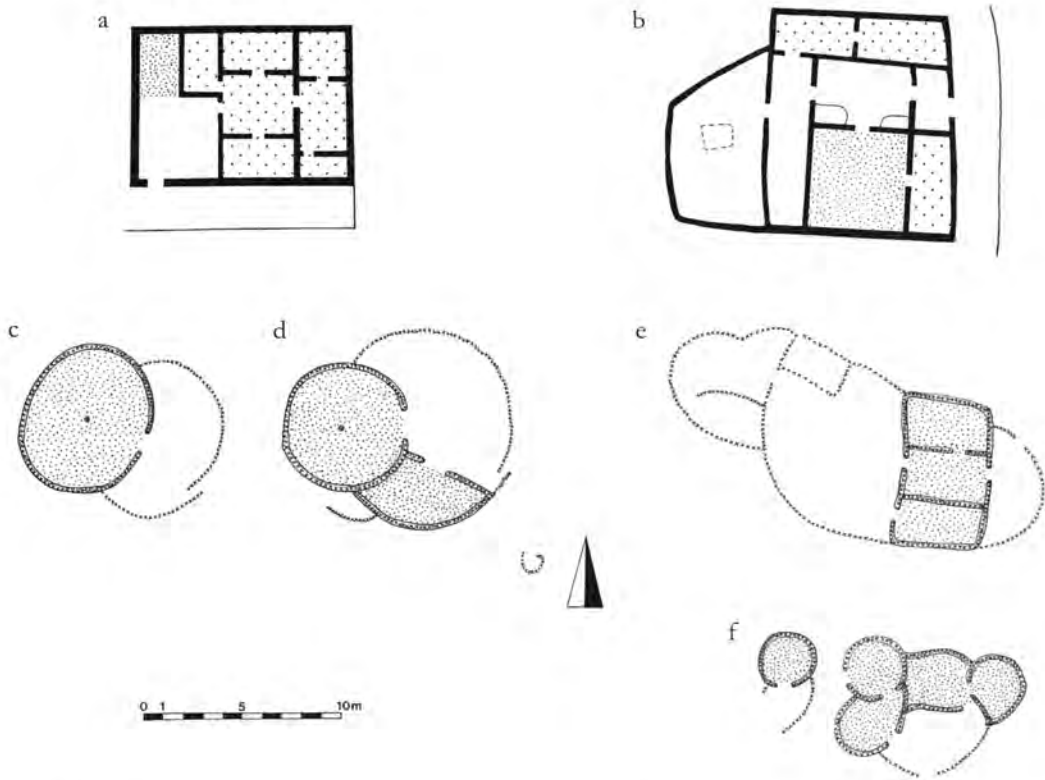


Fig. 5.31. Generalised plans of a) - b) traditional Fazzānī houses and c) - f) zariba buildings (after Scarin and Despois). Solid black lines indicate mudbrick walling, crosses indicate palm frond walls, crosses within solid lines indicate consolidated palm frond walls. Stippling indicates roofing (light indicates solid roof, heavy indicates palm fronds)

Murzuq) and less elaborate but interesting variants reflecting the influence of semi-nomadic groups in the Wādī ash-Shāṭi and at Ghāt (1937a, 538-39). The date of construction of the extant houses seen by 19th-century travellers or studied in the early 20th century is uncertain in most cases; but it is likely that most were already at least 100 years old. If the 19th - early 20th centuries were times of declining population and general poverty, it is more likely to have been a phase of refurbishment of existing houses than a boom period for new construction. The latest phase of buildings at Jarma, using the salt-enriched mud blocks in their construction, must be 15th century or later and many houses probably date to the 17th-18th century (a point supported by AMS datings of phase I-II levels and features).

The main focus of traditional Fazzānī houses is generally an entrance vestibule or court (*saqīfa*) or a covered principal room (*kawdi*) off which most rooms open. In the simplest rural houses, there may be a single living room (*dār*) and an attached court in which cooking is done. At the other extreme, larger houses may have suites of rooms arranged round up to three courtyards of both open and enclosed types. There is a lack of symmetry in the plans and a great variation in ground plans, reflecting in many cases a long succession of building on to, or remodelling, an original core.

Rural houses can be divided into two broad groups, simple and complex. The simple type contains at most a small cluster of rooms around an open court, into which access can be had from the outside. The kitchen may be either in the court itself or in a small cubicle in a corner of the house; ovens (*tannūr*) are common features in the court areas. The more complex type will generally have a covered central room (*kawdi*) with rooms opening off. The exact disposition of living rooms, kitchens,

stores, etc. varies considerably. A single room connecting only with the outside may indicate a guest chamber.

The urban house is generally built to a higher specification and on a larger scale; stairs to a second storey or to terrace roofs are to be expected in some cases. There are clear similarities with the larger rural types, with rooms clustered around courts. The entrance vestibule (*saqifa*) may be covered and have benches along it, for the reception of visitors, whilst family life is focussed on covered courts further back. Unsurprisingly, Murzuq was noted by Despois to have the greatest variety of houses – in part reflecting the cosmopolitan origins of its inhabitants. European travellers have left us several valuable accounts of houses there (Barth 1965, 149; Denham and Clapperton 1966, 145; Lyon 1821, 96-98; Nachtigal 1974, 73-74; Richardson 1848, 309-10). The al-Jadid area within the Sabhā oasis was also noted for the scale and quality of its buildings (Scarin 1937a).

The majority of the houses surveyed by the FP at Jarma belong to the 'rural' tradition, being modest single-storey dwellings (cf. Figs 5.31, 5.32). GER 1.53-54 are good examples of the type, with small clusters of rooms arranged round courts. These houses appear to have been expanded over time by the addition of additional rooms to the core structure. On the other hand, a few larger houses exist, which approach closer to the 'urban' tradition, for example GER 1.63 (Fig. 5.33). This large house near the southern mosque and kasba clearly belonged to one of the leading families in the town. It had a stair up to a partial second storey or terrace. At nearby Tuwash there are also a number of two-storey mudbrick houses, built on a grand scale (Fig. 5.34). One interesting aspect of the FP excavations at Jarma (site G1) is that the medieval houses below the early modern mud-block buildings appear to have been built on a larger scale, with wider walls of regular mudbricks, larger room-sizes and overall a larger ground area. Although the house plans obtained from these excavations are only partial, they give the impression that building styles have changed considerably across time. The evidence is too limited from which to generalise, but we should clearly be cautious in applying our knowledge of early modern houses to earlier periods of dwelling. On the other hand, there are hints of long-term continuities in the archaeology. For example, through several phases of buildings at the G1 site, despite changes in overall building layout and orientation, we repeatedly found kitchen features superimposed in the same area of the trench (and the same was true of courtyard areas).

The stone villages of the eastern Wādī al-Ajāl constitute an important regional variation in terms of construction type (Fig. 5.35). They have been little remarked upon in the literature – few of the European explorers in the 19th century travelled through this part of the Wādī, and even the Italian and French geographical surveys of the 1930s-1940s made little reference to the eastern Wādī

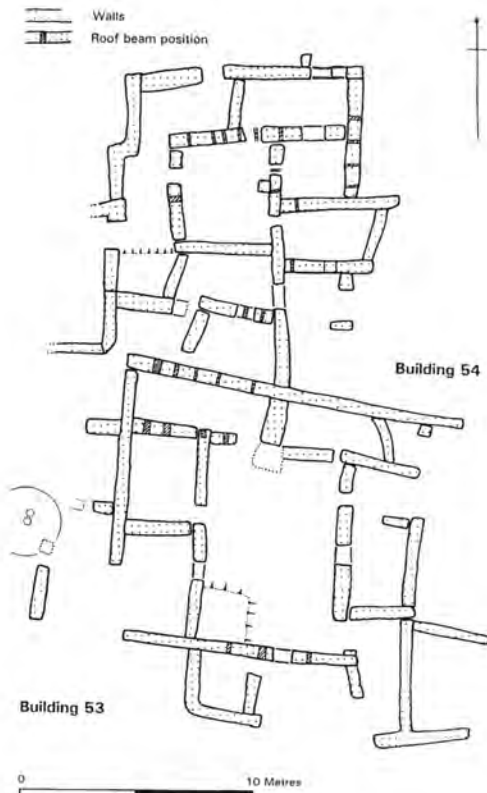


Fig. 5.32. Simple houses at Jarma (GER 1.53-54).

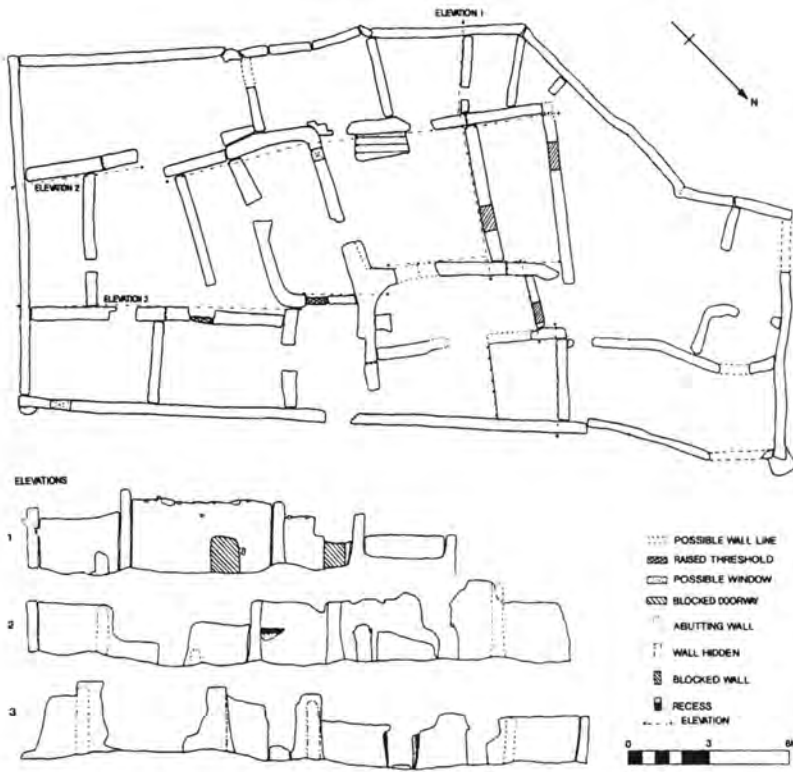


Fig. 5.33. Large house at Jarma, plan (GER 1.67).

(Sahara Italiano 1937, 621-23; Despois 1946, 247-48). These fortified villages resemble in many respects the oval mudbrick villages with dense-packed housing clustering round a central *qaṣr*. The main reason for the difference in construction here appears to be the presence of a series of rocky hillocks outcropping within the oasis well to the north of the escarpment, offering both perched locations for site location and readily available stone for construction. There are some similarities between these sites and the fortified village of Tmissân in the Wâdi ash-Shâṭi (Despois 1946, pl. XII). Little detailed work has yet been carried out on the ruins of these villages, which would repay further study.

The *zariba*

Zariba or palm-frond huts and villages have traditionally made up an important minority of sedentary settlement in Fazzân (Figs 5.22, 5.31*c-f*). Although only making up 32 percent of the villages with populations between 100-500 in 1931, they comprised 76 percent of nucleated settlements with less than 100 people (Scarin 1937a, 557). Many mudbrick villages contained some *zariba* huts within their bounds or on their margins. A minimum estimate would be that somewhere between 15 and 20 percent of the total population of Fazzân in the early 20th century lived in *zariba* huts. Locally the percentage may have been much higher in places. In the western Wâdi al-Ajâl, only 54 percent of the 1931 population lived in mudbrick buildings, the rest presumably being accommodated in *zariba* (Scarin 1934, 89-90). The archaeological evidence for these features is minimal after any lengthy interval, though the shallow oval depressions cut into the banks of a foggara near al-Fjayj (FJJ 1) probably represent the vestigial traces of a small *zariba* settlement. The typical plans of *zariba* huts are discussed by Scarin (1937a, 547-50) and Despois (1946, 80-85). There is great variety in form and layout, with both rectilinear and oval room shapes still attested in the 20th century.



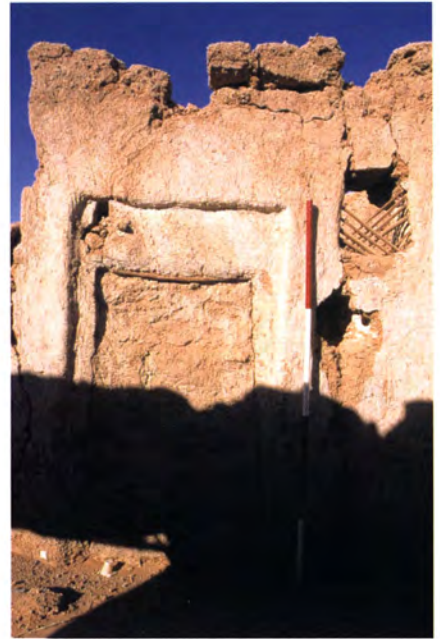
a)



b)



c)



d)



e)

Fig. 5.34. Details of traditional Fazzānī houses: a) Details of roof construction and support in an intact house attached to the mosque at Tuwīwa (FUG 23); b) detail of door of the same house; c) detail of internal staircase in a house at Tuwash; d) blocked doorway and window TEK 10; e) painted plaster LEK 18.



a)



b)



c)

Fig. 5.35. a) Stone village ZOU 15, general view; b) main building ZOU 15; c) detail of masonry technique ZOU 15.

The 'typical form' consists of a three-room living block (sometimes with mud-plaster lining of the walls), with courtyards attached to front and back and occasionally additional animal pens attached outside those first courts. In western Fazzān, Tuareg influence favours circular *zariba*, whilst in the Wādī Ḥikma a semi-cylindrical shape is sometimes found – reflecting Tubu traditions (Scarlin 1937a, 522-23). These huts are similar to those depicted in the rock-art (Khan Majilis 1978).

The most important point here is that in every period since the cultivation of the date palm began, palm fronds and trunks have been the single most abundant and ready-to-hand building material in Fazzān. Simple huts will have been a significant feature of the domestic architecture of every age.

CHAPTER 6 RELIGIOUS AND FUNERARY STRUCTURES

By David Mattingly,
with David Edwards

INTRODUCTION

This chapter will review the evidence for religious structures and funerary practice in Fazzān, concentrating on the Wādī al-Ajāl, but bringing in material from elsewhere as appropriate. Preliminary typological classifications are proposed for a range of funerary features.

RELIGIOUS STRUCTURES

Temples

At present little is known for certain about Garamantian religious practices, for although ancient source references to Ammon worship are plausible, the specific allusions to a temple of Ammon are steeped in literary convention (see above 76-79, 89). It is likely that religious practice in this part of the Sahara was influenced by the evolution of anthropomorphic divinities in the Nile Valley and its neighbouring oases, notably at the oases known to have been oracular centres of the Ammon cult, Siwa and Awjila. The theophoric images in the late neolithic rock-art, notably the animal-headed human figures, suggest that this process began at quite an early date (below, Chapter 8). Plans of temples of Ammon are known in the oasis of Siwa and in the Tripolitanian and Syrtic pre-desert zones, though the links between these and structures in Fazzān are unclear at present (Brouquier Reddé 1992; Fakhry 1973).

Two of the buildings excavated at Old Jarma have been suggested as possible temples (Ayoub 1967a, buildings A and F = Daniels 1971a, buildings 1 and 3 = GER 1.1 and 1.3). The evidence is most convincing for Building GER 1.3, which is fronted by a wide set of steps on its eastern side (Fig. 6.1) and from which came a decorated gold disk, the hand and arm of a bronze statue, a small statuette of 'Ammon wearing a crown' (perhaps an Egyptian figurine) and a bronze Silenus mask (Ayoub 1967a, 35-38). Several elements of columns, unadorned frieze blocks, bases and Ionic capitals indicate a columnar façade. The stepped columnar eastern façade appears to relate to a secondary remodelling, but the original arrangement is not clear. The interior appears to have been subdivided asymmetrically into a series of rooms. The excavations made here by CMD and the FP will be published in *Archaeology of Fazzān 4*.

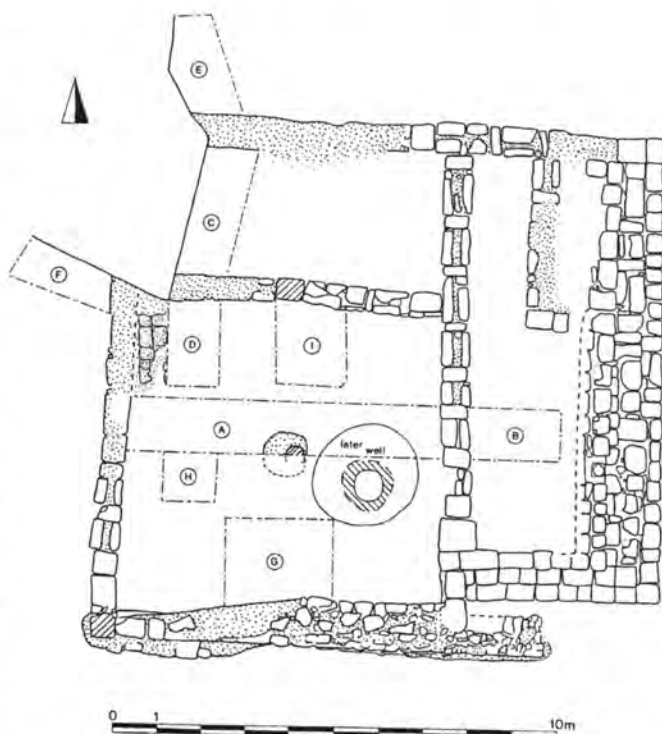


Fig. 6.1. Plan of temple GER 1.3 (after CMD).



Fig. 6.2. Stone column fragments from a possible shrine at Sāniat Jibril (GER 2). Scale 60 cm.

these elements could have been carried from the main site of Garama and buried here, it is more likely that the structure had originally stood in close proximity to the excavated part of Sāniat Jibril. The evidence might suggest that smaller Garamantian settlements in some cases were equipped with Mediterranean-style shrines, though on a reduced scale when compared with the main temple at Garama.

Another possible candidate for a religious site is the later phase of activity at Zinkekrā, when a series of mixed ashlar and mudbrick structures was erected on the southern side of the earlier defended promontory site. The dating of this cluster of structures (ZIN 3.1-6) may be as late as the 1st-2nd centuries AD, by which date the majority of the earlier settlement had been abandoned. Two of the so-called villas excavated by Caputo stand out for the quality of their construction and location (ZIN 3.2-3), terraced into the escarpment slope, above a fine ashlar terrace wall (ZIN 3.7). Both 3.2 and 3.3 have mudbrick walls on top of ashlar stone foundations (Fig. 6.3; cf. 5.25a). While there is nothing to confirm a religious interpretation for the complex, the architectural pretension of the group of structures here, in a place lacking water or shade, would favour a non-domestic function. The ground plans of buildings 3.3 and 3.2 are not dissimilar to GER 1.1 and 1.3.

“Holy places”

There are numerous other places in the landscapes of Fazzān that can be adjudged to have had some special (often religious) significance in the past. The sites of rock engravings along the Wādī al-Ajāl (see below, Chapter 8) often reveal great time depth, with repeated use of the same topographic locations. While the interpretation of some of the neolithic engravings is uncertain, there is a body of scenes that does seem to have clearer ‘religious’ or ‘sacred’ associations (such as clusters of engravings of sandals or feet, often accompanied by Libyan inscriptions). Many of the sites of

Building GER 1.1 is the most impressive building excavated thus far at Jarma, with ashlar quality masonry preserved to a height of over 1 m at the time of excavation (and the numerous blocks in the vicinity indicating that the walls were carried considerably higher in stone). Columns were used in an inner courtyard and rich finds (including several items of gold) were recovered by Ayoub (1967a, 16-18). However, the entrance to the building is small and off-centre, though flanked by pilasters, and the plan is very asymmetrical. If it is a temple, we lack comparable examples from the Sahara and the interpretation of the structure as an elite (perhaps even chieftain’s) house, proposed in Chapter 5 above, has much to recommend it (though see the discussion of ZIN 3.2 below).

The relatively small number of excavated Garamantian sites means that other possibilities are even harder to assess. At Sāniat Jibril, some small columns and part of a tympanum pediment were recovered from a late pit (Fig. 6.2). They probably represent the remains of a small stone-built shrine, but the original location of this structure is unclear. Although

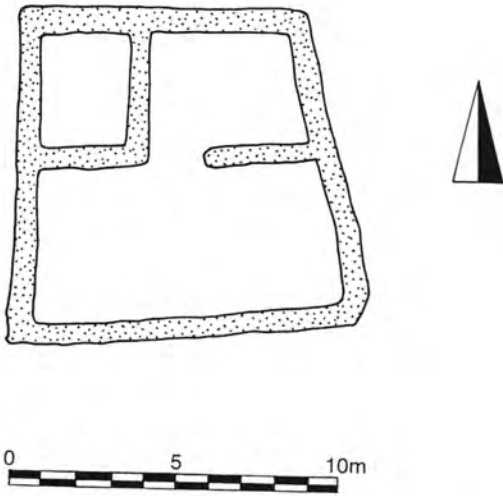


Fig. 6.3. Plan of ZIN 3.3, possible temple structure.

mausoleum (UAT 3) (Fig. 6.4). It is known that the practice of divination based on ancestor cults had a long history in the Sahara, even after the region was largely converted to Islam – though interestingly enough, when practiced, it continued to use pre-Islamic style stone monuments (*Encyclopédie berbère*, s.v. *adebni*, 124). On the other hand, the rapid acceptance of Islamic ‘holy men’ (the *murābiṭūn*) from Morocco and elsewhere from the 16th century onwards, and the construction of numerous ‘marabout’ tombs, suggests that the ancient trait of reverence of the graves of significant people had found a new outlet. There are numerous *murābiṭūn* or ‘marabout’ monuments in the Wādī al-Ajāl – Jarma alone had at least 10 monuments, both within and outside the walled area of the medieval town. Two burials were placed against the eastern wall of a small mosque (GER 1.45). The *murābiṭūn* were in general supporters

densest rock-art are dominant topographic points, from which a wide panorama could be surveyed, or mark important corridors through the landscape, as in the Maknūsa pass south of al-Fjayj (see Chapter 8).

Burial sites in north Africa have often been venerated places in the landscape. Libyan society was known in antiquity for its ancestor cults and the archaeological evidence supports the comments of the ancient writers on the existence of elaborate rites associated with special graves (Brett and Fentress 1996; Mattingly 1999). The provision of enclosures, stele and offering-tables attached to many tombs of classic Garamantian type (see below) is a good illustration of this tendency. The best example is the funerary enclosure close to the Waṭwāt



Fig. 6.4. Aerial photo of the elaborate Garamantian funerary enclosure/chapel (UAT 3) near the Waṭwāt mausoleum (East is to the right).

of the Awlād Muḥammad dynasty and their distribution should reflect to some extent the attempts of the latter to consolidate their power in the Wādī. The FP has not attempted to compile a systematic catalogue of *murābiṭūn* tombs up and down the Wādī, but this should be a priority for future research on the Islamic period, as many of the older monuments are associated with settlements or cemeteries no longer in use. The oral tradition relating to their dedications and precise locations could still be recorded in many cases, but time is running out with the passing of the elder generation. Richardson (1848, 261) provided a useful description of the *murābiṭ* cult at Sardalas, within a generation of the death of the ‘Saint’:

“The tomb of the marabout is enclosed within the usual square little house, having a dome or cupola roof, but it is not whitewashed as these sanctuaries generally are on the Coast. On the tomb is a coverlet of particoloured and showy silks. The room of the mausoleum is snug and clean. A little lamp is kept burning at the head during the night. ... There are two or three outhouses or rooms adjoining, in which, if anything be deposited, it is quite safe, it is sacred, no robbers ... being bold enough to commit such a sacrilege... The entire oasis is protected by the halo of the awful Marabout here buried.”

A simpler form of *murabit* monument, perhaps more typical of the majority in the Wādī al-Ajāl, is represented by a low plastered stone platform within a cemetery area (for example, GER 7). Although the burial monument is in a state of decay, it is still venerated to the present day, as indicated by fresh white flags and incense burners at the southern end of the grave and by a stack of discarded flags and incense pots close by (Fig. 6.5-6.6).



Fig. 6.5. ‘Marabout’ monument (GER 7), with continuing usage of incense burners.

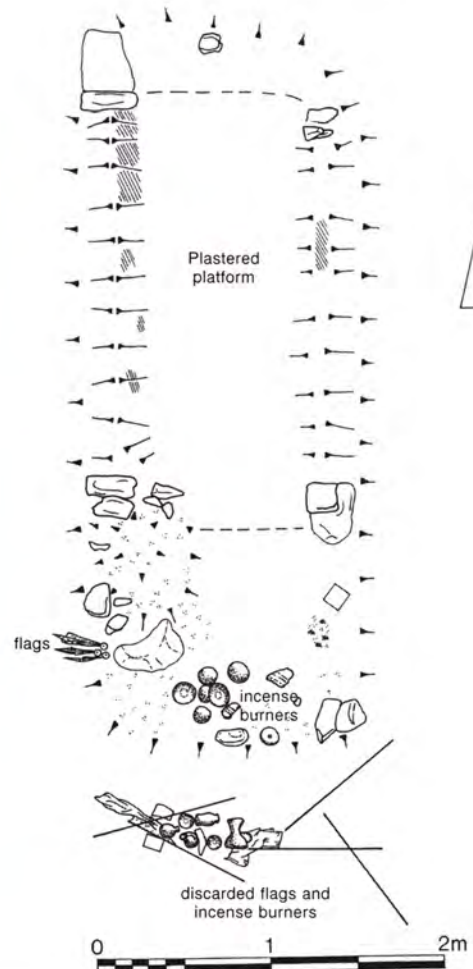


Fig. 6.6. ‘Marabout’ tomb GER 7.

Mosques

The mosques of Fazzān represent an important class of evidence relating to the spread and practice of Islam in the Sahara, but have never been thoroughly researched. Much of the evidence recorded hitherto has been the result of the colonial survey of extant mosques in the 1930s, and, although many of the buildings published by Scarin (1934, 95-105; 1937a, 545-48) were probably several centuries old, they cannot be considered representative of the earliest phases of Islamisation of Fazzān. Comparative studies from the Sahara are also rare (al-Mahmudi 1997; Insoll 1996a/b; Gaudio 1993), though the important study of mosques in the Air region of Niger by Bernus and Cressier 1991, 324-37) provides many points of comparison. With the exception of a few exceptional towns, where multi-aisled mosques are to be found such as Aghadis (6 aisles, 22 × 20 m) and Assoda (5 aisles, c.35 × 14 m), most Saharan mosques are of comparatively modest dimensions. In the Air region, old mosques generally have an elongated rectangular plan (long axis parallel to the *qibla*), with a triple-aisled prayer hall divided by walls pierced by numerous low doorways, and a *mīhrāb* built out from the centre of the eastern wall. The smaller examples generally have only two aisles in the prayer hall and measure under 10 m in length by 5 m in breadth). The larger triple-aisled examples can attain 15 × 10 m, but rarely more. Minarets and courtyards are rare outside the major urban centres. The former features are in many cases relatively late additions or constructions. Dating of historic mosques is very difficult without excavation, but architectural studies (suggesting important influences from the Western Sahara) and radiocarbon dating suggests that many of the extant structures are late 16th century at the earliest (Bernus and Cressier 1991, 335).

For Fazzān, there is only one early mosque that has been extensively excavated, the cathedral mosque of Zuwila (Fig. 6.7a), but it is not fully published (Abdussaid 1979; al-Mahmudi 1997, s.v. Zuwila; Ziegert and Abdusallam 1973). The visible remains appear to be 11th century in date, though an earlier mosque is still to seek. Zuwila was almost certainly the first of the Fazzān oases to accept Islam and it is where we would expect the most impressive early evidence – though even there perhaps not before the 8th century. Early conversion to Islam was probably limited to a small part of eastern Fazzān until the 10th-11th centuries, when the growth of the power of the Banū Khaṭṭāb based at Zuwila, may have led to a more widespread dissemination, including regions well to the South, such as the sub-Saharan kingdom of Kānim. The large extant mosque by the kasba at Murzuq was surveyed by CMD (Fig. 6.7c); it appears to be of Ottoman date.

Excavations at Jarma by Ayoub recorded parts of a large stone-footed building (misinterpreted by him as part of a defensive work: 1967a, 35), which is suspected as being an early mosque, GER 1.6 (Mattingly *et al.* 2000, 106-07). Although much of the structure was destroyed in the course of Ayoub's excavation down to the Garamantian structures below, the northern and eastern walls of the building are still partly extant, along with the north-eastern corner (Fig. 6.7b). A pier projects from the north wall, suggesting the position of an arcade c.5 m to west of the eastern wall of the building, while a projecting stone near the centre of the eastern wall hints at the presence of a *mīhrāb*. In 2000, excavations located the south-eastern corner and a small segment of the south wall, and another stone wall found in the 1999 excavation probably represents the western extent of the complex. We appear to have a large rectangular arcaded hall (26 × 15 m), with a courtyard area (c.25 × 10 m) to the west. Although the reconstruction is highly hypothetical, the form of this stone-footed building (in a phase when mudbrick appears standard for domestic architecture) is most plausibly interpreted as a mosque. On the basis of an AMS date of 921 ± 36 BP, the building can be assigned to the 11th-12th centuries AD (calibrated). This was clearly an important structure – it is roughly the same size as the cathedral mosque at Zuwila – and may be the earliest large mosque of western Fazzān.

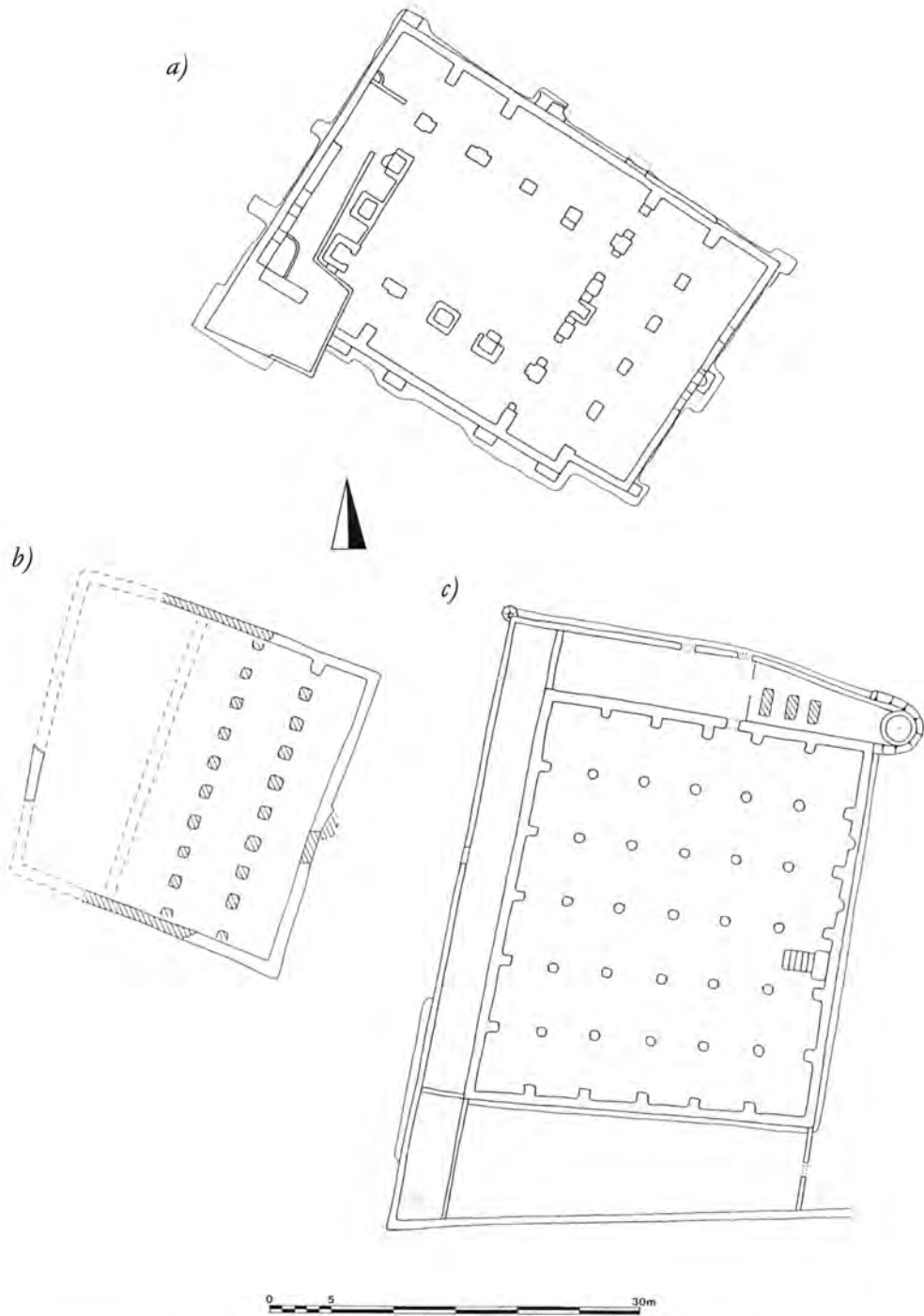


Fig. 6.7. Comparative plans of major mosques in Fazzân: a) ZUL 2, b) GER 1.6-7, c) MZQ 1 (Ottoman mosque).

Three other mosques have been recorded at Jarma, dating to the late medieval and early modern phase. The early mosque in the centre of Jarma (GER 1.6) was replaced on the same site by a smaller structure, also destroyed without record by Ayoub – though a few photographs survive, and its ground-plan is reconstructable in outline from an early air-photograph and notes and photos made by CMD in the 1950s. The date of this structure is not known, though the abandonment of the larger mosque probably occurred before the 18th century.

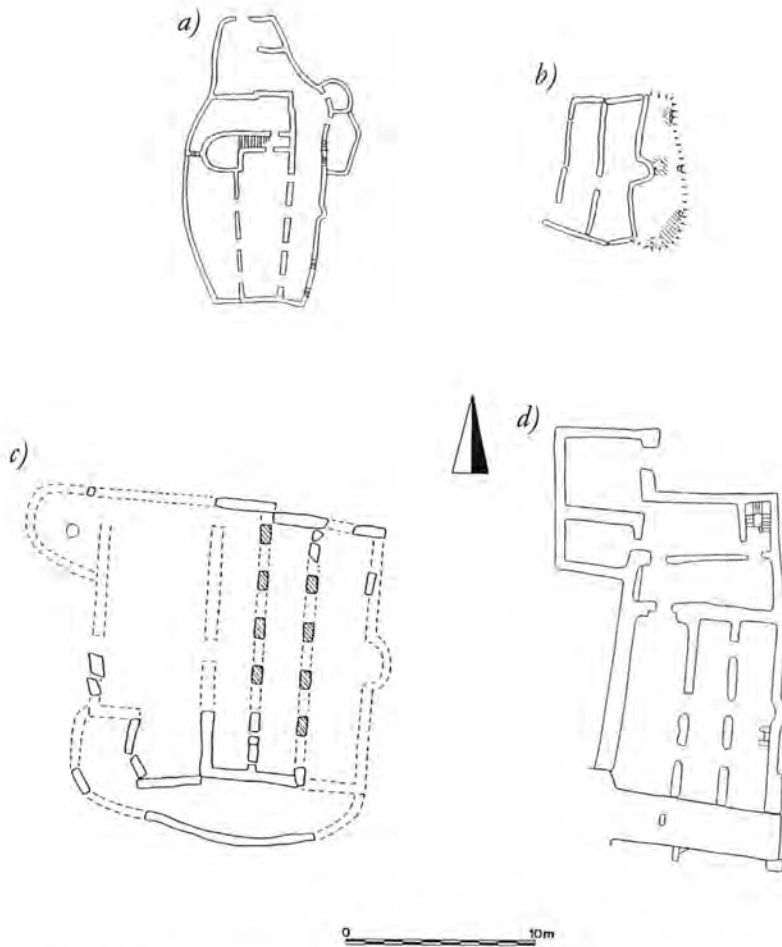


Fig. 6.8. Comparative plans of minor mosques in Fazzān: a) FUG 23, b) GER 1.45, c) GER 1.15, d) TEK 10.

GER 1.15 stood close by the southern gate of the city, and was largely destroyed when Ayoub dug through it in search of underlying Garamantian structures. Careful survey of the surviving traces of the building, supplemented by CMD's notes and photographs, allow a good reconstruction to be made (Fig. 6.8c). This building is well-dated by an AMS sample of a desiccated date-stone taken from right below the foundations of one of the piers of the eastern arcade of the prayer hall (716 ± 35 BP, for a calibrated date of the 13th century).

The final mosque (GER 1.45) is a small structure built in an open area near the eastern gate (Fig. 6.8b). The local tradition associates this mosque with a Moroccan woman, Fātima Ḥadrīa, and she and a *murābiṭ* are buried adjacent to it (Mattingly *et al.* 2000a, 225). This mosque is very similar to the smaller and simpler examples of those recorded by Bernus and Cressier (1991, 324-27) in Niger.

These later mosques are typical of the generality of Fazzānī mosques from the later medieval and early modern period (Figs 6.8-6.9). Generally small (prayer halls less than 15×5 m), they were normally whitewashed or plastered (rare in an area lacking in lime sources). They were constructed largely of mudbrick, with mushroom-shaped arcades and some minor plaster decoration. Although the prayer halls of mosques are generally fairly rectangular in plan, the example at Tawīwa (FUG 23) is less regular and the associated courts and washing areas were generally fitted into the available space (Fig. 6.8a). Many mosques had their own well in the courtyard, and some seem to have included provision for the housing of the imam. The *miḥrābs* normally protrude



a)



b)



c)



d)

Fig. 6.9. Details of mosque interiors: a) TEK 10 (entrance into prayer hall); b) LEK 18 (niches in outer court of mosque); c) FUG 23 (arcades of prayer hall); d) Agīf (New Jarma) (view into mihrāb).



a)



c)



b)

Fig. 6.10. Mosque minarets: a) at Tawīwa (FUG 23); b) Murzuq; c) Ghāt.

through the thickness of the eastern walls. Minarets are not always present (or surviving), but probably conformed largely to the tapering form of the mosques at Tawīwa and Murzuq (Fig. 6.10). Several sites show a close spatial connection between mosque and *qaṣr* (TEK 10 (Fig. 6.8*d* and 9.31), LEK 18, FUG 23), and the two components may well be of contemporary construction at some village sites.

Desert mosques

The desert caravans that passed through Fazzān spent long periods en route between oases and a characteristic feature of the main communication lines outside the oasis belts is the desert mosque (for parallels from the Air mountains, Bernus and Cressier 1991, 165-66, and 337). This typically comprises little more than a single row of stones delineating a roughly rectangular space, with a small apse in the long side oriented towards the east. The interiors are generally cleared of stones and sometimes there are internal divisions (corresponding to the arcades in a normal prayer hall), created by leaving uncleared ground between two aisles. The size of the structures would normally relate to the size of the party and it is not uncommon to find several contiguous desert mosques of different sizes. There is no doubt that many of these structures, once set up near wells or habitual camping grounds, would have been regularly reused by passing caravan groups.

Richardson (1848, 269) recorded similar desert mosques, marked out in outline by rows of small stones, and he illustrated several types of plan (Fig. 6.11). Although only a few examples of these features have been found in the Wādī al-Ajāl, unsurprisingly given the extended oasis belt and regular villages there, desert mosques are an important part of the desert heritage of Fazzān, and future recording of their locations,

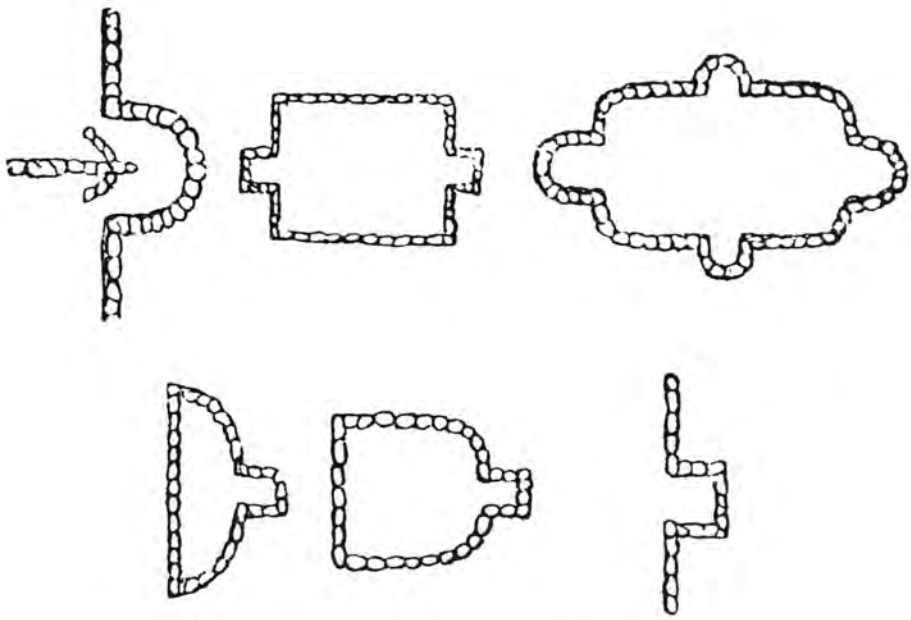


Fig. 6.11. Illustration of desert mosques (from Richardson 1848, 269).

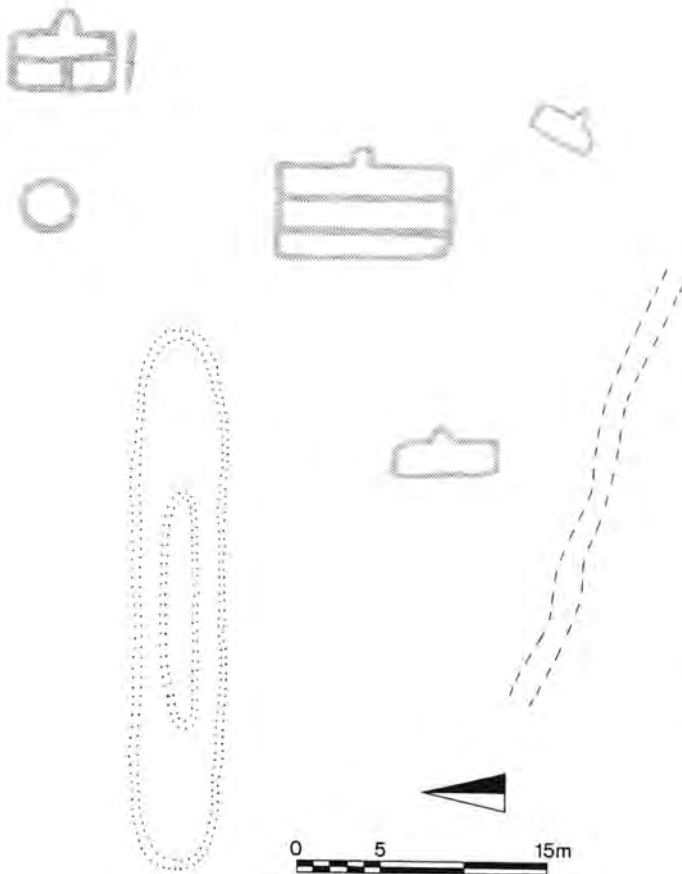


Fig. 6.12. Plan of desert mosques on Tinda plateau (TIN 21).

numbers and size may provide important evidence for a clearer understanding of the precise whereabouts of the old trade routes and the favoured locations of camps between wells and oases.

The desert mosque is not solely a feature of the caravan traders, as other mobile groups also had cause to worship in the desert. Clapperton (Bruce-Lockhart and Wright 2000, 92-94) described a group of desert mosques on the top of the Tinda plateau, south of Ubārī (they are still visible today, TIN 21, see Fig. 6.12). On top of this steep escarpment “lies buried a pious Shireef whose mortal remains the Tuaricks hold in great veneration and whenever they camp near Oubari they come up ... to pray for which purpose they have cleared several places on the top ... large enough for a man to say his prayers in.”

TYOLOGY OF TOMBS AND BURIALS

Introduction

“These tombs consist simply of circular heaps of stones, picked up from the rocks around. Some are large, perhaps a dozen yards in circumference. Mounting one, I found it hollow at the top; the stones had been merely heaped up in a circular ring. Within was a little sand settled, collected from the wind when it scatters the sand about ... The whole mountain range of the Wady, I am told, has heaps of stones piled up in this way. There is no doubt but that they are the graves of former inhabitants.” (Richardson 1848, 298-99).

The presence of vast cemeteries all along the foot of the escarpment that marked the southern edge of the Wādī al-Ajāl is one of the most remarkable features of the region. Discussions of the funerary monuments and practices of the Garamantes are primarily based on the early excavations of Caputo, supplemented by the observations of Ayoub, Daniels and others (Ayoub 1962a, 14-20; 1967a, 11-22; 1967b, 213-19, 1968a, 58-65; no date a, 1-11, 27-50; Caputo 1937, 312-21; 1951, 399-412; Daniels 1969, 41-44; 1970a, 33-35; 1971a, 265-68; el-Rashedy 1988b, 108-12; cf. 1988a; Ruprechtsberger 1989, 45-59; 1996, 147-51; Ziegert 1969, 54-57). The publication of the UNESCO Libyan Valleys Survey provides a useful basis of comparison from the pre-desert area to the north, though there are some significant differences in mortuary tradition between the two regions (Barker *et al.* 1996a, 142-49). Whereas the ULVS classification was primarily based on survey data alone, a sufficient number of tombs and graves has been excavated in Fazzān to allow more detailed commentary on sub-surface features, body orientation, etc. – though by no means as fully as one would wish (Di Lernia and Manzi 2002 appeared too late for full consideration here).

The funerary monuments of Fazzān, and especially of the Wādī al-Ajāl, are noteworthy for several reasons.

1. There is no reason to doubt that the vast majority of these are pre-Islamic monuments as invariably the only diagnostic ceramic material from these sites is Garamantian and many are aceramic. Early European travellers in the 19th century were assured by locals that the graves were those of Christians or Roum, whose ghosts wandered in the old burial grounds (Richardson 1848, 289 and 298-99). In 1933, Caputo paid a local Sheik to count tombs all along the Wādī al-Ajāl, using local people to carry out the ‘census’. The initial total of 45,000 was instantly recognised seriously to underestimate the visible numbers, and parts of the work were redone, yielding a total figure of c.60,000 (Caputo 1951, 210-12). CMD argued that this was itself a massive under-representation, and suggested that the true total was closer to 120,000 (Daniels 1989, 49). By any standards these are extraordinary large totals of preserved burials from antiquity and, although many were simple cairns of piled stones, studies have shown that overall there was a great variety of monument type.
2. There is significant variation in the morphology of these many burials, reflecting differing chronological, regional and social factors (see Caputo 1951, 241-406, esp. 399-406; Daniels 1971a, 265-68; Ruprechtsberger 1997, 51-65, for descriptions of the physical form of tombs). However, previous work has stopped short of devising a systematic typology for the funerary monuments, often using very broad catch-all terms to describe them (for example, cairns, chouchets).
3. There is rich evidence of a range of ritual features associated with the burials (offering-tables, stele, ritual enclosures, body deposition and grave goods, and so on), that offers a small window on the social beliefs of the people of the Libyan Sahara.

The funerary monuments of Fazzān in their Sabaran context

Although some aspects of the Garamantian funerary panoply are unique to that civilisation, many of the funerary monuments most commonly encountered in the Wādī al-Ajāl are paralleled in other areas of the Sahara (Milburn 1993; 1996). The Tuareg term *adebni* (plural *idebnan*) designates pre-Islamic Saharan funerary monuments of all types. The most impressive of these monuments (Milburn 1977; 1981) are the so-called key-hole enclosures around tumuli, or the antenna tombs (also frequently referred to as V-shaped monuments). But there is a great range of simpler tumuli and stone monuments also included in the general category (Camps 1961 remains the classic work, though its focus is primarily the Maghrib and the western Sahara; cf. also *Encyclopédie berbère*, s.v. *adebni*, 119-25). Much of the published literature is rather impressionistic, but a number of more detailed regional studies/surveys have been carried out in southern Algeria and Niger (Paris 1984; Savary 1966).

There is an important distinction to be made between a simple tumulus and a tomb, whether circular or square, with a built revetment – this applies to both low kerbs and a vertical outer wall. The latter are commonly referred to in the literature as *bazinas*, though the range of forms covered is extremely broad and usage of the term is by no means consistent across the Sahara and Maghrib. For instance, the term may describe tombs that are flat-topped, capped by round tumuli, or stepped and variously of square, rectangular or circular shape (*Encyclopédie berbère* s.v. *bazinas*, 1400-07). El-Rashedy (1988b, 90) uses the term *bazina* solely for quadrangular tombs in Fazzān. An important sub-type, the *bazina à carapace*, involves the horizontal surfaces of the monument being ‘paved’ with flat slabs – a feature encountered in the Wādī al-Ajāl area in some of the antenna tombs. Stepped constructions (*bazinas à degrés*) are extremely common and can reach very large sizes in both circular and quadrangular forms. The overall North African distribution of the quadrangular form does not favour a single diffusion from the East, where it might correlate with the Egyptian *mastaba* tomb, though an Egyptian connection is admitted as a possibility for the Fazzān examples by Camps (*Encyclopédie berbère* s.v. *bazinas*, 1403).

Choucha (plural *chouchet*) is a Berber term used to designate a particular type of drum tomb, normally with an internal inhumation in a cist (Daniels 1970a, 33-34, uses the term ‘*couchets*’; el-Rashedy applies it to any circular tumulus, while Caputo’s term ‘pseudo-crateres’ describes the degraded form of the same type: Caputo 1937, 312). Originally recorded in the Aurès area in Algeria, the term *chouchet* was employed with reference to a high drum (H: 2-3 m, by Diam: 3-15 m), with well-built outer walls. Large slabs covered the central burial (generally crouched in a restricted cist). Saharan *chouchets* are to be distinguished from those of Maghribian Tell in that they lack the large cover slabs and generally have a hollow central shaft (what Camps terms ‘monuments à margelles’, see *Encyclopédie berbère* s.v. *chouchet*, 1936-9). Because of the potential for visual confusion with the term *bazina* (especially when *bazina* tombs have been robbed through their tops), and the inconsistency with which the term has been employed in the past, we have not used it systematically in our classification.

Dolmen tombs are largely absent from the Sahara, despite their prominence in the Tunisian and Algerian tell regions. There are a few apparent exceptions in Fazzān, mostly chambers below cairns made from large stone slabs and where the covering tumulus has been stripped away. The general choice not to use megaliths was presumably cultural, rather than due to labour limitations. Certainly the scale of the *adebni* constructions can be very large, especially in the antenna tombs and so-called key-hole monuments (the former are attested in the Jarma area, but not the latter: Milburn 1983). It is also important to stress the very long-term nature of construction of *adebni* in Sahara. Some dated examples are as early as the 3rd-1st millennia BC, but others date from as recently as the 15th-16th centuries AD in areas where the

pre-Islamic traditions remained strong. Some of the forms of burial structure are also very long-lived, and caution must be expressed about attempts to date tombs closely on morphological grounds alone.

While the key elements of the Fazzān funerary repertoire can be recognised as Saharan, there are some similarities with external areas (such as northern Libya or Egypt/Meroe), though detailed analysis suggests small-scale cultural borrowing rather than large-scale diffusion (Barker *et al.* 1996a, 144-49; Geus 1991; Reinold 1991). The classification of tombs and associated funerary features that has been evolved here is intended to be primarily descriptive of the physical form of the structures, rather than adding to the ambiguities associated with the usage of terms such as *bazīna*, *chouchet*, *mastaba*, and so on. In this report we have preferred to use more descriptive categories to differentiate between tombs, rather than a blanket term such as *adebni* or *bazīna*. The present-day appearance of many of the tombs on the escarpments, typically consisting of a low ring of rubble around a central depression, is much altered from their original construction. There are several possible explanations of the central depressions in these structures: they could be due to systematic robbing of the graves, or to natural collapse of the superstructure into the grave chamber, or to an original feature of the design (so-called ‘crater tombs’ are common in the Sahara: Camps 1961, 71-74; Milburn 1993, 369 and 372). Where rectangular tombs have been robbed through their roofs, as at the Royal Cemetery GSC 30), the rectangular shape of the structure is often obscured by the spoil, and the same appearance of rings of rubble results. Caution must be exercised in assigning tombs to a particular type and many burials are not susceptible to close classification without clearance or excavation. A further complication is that there is a distinct type of shaft burial with limited superstructure that visually resembles the robbed state of other tomb types (see below).

The description of tomb types will start with a discussion of a few types of larger monumental tombs and then work through the range of surface markers more commonly employed. A number of common Saharan types only rarely encountered in Fazzān is also described. Some tombs are associated with other features: funerary enclosures or other built features attached to the tomb, stele, offering-tables or offering vessels. These features are described and classified in the sections following the main tomb classification (see now, discussion in Di Lernia and Manzi 2002, 17-37).

A key apparent distinction when discussing the funerary archaeology of Fazzān concerns the materials of construction. Graves are commonly marked by structures built of either stone or mudbrick, and the different characteristics of the two building materials may account for some elements of the variation apparent in burial form. However, when broken down into their simple geometric shapes and morphological characteristics, it is clear that many tomb types were built in mudbrick and stone alike.

Mausolea

This term is restricted to a class of monument constructed using ashlar quality masonry and following Mediterranean architectural traditions (columns, capitals, pilasters, cornices and mouldings, pediments). It resembles a type of mausoleum of Hellenistic-Roman type that was common in Tripolitania, the Mediterranean end of the major trans-Saharan route passing through Fazzān (Barker *et al.* 1996a, 144-48). However, in describing them as mausolea, it must be admitted that no burial has been located within or below any of the Fazzānī examples (see below).

The type site is Qasr Waṭwāt (UAT 1), especially for its superior preservation which allows a reasonably complete reconstruction of the superstructure (Figs 6.13-6.14). The other examples (Fig. 6.15) are known only at the level of their stepped bases (TWE 1.1-1.3 – three tombs, FUG 1), but are clearly of the same type (see Ayoub 1962a, 14-16; Caputo 1937, 314, ‘campione del Sahara romanizzato’, 317-18; 1951,

252-70; Daniels 1971a, 267-68; el-Rashedy 1988b, 94-97). The Waṭwāt ‘mausoleum’ was first reported by Clapperton, (Denham and Clapperton 1826, XLI-XLII; Bruce-Lockhart and Wright 2000, 87-88, fig. 1, p. 10), re-visited and re-illustrated by Barth (1965, 144-46) and Duveyrier (1864, 276, tav. XIV) (Fig. 1.6).

The Waṭwāt mausoleum consists of a three-stepped podium (c.3.25 m east-west, 2.4 m north-south, H: 1.30 m. At the western end of the podium rose the cella of the



a)



b)



c)

Fig. 6.13. Mausolea: a) and b) Waṭwāt (UAT 1); c) Tuwash (TWE 1).

tomb (c.2 × 2 m, H: c.4 m), comprising of engaged pilaster bases and mixed Ionic/Corinthian capitals at each corner (Fig. 6.14). The pilasters are not rendered in relief. The frieze zone above the capitals is unadorned, with a simple cornice above. CMD’s reconstruction of UAT 1 (and FUG 1 was clearly of the same type) places a pediment with winged acroteria on top of this tower-like main structure (whereas the mausoleum as restored has a flat roof). Other architectural fragments at UAT 1 show that it had a colonnaded porch (presumably supported on only two columns) (Caputo 1951, 558-60; cf. Stucchi 1987 for parallels).

While the Waṭwāt mausoleum has inevitably attracted most attention, it is interesting that it is actually the smallest of the five known mausolea in terms of ground plan, and the Tuwash group of three must have been far more impressive (they are also located almost equidistant from Old Jarma as UAT 1). In three examples it is possible to reconstruct something of the superstructure on top of the stepped bases (UAT 1, FUG 1 and TWE 1.1), and in each case it is clear that the mausoleum faced E.

The question of whether there were burials beneath the mausolea is unresolved. The Italians failed to find a burial chamber beneath UAT 1 and CMD evidently examined the Tuwash

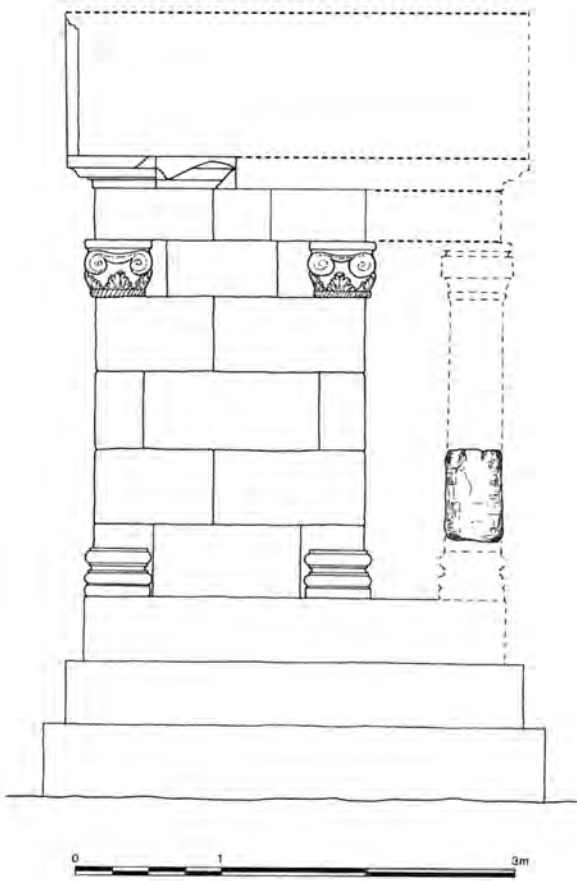


Fig. 6.14. Elevation of Wawwat mausoleum, showing reconstructed porch.

and Ibrayk examples with a similar negative result. But although no trace has been noted of a proper funerary chamber, short of fully lifting the foundations it is hard to see how there can be absolute certainty that there was no burial shaft beneath. Caputo chose to associate two cremations in amphorae found within a few metres of the mausoleum UAT 1 with the mausoleum itself, though such an arrangement would be peculiar. He suggested that the use of cremations implied that the monument had been constructed for non-Garamantian (possibly Italian) merchants. He was doubtful, however, of Petragarni's mischievous and uncorroborated claim to have seen a dedication to a Cecillia Plautilla (allegedly a proconsul's daughter who is supposed to have died here on a journey) (1928, 307-08 and 389-90). The story is plainly a fabrication and the absence of burials beneath the monument could be taken to favour its construction for a non-Roman. Much

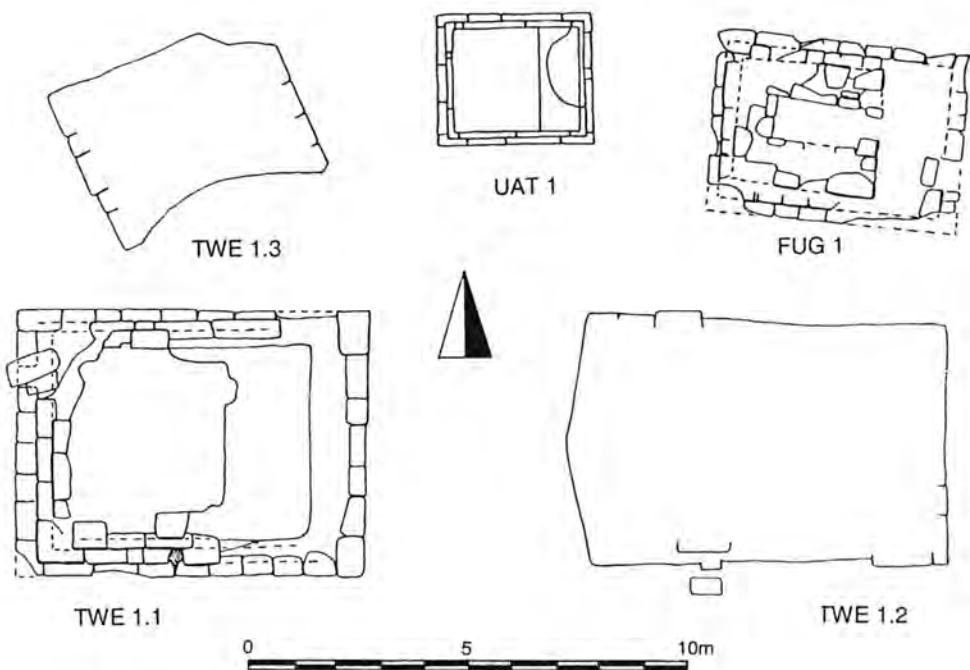


Fig. 6.15. Plans of mausolea in Wadi al-Ajal (after Daniels 1971a).

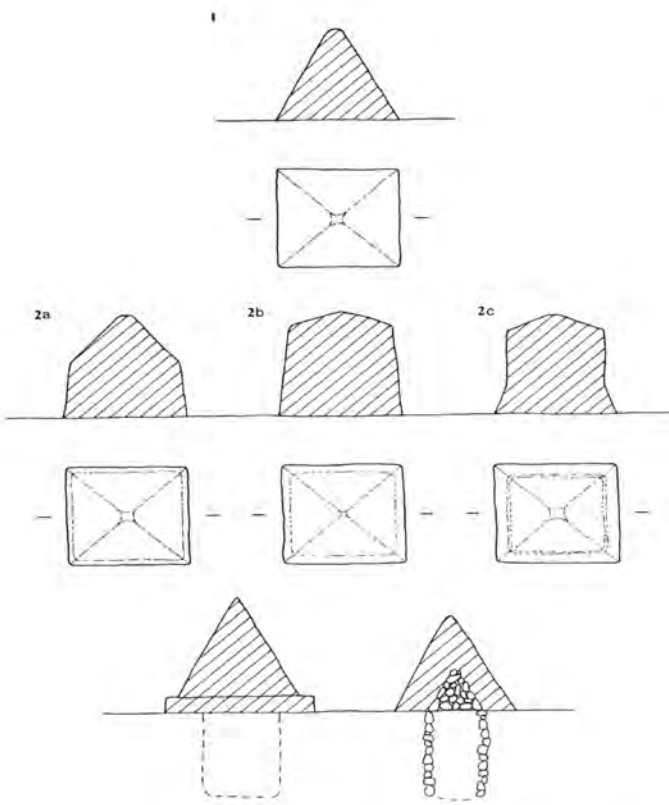


Fig. 6.16. Pyramid tomb types and (below) internal structure of pyramids.

Pyramid tombs

The Wādī al-Ajāl contains several cemeteries of mudbrick pyramid-like tombs (Ayoub 1968a, 59-61; Caputo 1951, 363-73; Daniels 1970a, 34-35; 1971a, 267; 1989, 49; el-Rashedy 1988, 92-94; Ruprechtsberger 1997, 54), though not all appear to have been built as true pyramids of equal sides and even slope (Fig. 6.16). Some examples resemble rather more the obelisk or tower tombs known in the pre-desert, in that they consist of a pyramid form atop a square tower-like base (Barker *et al.* 1996a, 144-48). The most famous cemeteries are those at al-Kharā'iq (CHA 1) and al-Ḥatīya (ELH 1-2) and these have often been illustrated photographically (Ayoub 1968a, 59-61; Caputo 1951, 363-73; Daniels 1970a, 34-35, pl. 7; 1971a, 267; el-Rashedy 1988, 92-94; Ruprechtsberger 1997, 42 and 48) (Fig. 6.17). Apart from a partial plan of about 10 of the al-Kharā'iq tombs (Caputo 1951, 363-64), none of these cemeteries has been planned before. The original form of the pyramids is partly obscured at even the best-preserved sites (CHA 1 and ELH 2) due to tomb robbing, complicated at the latter site by the effects of extensive wind erosion to the base of the monuments. Nonetheless it would appear that four main variants can be identified (Fig. 6.16).

Type 1 is a true pyramid that originally sloped in from ground upwards.

Type 2a is a pyramid on top of a vertical mudbrick square section pier.

Type 2b is a tall near vertical square section pier that may have had a small flattish pyramid structure at the top.

Type 2c has a sloping base section with a straight shaft above and presumably a pyramidal top.

recent scholarship has demonstrated the adoption of Mediterranean-style mausolea by native Africans in other parts of the Libyan pre-desert and at the oasis of Ghadāmis (Barker *et al.* 1996a, 144-48; Mattingly 1995, 162-66; 1999, 385-97). Given the number of these structures known in the vicinity of Jarma it is probable that some at least were built for Garamantian notables or rulers. In the absence of burials directly below these structures, it is possible that they were adopted as 'cenotaphs' by members of the Garamantian ruling elite, expressing their power and culture in a new way, whilst they may have chosen actually to be buried in tombs of more traditional type. Alternatively, we cannot exclude the possibility that the structures could have been adopted to serve as shrines within cemeteries.

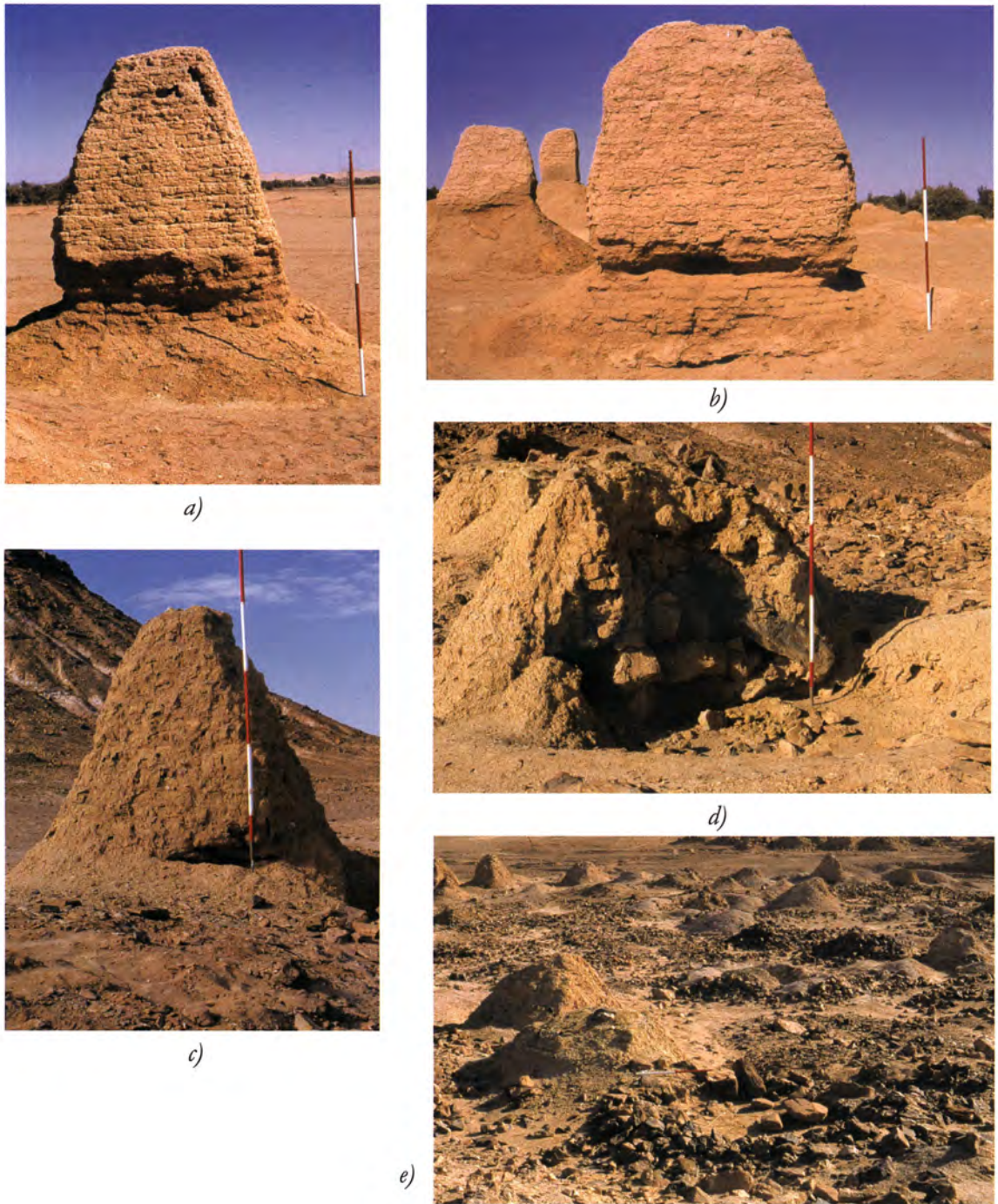


Fig. 6.17. Pyramid tombs: a) ELH 2.3; b) ELH 2.4; c) CHA 1; d) CHA 1, showing internal armature of stone blocks; e) CHA 1, general view, showing juxtaposition of circular tombs and pyramids.

At ELH 2, some pyramids have undergone restoration since the 1960s and this has exposed in several instances (ELH 2.9-12, 2.97-98) a low square platform below the pyramid (unless these platforms are in their entirety an addition of the recent conservation, which seems unlikely). It is possible that further burials in the cemetery sat on similar platforms, but this is not certain because of the depth of windblown sand around the ELH 2 tombs. Only one of the tombs at CHA 1, excavated by the Italians, has provided evidence of similar platforms there (Caputo 1951, 369-70, fig. 161, tomb IX).

Burials were made in deep circular or square shafts (up to 2 m deep below the pyramid – CMD abandoned an excavation below one of the pyramids at ELH 1 at a depth of 1.2 m without having reached the burial). At al-Ḥatiya shafts were sometimes lined with mudbrick and at al-Kharāʿiq sometimes with stone.

The size of the pyramids varies considerably, from the largest examples, which measure $\approx 4 \times 4$ m at the base by over 3 m tall, to miniature examples that were probably never much bigger than 1×1 m by 1 m tall. The al-Ḥatiya examples are solid mudbrick structures, whilst at al-Kharāʿiq the constructors reduced the amount of mudbrick required by incorporating a core (or armature) of stone blocks in the centre of each pyramid. The difference simply reflects the distinctive locations of the two sites – ELH 1 situated in the oasis belt 3 km from the nearest source of stone on the escarpment pediment, while CHA 1 lies on the southern edge of the oasis belt at a point where an isolated spur of the escarpment made a supply of stone readily available.

When first encountered, the Fazzān pyramids were considered a localised novelty, perhaps introduced experimentally into the local funerary repertoire for a short period only. Caputo believed the form to be late Roman in date on the basis of his work at CHA 1 (Caputo 1951, 363-73), but follow-up survey by the Fazzān project suggests that the pyramid form may have spanned the 1st-4th centuries AD at least. There are also now data to suggest that the form was more widespread and more important than hitherto considered. To the west of Jarma, in addition to the two main pyramid cemeteries at ELH 1 (minimum of 37 pyramids) and 2 (minimum of 90), there are other pyramid cemeteries now known at TAG 12 (≈ 40 burials of pyramid or square form), TAG 32 (at least 5 pyramids) and ELH 7 (1 surviving). Moreover, aerial photographs of ELH 2 have revealed numerous additional tombs around the visible monuments, suggesting that the form was far more common than the rare survivals might suggest (Fig. 6.18). To the east of Jarma, in addition to CHA 1 (155 pyramids, Fig. 6.19), there are now known to be at least three other cemeteries with pyramids: GER 11 (1 example in area excavated), GER 13 (1 tomb), TWE 1 (2 examples). There may well once have been many other examples in valley-centre cemeteries, as the form is essentially a mudbrick tomb-type and was not a feature of the better preserved scarp-edge cemeteries (the sole exception is CHA 1, where the cemetery sits at the junction between oasis and escarpment). The lack of excavation on Wādī-centre cemeteries (apart from Sāniat bin Huwaydī), and the likely dereliction of those sites below modern cultivation, obscures the full picture of their distribution. On the other hand it is perhaps relevant that the known examples all cluster within a ≈ 30 km radius of the Garamantian capital.

Rock-cut tombs and subterranean chambers

Rock-cut tombs are not attested in the Wādī al-Ajāl and in general appear very rare in Fazzān. This is of significance as there was a strong tradition of cutting rock chambers (sometimes with elaborate façades) into cliff-like escarpments in many other oases between the Nile and Fazzān, as at Sīwa and al-Jaghbūb (Fakhry 1973, 1974; Mohammed 1998; Mattingly 2000e/f). Subterranean rock-cut mortuary chambers are also common in other oases of the eastern Sahara.

There are a few examples of this sort of tomb in Fazzān, including a subterranean chamber tomb at Zuwīla excavated by Ziegert (1969, 51-52). A central shaft gave onto two horizontal burial chambers in which at least four bodies were interred. There is also a group of rock-cut features at the foot of the prominent hill on which the ancient settlement of Idrī was located. One example illustrated by Barth is shaped like a clover-leaf with three rounded chambers giving off the entrance area (Barth 1965, 135-36, fig. on p. 137). Both Barth and Clapperton, who saw these in the 19th

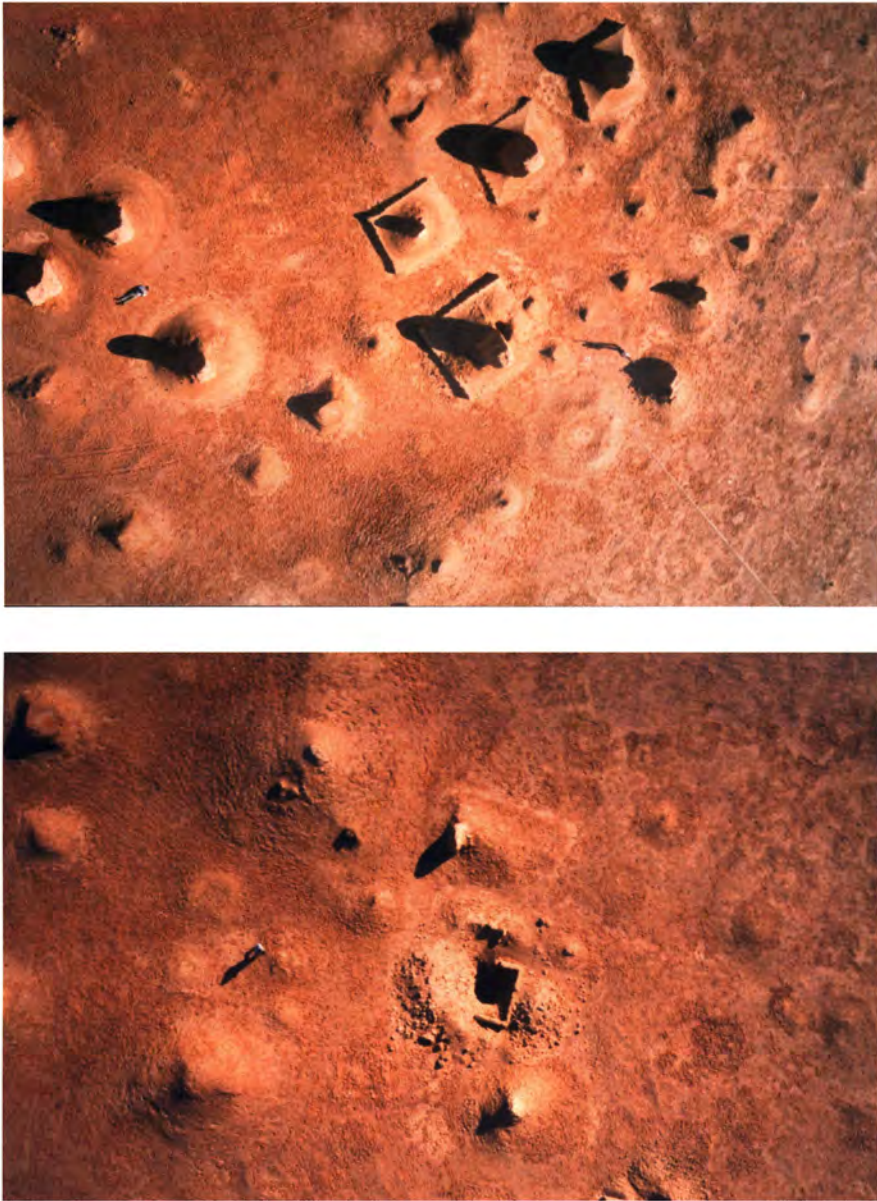


Fig. 6.18. Aerial views of cemetery ELH 2: a) area of largest pyramids, showing arrangement of tombs in rows; b) area on north-western fringe of cemetery, revealing presence of many additional tombs not visible at ground level.

century, report people living in these man-made caves, but the position and the morphology seem much more appropriate to ancient tombs (Denham and Clapperton 1966, 181-82; Bruce-Lockhart and Wright 2000, 107).

Future work in other parts of Fazzān should thus take account of the possibility that rock-cut or subterranean tombs may have been adopted on a localised basis.

Surface structures

Superficially many of the tombs from the extensive dispersed cairn fields and from the densely packed nucleated cemeteries appear similar, and this has been exacerbated by the means by which many have been robbed through their centre from above, the debris thrown out obscuring important features. What follows is an attempt to suggest

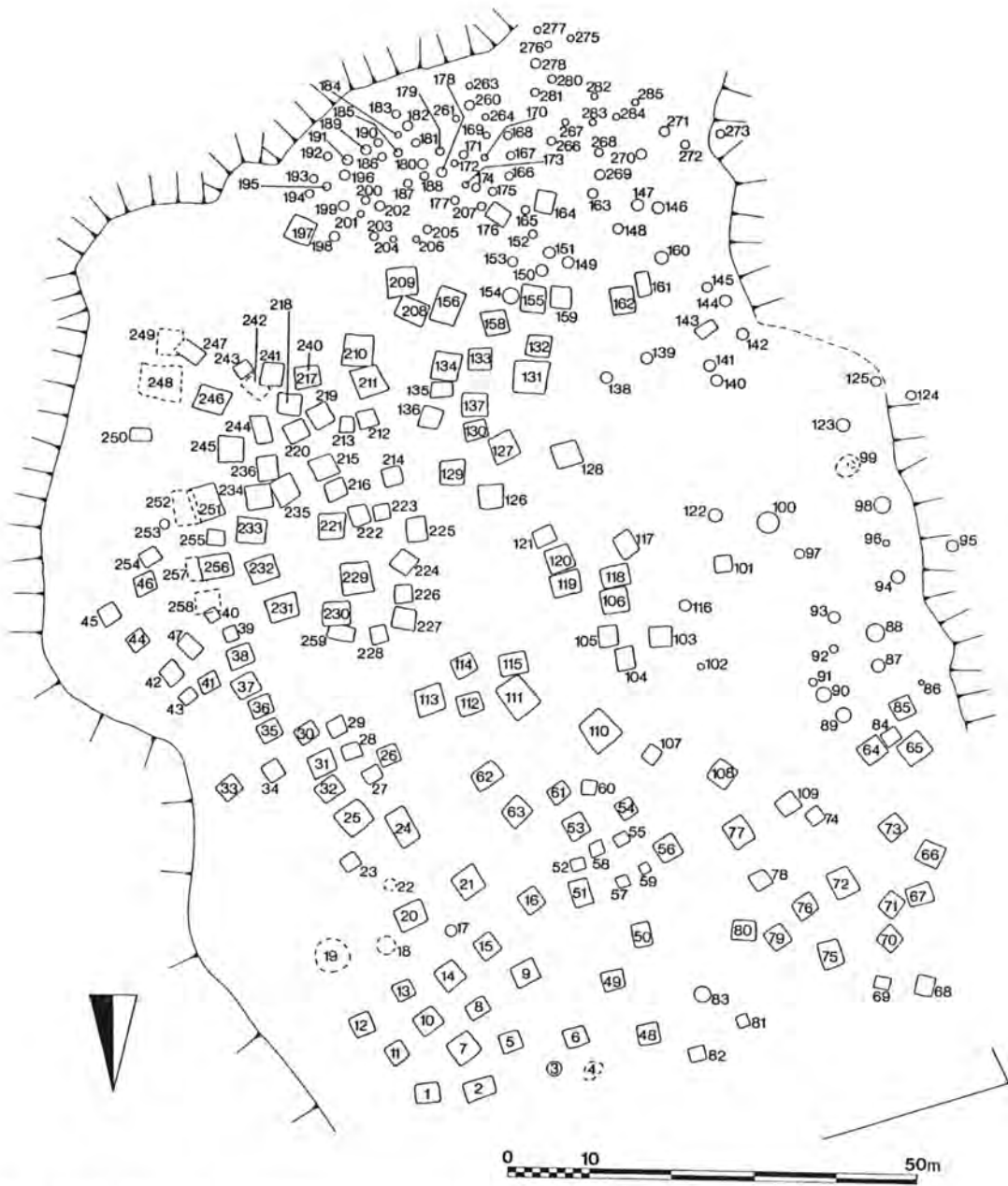


Fig. 6.19. Plan of al-Kharāsiq pyramid cemetery (CHA 1-2).

descriptive criteria by which they might be classified (Fig. 6.20). This list is organised by shape, but we may note that many of the different sub-types are executed in a range of shapes – for example, we can find examples of stepped tombs that are square, rectangular, oval, multi-sided, and circular. There is of course further variation to consider in terms of size, the number of steps and the materials of construction.

Type 1 Simple Cairns (Figs 6.20-21)

Very large numbers of burials in the Wādī al-Ajāl comprise simple cairns and only close examination or excavation can sometimes distinguish more accurately between various sub-types.

Type 1a. The **mound cairn** is a simple circular heap of piled stones, generally of low conical form. Dimensions can vary greatly from c.1-3 m diameter and from 40 cm to over 1 m in height, though the majority is towards the lower end of the range. The type is mostly found in dispersed cemeteries, but is also present in nucleated cemeteries and appears to have been a very long-lived form of burial (Milburn 1993, 365, 372 refers to the type as a tumulus).

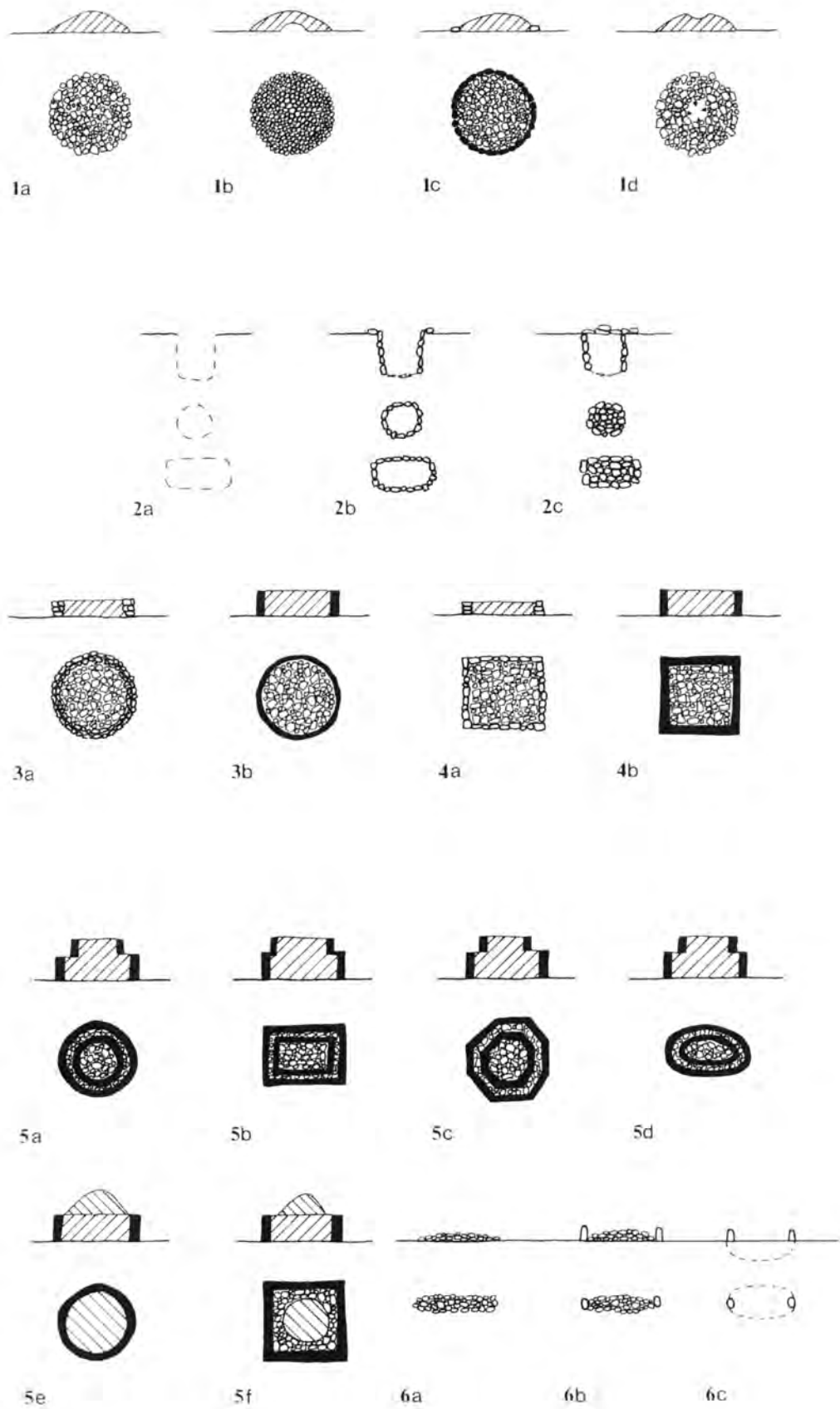


Fig. 6.20. Tomb typology.

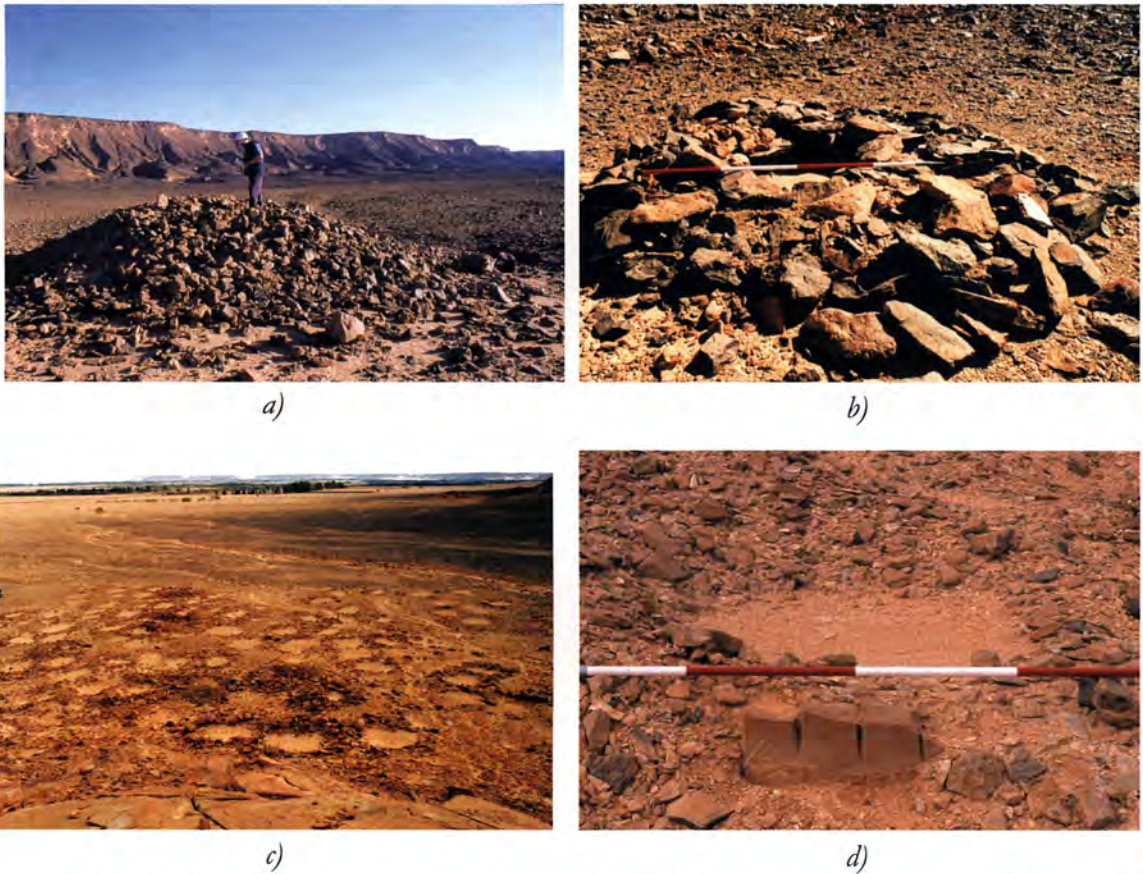


Fig. 6.21. Tomb types - cairns and shafts: a) type 1a cairn (TAB 19); b) type 1b corbelled cairn (TAB 20); c) type 2 shaft burials (ZIN 280); d) type 2b shaft burial (ZIN 280).

Type 1b. The **corbelled cairn** is a more carefully constructed version of the mound cairn, generally with carefully overlapping layers of stone to produce a corbelled central grave space.

Type 1c. The **kerbed cairn** has a ring of carefully laid (often larger) stone blocks defining its outer circumference. Although normally circular, examples have been noted of oval or sub-rectangular form.

Type 1d. The **crater cairn** is a circular heap of piled stone with a depression in the centre. This was evidently a common type in the Quqamān cemetery at Ghāt (Pace *et al.* 1951, 455-58). The depression is an original feature of the construction, not the result of robbing, though it can be very difficult to discriminate between this type of cairn and a robbed grave (for the type see Camps 1961, 71-74; Milburn 1993, 369; Hugot 1962 records the type in Chad).

Type 2 Shaft Burials (Figs 6.20-21)

This group covers a range of burials where the most significant element of the burial structure is a shaft (mostly circular or oval). Surface traces comprise at most rings or low piles of stones. These types are quite common in the nucleated cemeteries of Garamantian date.

Type 2a. The simplest version comprises a **circular or oval shaft** that is often marked at the surface only by a slight depression, in which sand has collected.

Type 2b. A circular or oval shaft marked at the surface by a **stone ring**, with no more than one or two blocks piled up around the opening of the shaft. The shafts are also commonly lined with slabs of rock.

Type 2c. The **capped shaft** comprises a circular or oval shaft, mostly lined by slabs, capped with a low pile of flattish stones. This is a very common type, though hard to differentiate from a small cairn when robbed.

Type 3 Drum cairns and drum tombs (Figs 6.20, 6.22)

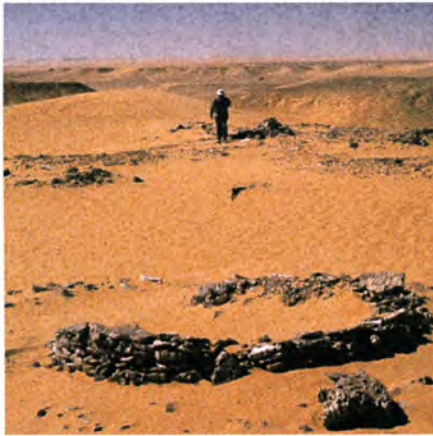
These comprise a class of circular burials with built outer walls and flattish tops. The interior fill is generally of loosely piled stone, but can also include layers of gravel and chippings. The distinction between a drum cairn and a drum tomb is largely a subjective one based on the quality of the coursing



a)



c)



b)



d)



e)

Fig. 6.22. Montage of drum tombs and stepped tombs: a) type 3a drum cairn with associated stele and offering table (ZOU 2); b) type 3b low drum tombs (BBG2); c) type 5b stepped tomb, with plaster facing (GSC 30.5); d) type 5b stepped tombs with 3-tiers (TAG 1); e) mud plaster facing (TAG 1).

and construction of the outer perimeter wall. The rough-coursed walls of drum cairns tend to be lower than the well-coursed, carefully jointed walls of drum tombs. The underlying burial structures is most likely to be a built stone cist or a shaft, with shafts being more common with the tomb type. Some examples use corbelling in the centre of the drum.

Type 3a. The **drum cairn** has a vertical or near-vertical outer revetment wall and is generally flat-topped. Coursing will be irregular, unbonded, with stone blocks of many different sizes employed. The outer face is somewhat uneven in appearance. A drum cairn does not normally stand much over 60 cm high.

Type 3b. The **drum tomb** has a vertical outer revetment wall and is generally flat topped. Coursing is regular, sometimes with mud-bonding, and may involve the use of either carefully selected and jointed stone or of mudbrick. The outer face appears fairly regular and the tomb can commonly stand up to 1 m or more in height.

Type 4 Square or rectangular built cairns or tombs (Fig. 6.20)

These are similar to Type 3, but consist of square and rectangular burials with a vertical outer wall and flattish tops. Again, the prime distinction between a built cairn and a tomb concerns the quality of the construction of the perimeter wall. Rougher-coursed (and often lower) versions are generally to be classified as built square cairns, with better constructed examples, with more regular coursing as square tombs. The underlying burial structure is most likely to be a built stone cist or a shaft, with shafts being more common with the tomb type.

Type 4a. The **quadrangular built cairn** has rough-piled stone outer walls and is generally flat-topped. Coursing is irregular, unbonded, with stone blocks of many different sizes employed. The outer face is somewhat uneven in appearance and does not normally stand much over 60 cm high.

Type 4b. The **quadrangular tomb** has a vertical outer revetment wall and is generally flat-topped. Coursing will be regular, sometimes with mud-bonding, and may involve the use of either carefully selected and jointed stone or of mudbrick. The outer face appears fairly regular and the tomb can commonly stand to up to 1 m or more in height.

Type 5 Stepped tombs (Figs 6.20, 6.22-23)

An important class of burials consists of stepped monuments, in a variety of shapes. The stages generally have vertical sides (Types 5a-d), but some examples of mound cairns set on a built base have also been recognised (Type 5e). The most common types are the quadrangular and circular stepped structures (Types 5b and 5a), and these occur in both stone and mudbrick construction. The visual difference between these types may have been less pronounced in the past than appears to be the case today. There is evidence to suggest that both types were often treated with an external mud-plaster coating, though this often does not survive at all well on the stone-built tombs.

Type 5a. The **circular stepped tomb** consists of two (rarely more?) superimposed drums delineated by built walls, with an internal fill.

Type 5b. The **quadrangular stepped tomb** consists of two or three superimposed stages of diminishing size, with well-built outer walls. Although most commonly these tombs are $\approx 2 \times 2$ m to 3×3 m by 1 m or less high, the largest examples recorded (GSC 30) are over 7×7 m in plan and some examples at TAG 1 stand over 1.50 m high.

Type 5c. The **multangular tomb** is rare – represented by an octagonal example from TAG 1, but in a collapsed state examples would be difficult to distinguish from the circular stepped tombs.

Type 5d. The **oval stepped tomb** is a sub-rectangular version of Type 5b, noted in some dispersed cemeteries (TAG 6).

Type 5e. The **conical stepped tomb** comprises a small conical mound cairn placed on top of a drum cairn/drum tomb, to form a distinctive two-tier structure (GSC 6.2).

Type 6 Simple graves

The principal form of burial under Islam consists of a north-south aligned grave, often demarcated at the surface by a low mound or by small stones marking the head or foot end of a grave. The body is buried with head facing east. Richardson (1848, 265-67) describes this type of burial also being dug with an east-west alignment and the head facing south in the case of a female slave who had died in transit (Richardson provided a head- and footstone for the grave, suggesting that these extras were not normally provided for non-Moslems).

Type 6a. A simple cigar-shaped **grave mound** generally measures between 1.5-1.8 m in length. The material of the mound may comprise small stones, chippings or simply earth.

Type 6b. The **grave mound with head/footstone** is similar to type 6a, with the addition of a vertically-set stone at one or both ends of the grave. The most common form in Fazzān appears to be the provision of both head- and footstones.

Type 6c. The **grave marked by stones** consists of a burial in a cut that had been backfilled flush with the ground surface, with its position marked only by vertically-set stones at the head and foot of the grave. This type is common in the early modern cemeteries of the Wādī al-Ajāl.

Some other common Saharan tomb Types (Fig. 6.24)

Keyhole monuments

One of the principal types of Saharan monument in southern Algeria is the so-called keyhole structure, examples of which can be 30 m in diameter (Faleschini 1995; Milburn 1983; 1993; Savary 1966, 35-67). The structure consists of a central cairn flanked by concentric rings of stone, with a stone-lined approach corridor from the eastern side. Although this type has not been recorded to date in Fazzān and only a single example is known in Wādī Tanzzūft, the emphasis on the eastern orientation is a feature held in common with many of the tomb types of southern Libya (Fig. 6.24a).

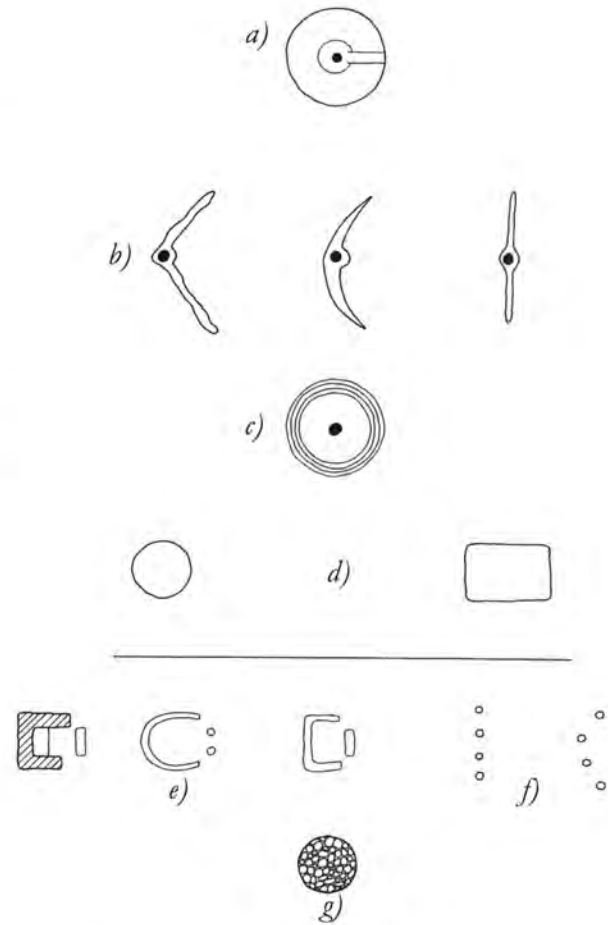
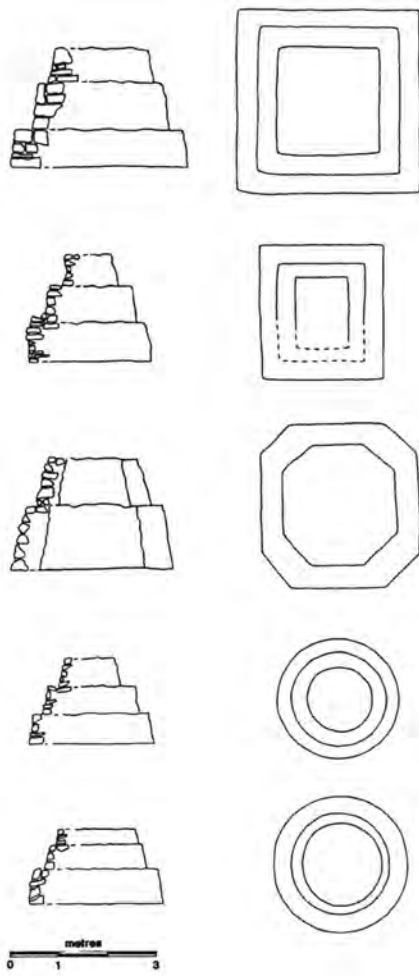


Fig. 6.23. Tomb superstructures at TAG 1.

Fig. 6.24. Some other Saharan monument types.

Antenna tombs

Antenna tombs or V-burials are a well-recognised Saharan type, though there may be considerable more diversity in form and date than sometimes recognised (Reygasse 1950, 56-62). The most commonly attested form consists of a central cairn burial, with two radiating ‘antennae’ demarcated by lines of stones pointing approximately north-east and south-east (Figs 6.24b, 6.25-6.27). In other cases, the central burial has a more lozenge shape, or there are additional stone lines encircling the burial (*Encyclopédie berbère* s.v. antennes (monuments à), 710-12; Faleschini 1997; Faleschini and Palmentola 1990; 1991; Gauthier *et al.* 1997; Le Quellec 1990a; Milburn 1981, 210-11; Reygasse 1950, 56-62; Scarpe Falce and Scarpe Falce 2000). There are numerous examples of these monuments on the top of the Massāk Šaṭṭafat, south and south-west of Jarma, but at least nine examples are now known from the Wādī al-Ajāl (TAB 1, 2, 9, EDS 12 (x2), ELH 19, TWE 44, BNH 11, 14). Pauphillet (in Bellair *et al.* 1953, 91, 93) appears to refer to further examples of antenna tombs in the al-Qrāya/ar-Raqayba area (Fig. 6.25).

The size of these structures varies greatly, with the arms being anything from a few metres to up to 50 m in length. The two arms are often of different lengths and of slightly sinuous course (Figs 6.26-27). A peculiarity of the type is that although these monuments look spectacular when viewed from above, this was clearly not a primary concern of the constructors as most of them are not in positions where they can be seen from above: at ground level they can be hard to observe in their entirety. This suggests that it was the internal features of these structures rather than their external visual aspect that was important to the builders. The arms were often delineated by small slabs set edgewise in the ground surface, with the space inside being paved in some cases (TAB 9) or filled with specially selected coloured stones (as in the case of an example on the Massāk). Variant forms of the antenna tombs include more lozenge-shaped and crescent-shaped examples (Milburn 1993, 367-71).

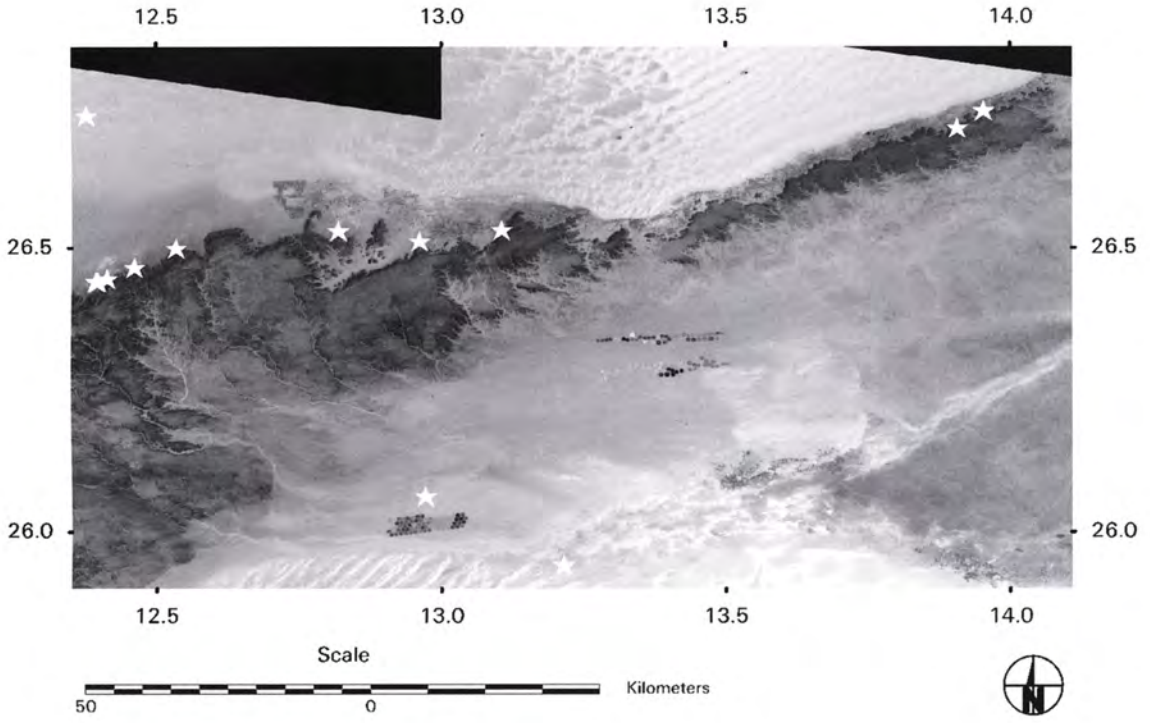


Fig. 6.25. Satellite image showing location of antenna tombs located during the FP.



Fig. 6.26. Air-photo of antenna tomb ($25^{\circ}25.561$, $10^{\circ}47.233$) on northern edge of 'Arq Wān Kāsā.

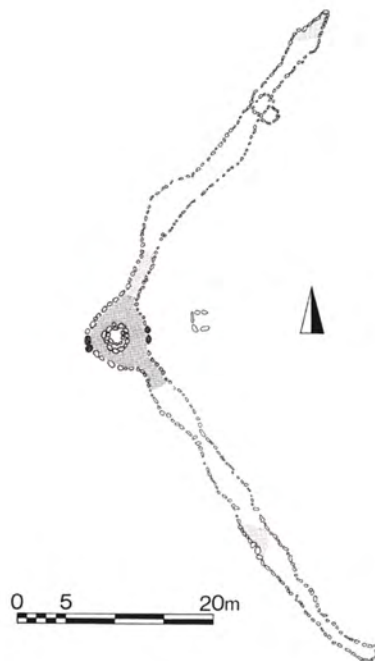


Fig. 6.27. Plan of antenna tomb near Tīn Abūndā (TAB 9).

It is clear that orientation of the structure was significant in many cases. Although other orientations are known, the antenna tombs most commonly face approximately E, when the angle between the two antennae is bisected. In some instances, this impression is heightened by the existence of higher sighting stones on the western and eastern sides of the central monument (TAB 9); or 'altars' placed a short distance from the tomb on the eastern side, or by lining up other cairn burials to west and east of the central burial. It is this eastern orientation that took precedence over the visual impact of being able to see the monument to maximum effect. The dating of antenna tombs is uncertain (Milburn 1996 leaves the question open). Italian excavations of a cemetery at Tin Abūndā (Caputo 1951, 384-86) produced nothing diagnostic from an antenna tomb, but an iron artefact was found in a nearby cairn. This might suggest a date for the cemetery within the 1st millennium BC, but excavation in 2001 of the robbed spoil around a central burial in another antenna tomb close to Jarma (TWE 44) revealed a handful of crude ostrich eggshell beads and a few mid-late Pastoral lithics (Mattingly *et al.* 2001). At a third location in the Dahān Ubārī, an antenna tomb (EDU 28) was constructed over a dried-up lake bed, using slabs of the calcrete crust to form its outline. The most likely interpretation at present is that the antenna tomb is a form of individual elite burial of late Pastoral date, after the major climatic downturn in the region and at a time when individual authority was on the rise. It may be significant that most of the recorded examples in the Wādī al-Ajāl come from the western and eastern fringes of the valley. The other concentration of examples on the Massāk would support the interpretation that the type was primarily associated with pastoral groups.

Cairns with straight stone alignments

Milburn has noted that a variant on the antenna tomb has straight arms running out on either side of a cairn burial (1981, 212; 1993, 368-69, his 'axle' or 'propellor' type; cf. Camps 1961, 174-76). No exact parallels for this type have been seen in the Wādī al-Ajāl. However, c.15 km to the south-south-east of Jarma, in a broad Wādī running north-south out towards the Wādī Barjūj, a dense group of unusual stone alignments was spotted at 26° 25.83/13° 07.65 by Mike Keane and reported to the FP in 1999. These features consist of several groups of lines of small stones laid in single file down the eastern escarpment of the wādī. The lines are quite close one to the next, generally within 5-10 m and their total east-west length can be 50 m and more (the western end of many lines in the valley floor may have been partly obscured). A large number of the lines have small cairns of piled stone towards their lower western ends, where the slope flattens out a bit. These cairns seem to fall into an approximate north-south line. There are more than 20 lines in total, but a full survey has not yet been carried out. These features are clearly different from the axle monuments described by Camps and Milburn, which generally have a north-south axis, but the most likely explanation is that the cairns indicate burials and the eastern alignment has some cultural significance, as with the antenna tombs.

Cairns inside circular enclosures

Concentric rings of stones set into the ground are another recognised Saharan type (Camps 1961, 86-89; Milburn 1993, 368-69; *Encyclopédie berbère* s.v. bazinas à enceintes concentriques non appareillées, 1401). Some of these circles contain central burials. A single example of this type of feature (Fig. 6.24c,



Fig. 6.28. Cairn with enclosure of concentric stone rings (ITF 13).

6.28) has been recognised by the FP to west of Ubārī (ITF 13). Its date is unknown. No doubt other examples would be recorded by careful search of the Wādī Irāwan and other pastoral zones.

Stone platforms

Circular low platforms of stones are another common Saharan type of monument (Fig. 6.24g) and similar features have been noted in the Massāk Şaţţafat area (Milburn 1993, 364-69), though examples have not yet been recorded in the Wādī al-Ajāl.

Circular and Rectangular enclosures

Not specifically attested in Fazzān as yet, these are relatively common in the Sahara as a whole (Fig. 6.24*d*; cf. Milburn 1993).

Smaller structures

A range of other minor Saharan stone monuments might also be expected in Fazzān, and though precise parallels for these are not known in every case at present, they are listed here in the hope that future research will fill out knowledge. Many of these structures are probably associated with pastoral groups of the late Neolithic and later periods and in the Wādī al-Ajāl any early feature are likely to be swamped by the cemeteries of farming communities. However, on the margins of the oases and in mountainous zones such as the Tadrart Akākūs and Massāk Ṣaṭṭafat, careful search is likely to reveal a greater range of such stone features.

‘Chapel’ Monument.

This type has been identified by Camps (1986) as especially suitable for the practice of ‘incubation’, where a descendant of the deceased sleeps adjacent to the funerary chamber in the hope of experiencing revelatory dreams.

Tent of Fātima.

The date and function of these enigmatic stone structures are disputed (Fig. 6.24*e*), but a connection with the Chapel monuments should not be excluded: they may be a simpler (and/or later) form of the type. Examples have been recorded alongside a Garamantian-date funerary monument at In Aghalasham near Ghāt (Liverani *et al.* 2000, 132-33, fig. 16).

Cairn alignments.

Straight or curving alignments of cairns occur in association with other stone monuments are again attested at In Aghalasham (Fig. 6.24*f*).

Landmark cairns.

These are tall, conical cairns of careful construction, standing up to 2 m high, but rarely more than 1 m in diameter. They are thought not to cover burials, but to serve as landmarks (of routes, territory, water) for pastoral groups travelling on the hamada of the Massāk Ṣaṭṭafat – where they are quite common.

Substructures/subterranean features

There was a range of options for the placement of the body on or in the ground below the tomb or grave superstructure. All of the features listed below are attested in the Wādī al-Ajāl.

1. no subterranean features – body laid on ground surface
2. a cist structure constructed on the surface to receive the body within the cairn/tomb
3. a grave chamber within a tomb created by the use of corbelling
4. grave cut for body
5. lined grave cut/cist for body
6. circular grave shaft
7. lined circular grave shaft
8. square or rectangular shaft
9. lined square or rectangular shaft

Many of the earliest simple cairns were probably built up over bodies laid on the ground surface or in shallow pits. Later tomb builders seem to have favoured cist structures or, most commonly, lined shafts below the superstructure. Considerable care seems to have been taken over the construction of some of these (considering the relative urgency of consigning the body in a Saharan summer). The type-2 burials, which are very common in the nucleated cemeteries of Garamantian date, place the chief emphasis on the cutting and lining of a shaft up to 1.2 m deep (Fig. 6.29). The surface markers are relatively slight rings of stone or low piles of rough slabs. With the exception of some of the drum cairns/tombs that had cist burials below them, the

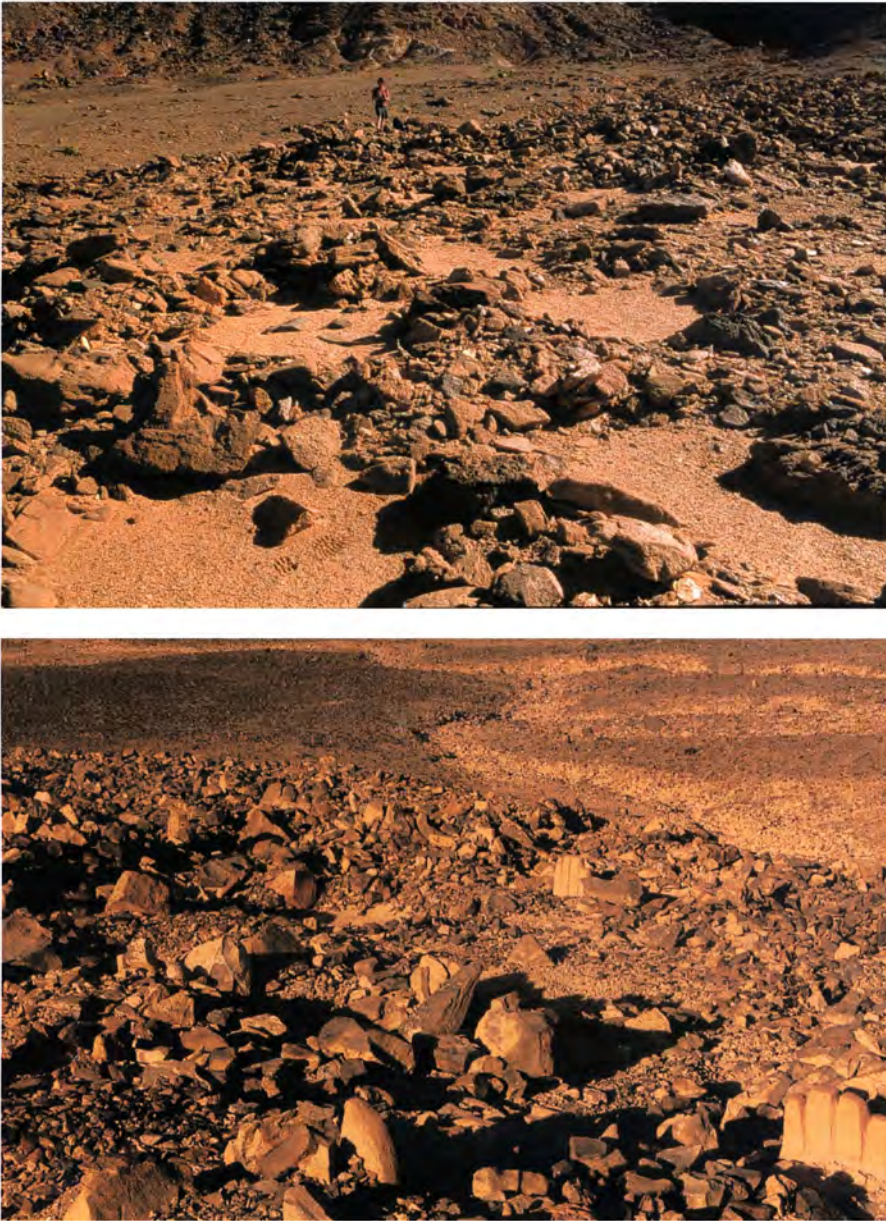


Fig. 6.29. Surface appearance of dense Garamantian cemeteries: a) UAT 9; b) ZOU 2.

more sophisticated tomb types (types 3-5 and the pyramid tombs) almost invariably had circular or square shafts below, some as much as 3 m diameter and 1.8-2 m deep. The cutting of shafts on this scale and the lining of them with stone blocks shared the technology of *foggara* construction.

Various options existed for the closure of the cist or shaft:

- 1) large slabs sealing the subterranean structure
- 2) large natural boulders used to support slabs for roof, though obviously only usable for shallow shafts. Example UAT 8-9.
- 3) mortared mudbrick
- 4) a corbelled structure
- 5) fill of light material (sand, cemetery earth, other debris)
- 6) fill of stone or heavy material (fragments of mudbrick)

Associated Features

Some tombs are associated with other features:

- 1) 'Hands', 'horns' or other stele (see below; Caputo 1937, 315; el-Rashedy 1988, 97-103).
- 2) Offering tables, proto-tables, stone bowls, 'altars', 'milking stools' (see below; el-Rashedy 1988, 103-07).
- 3) Square or rectangular funerary enclosures, notably at Sāniat bin Huwaydī (GER 11), where they are attached to the side of many square tombs (cf. Camps 1986, on funerary enclosures on Saharan tombs; Caputo 1937, 319-20 and fig. 17; 1951, 271-91 for UAT 3).

Typology of stele.

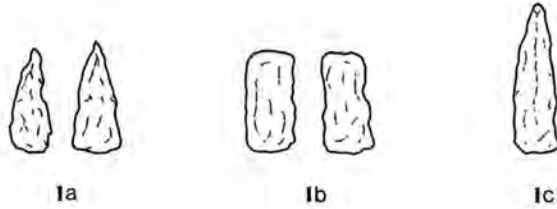
Many pre-Islamic burials in the Wādī al-Ajāl were once marked by stele of various types and differing levels of sophistication, though such features rarely survive *in situ* today (Figs 6.29-30). The predominant types of stele have in the past generally been classified as 'hands' and 'horns' (Caputo 1937, 315; 1951, 248-51, 408-12; Daniels 1971a, 266; el-Rashedy 1988b, 97-103; Ruprechtsberger 1989, 55-57, figs 58-61, 74, 85-87; 1997, 45-46, 50, 54-55, 60). Imagery of hands and horns is abundant in Saharan rock-art (Le Quellec 1992; Lutz and Lutz 1997; Chapter 8), seemingly supporting the distinction.

'Hands' are formed of four vertical and symmetrically arranged 'digits', whilst 'horns' are V-shaped and more sharply pointed. At first sight the contrast between the two types of stele is clear-cut (Fig. 6.31, compare 2a and 6a), though the significance of the two broad styles of stele is unclear and it is not possible to suggest criteria by which to distinguish between their use (whether chronological, relating to tomb type, status/sex of deceased, or region of the Wādī). However, the classification below suggests that despite the distinctions between the two broad groups, there are a number of general similarities that hint that they are closely related symbolically (Figs 6.30-32). 'Horns' frequently occur in pairs (making four 'points' in total), giving them a much more similar appearance to hands than previously appreciated. Similarly many 'hands' were evidently manufactured in three pieces (see type 5) and the separate outer points and the central pincer-like element of the type 5a or the sharply-pointed main element of type 5c can easily be mistakenly identified as parts of 'horn'-type stele of



Fig. 6.30. Associated burial features: a) early proto stele and stone bowl (TAG 6); b) classic stele and offering table (ZOU 2).

A



B

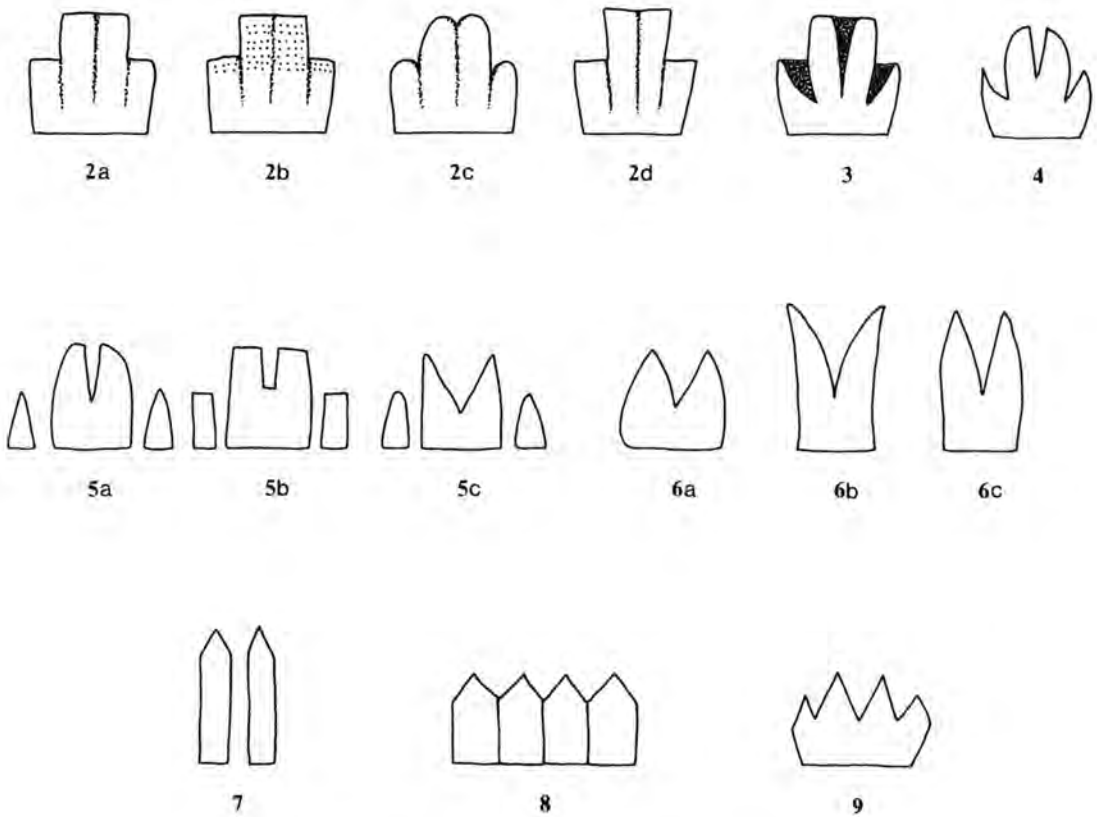


Fig. 6.31. Typology of stele (A = rough slabs; B = dressed stone).

type 6c/6a. All types of stele are most commonly found against the eastern side of the tomb, though in the most densely packed cemeteries, where graves abut one with another, examples are also found on the western side (where there is a choice, the eastern side is preferred). Stele of all types were generally paired with offering-tables or similar vessels, which were normally placed directly adjacent to the stele. Traces of red paint survive on several examples, notably on a number of 'horns' of type 6b and 6c and on the picket fence type-8 stele from Sāniat bin Huwaydī and Zinkekrā. It has also been recorded on the more common four-digit type-2 'hand' (Caputo 1951, 361); it is likely that many other stele were originally painted and that the red ochre has simply weathered away. Several examples of type-2 hands at ZOU 2 and at the so-called Royal Cemetery (GSC 30-31) have rows of painted dots and have been treated as a distinctive type (type 2b) (Figs 6.31-32).



a)



b)



c)



e)



d)



f)

Fig. 6.32. Some stele types: a) Type 2b with painted dots (ZOU 2); b) Type 5a (ZOU 2); c) Type 6a? (ZOU 2); d) Type 6c (GSC 30); e) Type 6c in situ as 4-digit set (GSC 30); f) type 8 with red ochre (GER 11).

Type 1 stele – unworked stone

The earliest stele are believed to be those in unworked or crudely fashioned rough stone. Generally arranged in groups of two or four (in the latter case, the two central elements are often taller), the slabs sometimes have a notably pointed appearance; other examples are flat-topped. Sometimes both pointed and square-ended stele occur in groups together, as at UAT 3, where no less than six rough stele of mixed square and pointed types were erected. Type 1 stele are commonly found in association with ‘stone bowls’ rather than properly worked offering-tables. Examples: UAT 13, GSC 8, GSC 12. In the Massāk Ṣaṭṭafat area some examples of engraved stele have been recorded (Le Quellec and Gauthier 1993; van Albada *et al.* 1994, 32-33), but nothing similar has been found in the Wādī al-Ajāl. Three main variants have been noted in the escarpment cemeteries.

Type 1a. Pairs of pointed stones, carefully selected from natural rocks, rather than worked in most cases. These are mostly in the length range 40-70 cm and are normally found set vertically against the eastern face of a cairn or simple tomb.

Type 1b. Pairs of roughly square-ended slabs, carefully selected from natural rocks, rather than worked in most cases. These are mostly in the length range 40-70 cm and are normally found set vertically against the eastern face of a cairn or simple tomb.

Type 1c. Elongated needle-like slabs, carefully selected from natural rocks, rather than worked in most cases. These are mostly in the length range 70 cm-1.2 m and appear to have been used singly in some cases and built into the structure of a cairn, rather than set up against it.

Types 2-9 stele – worked stone

Type 2a. Cut from a single block of fine sandstone, four digits demarcated by grooves, tapering slightly towards the top and generally square-cut at the top. Outer pair shorter than inner pair and all flat-topped. Typical dimensions: H: 65 cm (50 cm outer), B: 69 cm (45 cm inner pair), W: 10 cm (examples: LEK 9, ZOU 2).

Type 2b. As Type 2a, but exhibiting painted dots in rows. Examples at ZOU 2 had 5, 20 and 20 rows of dots of up to 8 dots per digit. All the ZOU 2 examples with spots faced west. Dimensions of one example *in situ* by its offering table: H above offering table: 47 cm (32 cm outer digits), B: 49 cm (30 cm inner digits), W: 8 cm.

Type 2c. As Type 2a, but with rounded tops to the digits (example: ZOU 2).

Type 2d. As Type 2a, but with central pair of digits splaying out at top and a dished (sloping towards the centre) upper surface to the central pair of digits. A variant on this type has flat tops to the central pair of splayed digits, but with an overall more splayed appearance than type 2a (examples: ZOU 2).

Type 3. Cut from a single block, with deep, broad grooves creating greater separation of the digits than on Type 2, though not cut through full width of stone. The outer digits taper in to sharp points (example: LEK 11).

Type 4. Cut from a single block, hand with four digits demarcated by cuts right through the width of the stone. The outer pair of digits is shorter and more pointed than the central pair. The latter has a convex upper surface, sloping up to the centre. Typical dimensions: H: 65 cm (48 cm outer), B: 68 cm, W: 10 cm (example: TAG 1)

Type 5a. Four-digit hand, manufactured from three pieces, a central pincer-like piece (H: 44 cm, B: 42 cm, W: 10 cm) and two small pointed stele (H: 25 cm, B: 15 cm (base), W: 10 cm). When set in the ground, the appearance of the type 5 hand is similar to type 4 (examples: ZOU 2, ELH 2?).

Type 5b. Similar to type 5a, but with a three-piece construction of more square-cut appearance – resembling the type 2a when assembled (example: GDD 2).

Type 5c. A ‘horn’-type central element flanked by two small pointed stele. Noted at Sāniat bin Huwaydī and also by Caputo (1951, 352, fig. 140).

Type 6a: Either a pincer-like ‘horn’ or a Type-5 hand lacking its outer digits (which can be easily disturbed and separated?) (example: UAT 2).

Type 6b. Pair of outward-splaying elongated points cut from single stone block (like goat horns). Can stand well over 1m tall – as at GSC 30. At the Royal Cemetery (GSC 30.2) there is an example with two pairs of red-painted, two-digit horns erected side by side.

Type 6c. More vertically-aligned pair of elongated points cut on single block (like gazelle horns or rabbit ears). Can stand well over 1 m tall and often red-painted (example GSC 30).

Type 7. The obelisk stele is a needle-like worked stone marker, with sharply pointed top. Uncommon, but, where found, generally erected in multiples of two (though in at least one case at GSC 31, a group of three was recorded). At GSC 30, a pair of obelisk stele was erected outside a pair of type-6 ‘horns’ – giving a total of six points (Caputo 1951, 299). Example: GSC 31 (Caputo 1949, 21).

Type 8. Four-digit stele of broad width, thin section and triangular shape (picket-fence type), with all four digits normally of equal length. The eastern face of these stele is generally painted red. Known only at Sāniat bin Huwaydī (GER 11) and at Zinkekrā (ZIN 280).

Type 9. Four-digit stele, with two central digits larger and taller than outer pair. Has same width-to-height ratio as type 8, but in other respects resembles type 4 (example: TWE 2).

Offering-tables and similar structures

Offering-tables are a common feature of classic Garamantian-period cemeteries (Fig. 6.30) and the antecedents of the tradition can be traced in the placing of ceramic and stone bowls alongside tombs in early dispersed cemeteries (on the offering-tables, see Caputo 1951, 248-51, 408-12; Daniels 1971a, 266; el-Rashedy 1988, Ruprechtsberger 1989, 55-57, figs 58-61, 74, 85-87). The density of offering-tables varies from cemetery to cemetery, but CMD believed was greatest in cemeteries with large numbers of stepped tombs. The size of the offering-tables varies also, with the largest examples from the so-called Royal Cemetery (GSC 30.3 was fronted by an example measuring 1.6 m × 73 cm × 39 cm) (Daniels 1971a, 266). Some tombs had small platforms built against their eastern side to accommodate the offering-tables and stele (GER 11 and GSC 30: Daniels 1970a, 34).

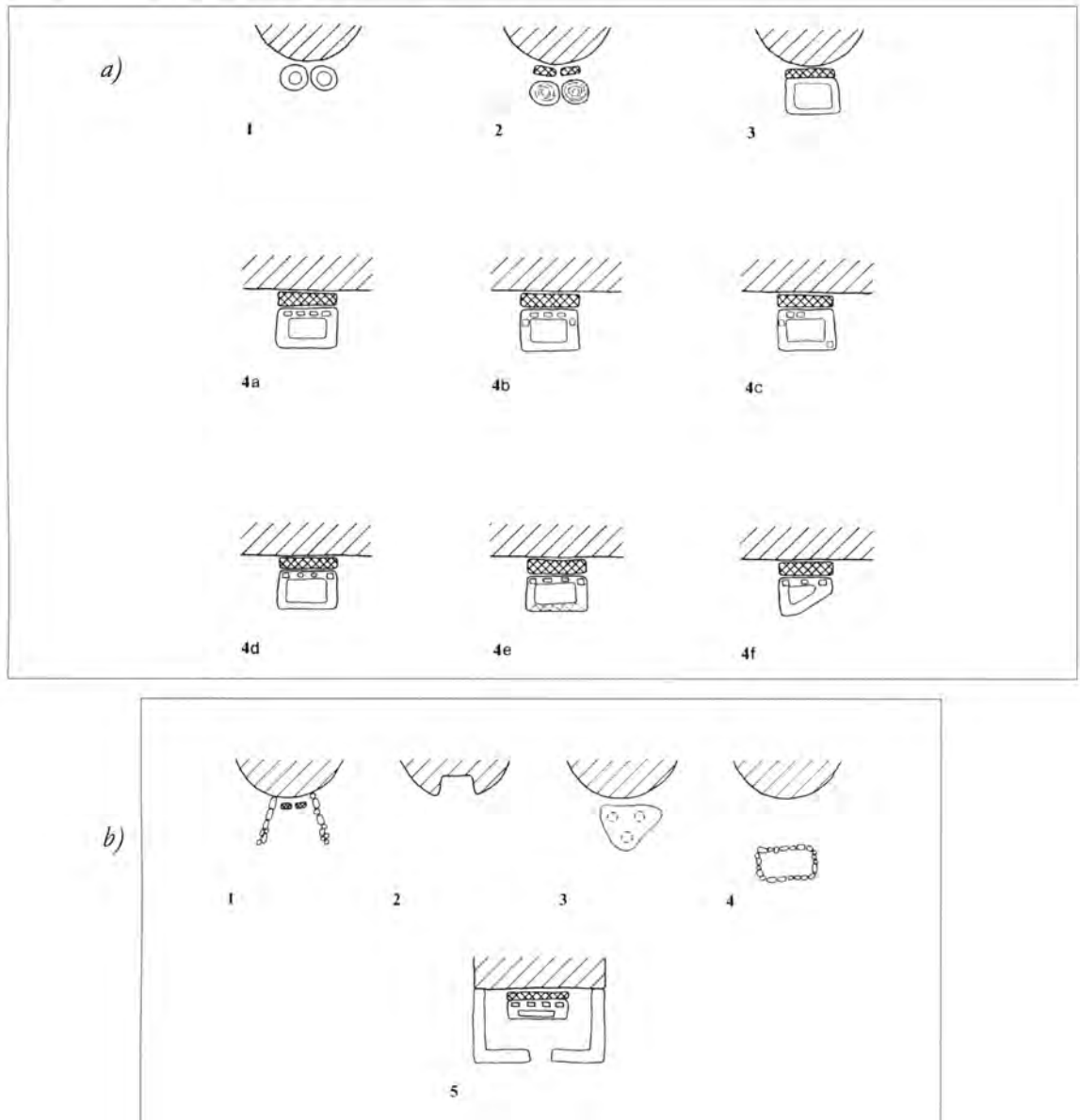


Fig. 6.33. a) Typology of offering-tables; b) other offering structures/spaces associated with tombs.

In the classification below (Figs 6.33a; 6.34), although Types 1-3 are believed to represent an evolutionary sequence that culminated with the standard offering table of Type 4, the precise dating is unclear and earlier forms may have continued in use alongside the developed type. The standard Type 4 offering table was cut in a rectangular block, with a series of sunken compartments in which food or liquid commodities could be placed (somewhat akin to a modern airline meal tray). Similar stone offering-tables are not uncommon finds in cemeteries of Roman date in eastern and central Numidia, presumably reflecting the same African burial custom.

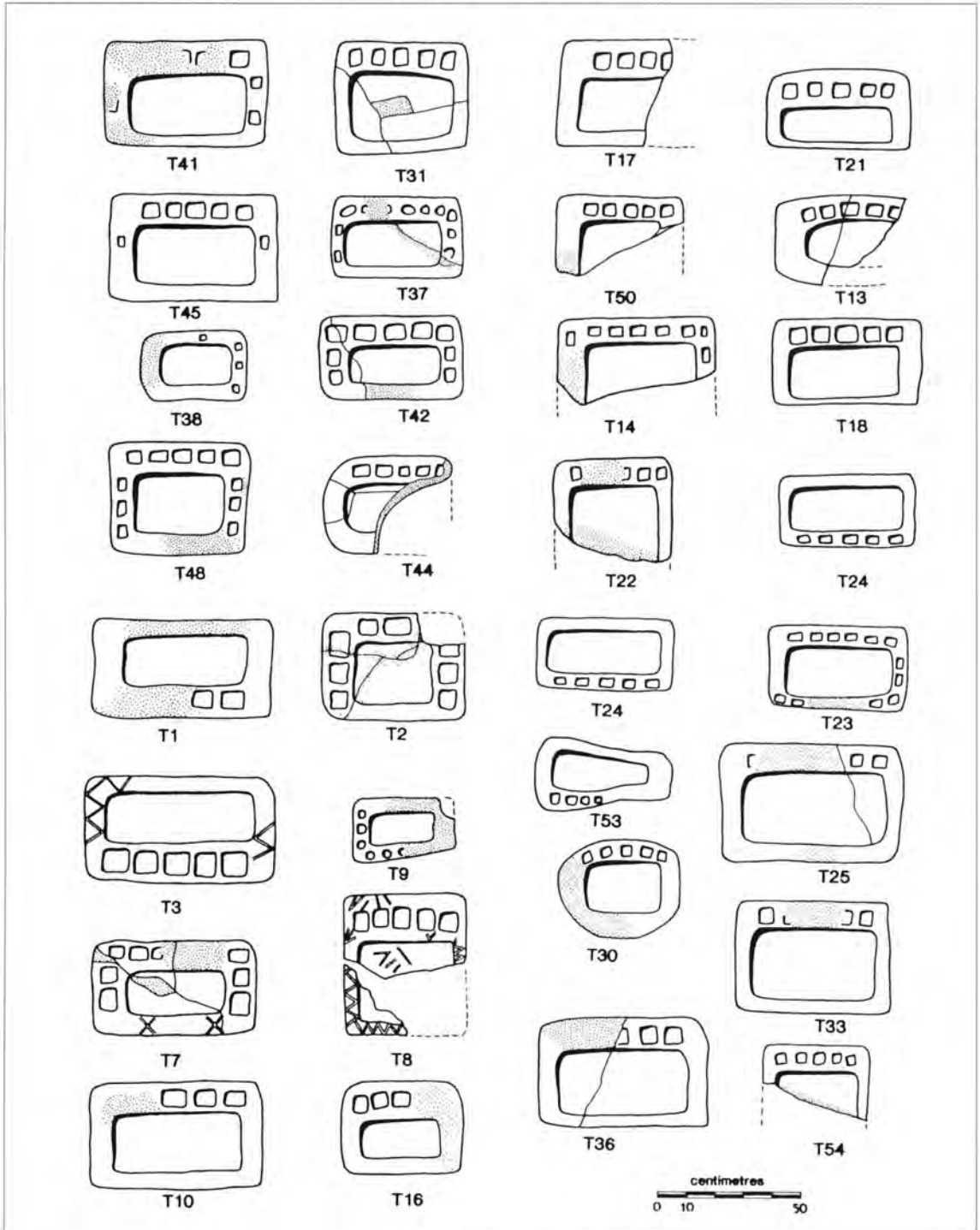


Fig. 6.34. Offering-tables from TAG 1.

Type 1. Ceramic vessels placed in front of a tomb. These rarely survive intact, but CMD noted several instances of pots on the eastern side of tombs and presumed them to be intended to hold grave offerings, rather than as funerary offerings in their own right. Ceramic vessels set in the ground are recorded in some cases alongside stone offering-tables (Caputo 1951, 333-34; Daniels 1971a, 266) (example: UAT 3, GER 11).

Type 2. So-called 'stone bowls', some are no more than rough stones or slabs (c.25-30 cm across) with shallow depressions worn or ground into them to serve as places for placing offerings. They generally occur in pairs, placed in the same position on tombs as the Type-4 offering-tables (normally backed by crude slab stele in place of the hands/horns) (example: UAT 13).

Type 3a. A large rough slab of stone, in which a series of depressions has been cut, is placed in front of the tomb. Both this and Type 3b are sometimes described in CMD's notes as proto-tables (example: UAT 13).

Type 3b. A reduced version of the classic offering table, consisting of a simple stone trough, without the additional small compartments. Generally placed on the eastern side of the tomb, backed by a stele (example: UAT 14).

Type 4a. This simple version of the developed offering table was fashioned in a sandstone block, generally with good level of stone-cutting, with a large elongated rectangular slot taking up half or more of the top surface, with a series of smaller square cut depressions (normally in the range of 3-6) in a line along one side only. The trough and smaller compartments are arranged symmetrically on the top surface. This is by far the most common type. Typical dimensions are 35-60 cm long × 30-40 cm broad by 13-30 cm deep. The long trough-like compartment is generally 20-50 cm long × 15-30 cm wide × 5-10 cm deep, and the smaller cut-outs for offerings are generally 5-10 cm square × 5-10 cm deep. Normally the offering table was placed next to a 'hand' stele, in turn set against the eastern side of the tomb, with the line of smaller compartments placed nearer the tomb than the long trough.

Type 4b. The same as Type 4a, but with the smaller compartments continuing round more than one side of the central rectangular trough. In some cases this may comprise a full row on the long side behind the trough, with a pair or two of square cuts on the two shorter sides. The arrangement is symmetrical. (Examples: TAG 1, ZOU 2). There are rare examples with small rectangular compartments instead of the normal square slots (example: RUG 2).

Type 4c. Similar to Type 4b, but with an asymmetrical arrangement of small compartments. This type is very rare and the normal pattern of symmetry seems to have been considered important (example: TAG 1).

Type 4d. Similar to Types 4a or 4b, but with the shape of the smaller compartments more varied (e.g. round instead of square, or a combination of shapes) (Caputo 1951, 248; el-Rashedy 1988, 104) (example: GER 11).

Type 4e. In some cases, parts of the upper surface of the slab are decorated, almost invariably with a zig-zag motif. This is most commonly found on the front lip of the long trough, but occasionally around the short sides of the trough also. Some examples with a pattern of 'Xs' are also known (examples: TAG 1, ZOU 2, CHA 1; cf. Caputo 1951, 251).

Type 4f. An offering table cut into an irregular shaped block (oval, bowed, uneven quadrilateral) – this form is rare, as symmetry seems to have been valued (example: TAG 1).

Structures associated with burials

A range of built features can be observed on tombs (Fig. 6.33*b*), some directly associated with stele and offering-tables, others in part fulfilling a similar role of providing a preferential area for the deposition of offerings at the tomb. Types 1-4 are found on the escarpment cemeteries, type 5 in the oasis cemetery at Sāniat bin Huwaydī.

Type 1. Small annexes are created by pairs of parallel walls attached to the outer edges of cairns and tombs, typically on the eastern (and/or western) side and sometimes containing stele and stone bowls (example: FJJ 3.5). In at least one example in the Wādī (FJJ 5.5), a pair of annexes are attached to the south-eastern and south-western sides of a drum cairn. The type is also attested at Aghram Nadarif, and a related tradition of small built platforms against the outer wall of cairns is recorded elsewhere in the Sahara (Camps 1961, 167).

Type 2. Niches in the side of tomb/cairn – not directly attested in Fazzān but common in the Sahara (Camps 1961, 177-79).

Type 3. Flat slabs (sometimes rounded) set horizontally on top of an arrangement of three small stones set vertically in the ground alongside a tomb (the so-called 'milking-stool' type) (examples: GRE 2, LEK 6).

Type 4. Small compartments or 'altars' defined by stones set on edge in a square or rectangular arrangement to define shallow boxes, normally on the eastern side of tombs and up to 1.5 m from the tomb

itself. Several of the In Ṭafarāt examples still contained fragments of animal bone – young ovicaprids and pig (examples: ITF 3, 12). Similar features are recorded elsewhere in the Sahara (Camps 1961, 186-87).

Type 5. Square or rectangular enclosures are attached to some tombs at Sāniat bin Huwaydī (GER 11) – and presumably at other unexcavated oasis-centre sites. These appear to represent an evolved form of Type 1 annexes, in that they surround the emplacement of the offering table and stele. The exceptional tomb complex UAT 3 recorded near the Waṭwāt mausoleum (Fig 6.4), with a burial contained within a large two-roomed funerary compound, is essentially a larger version of the type 5 arrangement.

CEMETERY MORPHOLOGY AND DATING

There are five main factors to take account of in evaluating the significance of the range of monument type:

- 1) Changes over time;
- 2) Spatial differentiation (that is, regional differences);
- 3) Ethnic differences or other issues of identity;
- 4) Social differentiation or hierarchy and status-related choices;
- 5) Variance in the materials and techniques of construction.

The most detailed evidence currently available is from the Wādī al-Ajāl and it must be emphasised that the classification of tombs, associated features and cemetery morphology outlined in this chapter will be most relevant to that area. Detailed studies elsewhere in Fazzān are likely to introduce many other variables.

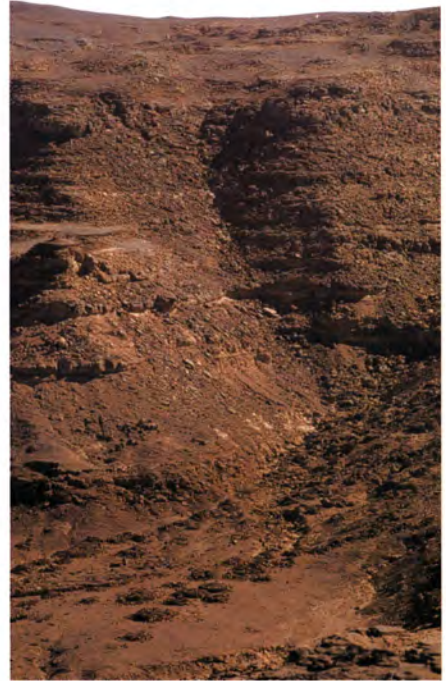
The majority of the recorded burials in the Wādī al-Ajāl relates to the escarpment cemeteries (Figs 6.35-37). It is known that other cemeteries of Garamantian and later date existed within the oasis zone, but few of these have been systematically recorded or excavated (Sāniat bin Huwaydī is the notable exception). Circular and oval cairns are by far the most common features encountered in the escarpment cemeteries, though detailed examination of selected cemeteries has revealed considerable variation in construction and type. The dispersed cemeteries primarily consist of individual mound cairns spread over considerable areas. Simple conical cairns of piled stone and corbelled types predominate, though there are also examples of crater cairns, kerb-edged cairns, drum cairns and occasional rare stepped tombs.

Many of these same types also occur in the nucleated cemeteries. Caputo (1937, 312-13; 1951, 321-22; 337-38; cf. Pace 1935, 169) gives the clearest description of the simple types that predominate in the nucleated cemeteries. Although batched together by him as 'pseudo-crater' burials, in fact these correlate with a range of types in the above list: the simple cairn of piled stone, corbelled cairns, kerb-edged cairns, crater cairns and circular shafts outlined at the surface by kerbs of stones. In addition there are significant numbers of the various types of drum cairn and drum tomb (which Daniels described as 'gasometer tombs' in his notes) and these form another important group in both the nucleated and some of the dispersed cemeteries. Circular stepped constructions occur less commonly, along with quadrangular tombs of various forms.

The unworked and irregular nature of the stone blocks selected for construction of the tombs, and the common lack of regular coursing, can give the impression of haphazard work. But close inspection of the better-preserved or excavated examples reveals interesting details, such as the common use of corbelling over the burial chamber or the careful construction of slab-lined internal burial chambers or cists. Even the simple piled stone cairns (type 1a) may have been more carefully constructed than is at first apparent. Scarin (1934, vol. 2, 25-29) gives an account of his excavation of a conical cairn near Bintbaya. The tumulus was c. 3 m diameter by 1 m high. The crouched burial was made directly on the surface, covered with layer of sand and then a vault of sandstone fragments with a central hole, over which small stones had been piled, with a layer of larger stones forming the outer and upper surface.



a)



b)



c)



d)

Fig. 6.35. Escarpment cemeteries: a) dispersed (TAG 6); b) semi-nucleated drums (UAT 13); c-d) nucleated (UAT 8-9 and LAR 10).

Scarlin observed that the simple cairn tombs in the Wādī al-Ajāl were paralleled by others in Wādī Tanzūft (especially at Quqaman/Ghāt) and south of al-Birkat (Aghram Nadarif) and in the Wādī ash-Shāṭī (1934, vol. 2, 25-29). He also noted that the distribution of the simple dispersed cairn cemeteries is to some extent a factor of where the escarpment comes closer to the oases. Burials are more concentrated in these areas and in some areas where there are deep embayments (as in the ad-Dīsa and al-Ḥaṭīya area), cemeteries appear to be rare or absent on the escarpment pediment.

Scarín recorded that cairns tend to be denser on the less steep part of the slopes, so they often seem to congregate on the dejection cones, sometimes with apparent arrangement in horizontal rows. On small isolated outliers of the escarpment, tombs can be clustered near the top.

There is a basic contrast between dispersed cairn cemeteries and later nucleated cemeteries (Daniels 1971a, 266). The wādī-centre cemeteries differ from the escarpment cemeteries principally in their use of mudbrick rather than stone. The architectural possibilities of mudbrick bonded with mud mortar extended to some larger-scale constructional types, such as the pyramid tombs. But most of the other tombs resemble in many respects the stone examples of drum tombs, rectangular tombs and stepped tombs. In very broad terms, eight main variants on pre-Islamic cemetery morphology can be proposed (Figs 6.36-6.37), with the first five being applicable to the escarpment zone and the final three groups to the depression floor or oasis zone.

1. Dispersed simple cairns (mainly of Type 1) running up the escarpment, often covering the entire zone from lower slopes and terraces, to a high level on the steeper slopes. Colluvial fans are favoured zones for placement. Overall the density is fairly low and the limits of cemeteries can be difficult to define, with cairns more or less continuous along stretches several kilometres in length. The ancient conception may have been more of a burial 'zone' than a 'cemetery' as such.
2. Dispersed cemeteries including type-3 drum cairns alongside type-1 cairns, with signs of some clustering of burials, especially around the larger drum cairns, and the introduction of proto-stele and stone bowls and proto-tables. This type probably represents the introduction of new forms of burial and funerary features into existing dispersed burial zones.
3. The nucleated escarpment cemetery often combines a range of tomb-types, from simple shaft burials (type 2) to drum cairns/tombs (type 3), square and rectangular forms (type 4) and stepped tombs (type 5). Evolved stele and offering-tables are reasonably common (generally placed on the eastern side of burials). A key aspect of the nucleated cemeteries is the way in which blocks of tombs abut one another to form an overall honeycomb-like pattern. This appears to represent accretion of additional burials over extended periods of time, rather than laying down at a single time of blocks of the honeycomb. There are hints of larger tombs being originally laid out in rows, but with the space between them subsequently having been infilled.
4. Some nucleated cemeteries consist almost entirely of non-monumental burial types (cairns of type 1 or shaft burials of type 2).
5. Outside the Wādī al-Ajāl, some nucleated cemeteries have a different form, being much less densely packed, with more space around each tomb. A smaller range of forms is present (large cairns and drum tombs in particular). This is the pattern at Qaṣr ash-Sharrāba, Qaṣr Māra, Bi'r Baqqārā, Ghāt and Aghram Nadarif.
6. Linear cemeteries have been recorded at several points in the Wādī al-Ajāl near Jarma, with a series of tombs constructed in a single file running away from the escarpment towards the Wādī centre. The best examples are the Royal Cemetery (GSC 30) or UAT 4 by the mausoleum (Figs 6.38-39).
7. Nucleated oasis-centre cemeteries are represented at one extreme by the pyramid cemeteries of al-Ḥaṭiya and al-Karā'īq, where there are clear elements of linear planning of the major pyramids, with evident infilling between.
8. Sāniat bin Huwaydī (GER 11) provides the model for the other type of nucleated Wādī-centre cemetery. Situated on a low mound, space seems to have been at a premium, with super-position as well as infilling taking place. The cemetery has elements of an original planned layout, but this has been distorted by the density of successive phases of burials. The similarity with type 3 is clear.

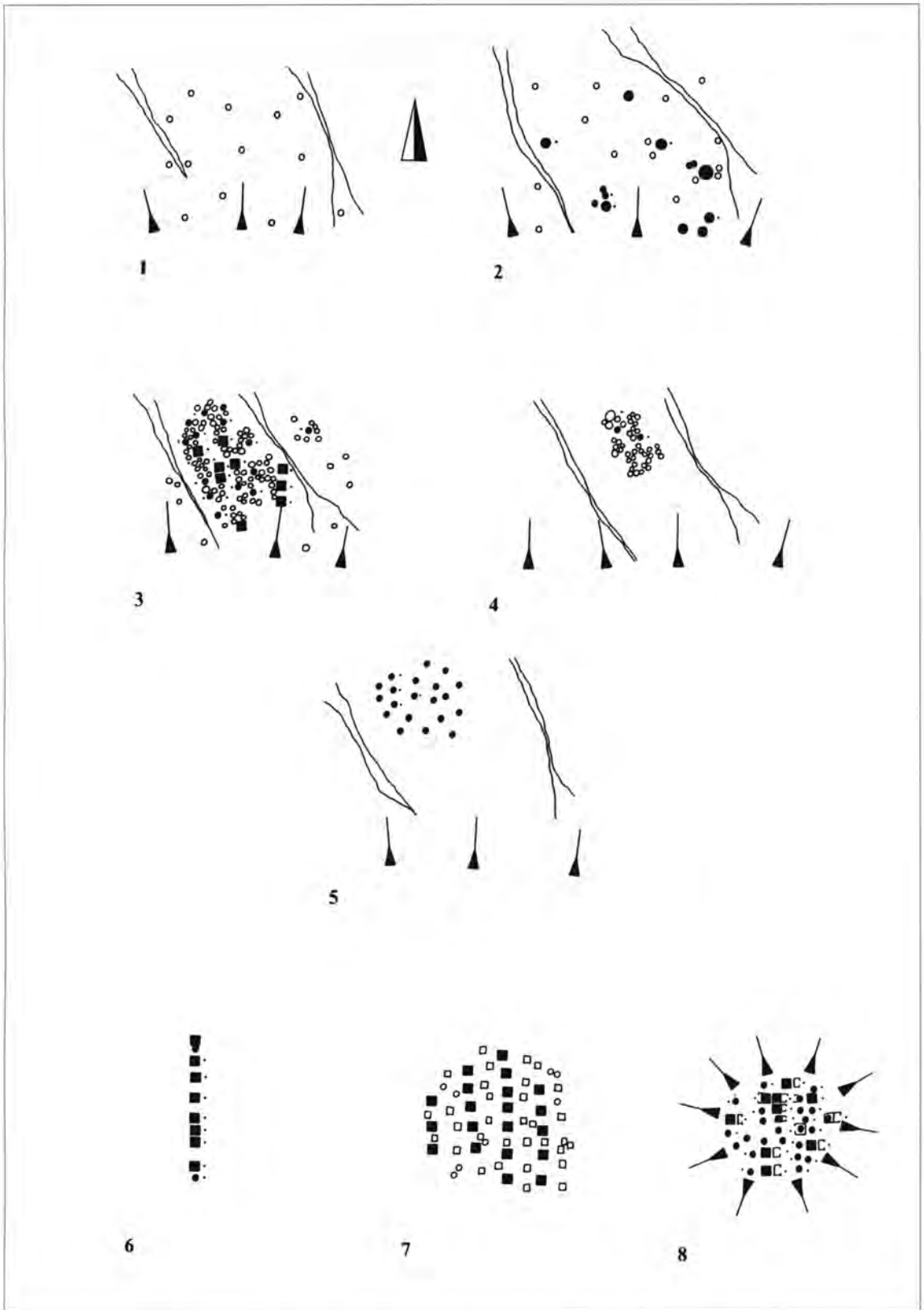


Fig. 6.36. Cemetery morphology: some models. 1. Dispersed escarpment cairns; 2. Dispersed escarpment cemetery; 3. Nucleated escarpment cemetery, with monumental types present; 4. Nucleated (non-monumental) cemetery; 5. nucleated cemetery, drum cairns/tombs; 6. Linear cemeteries; 7. Nucleated wadi-centre cemetery, linear alignments; 8. Nucleated wadi-centre cemetery, dense infilling and superimposition.



(a)



(b)

Fig. 6.37. Aerial-photographs of cemeteries: a) linear (UAT 4/7); b) nucleated round mausoleum (UAT 1-2); c) nucleated (UAT 9).

In chronological terms, type 1 dispersed cemeteries are thought to be primarily of protohistoric or early Garamantian date (though it is possible that some of the dispersed cairns are also of the post-Garamantian non-Islamic phase). Type 2 appears to date mainly to the latter centuries BC, to judge from sparse surface finds and the presence of the presumed early variants of stele and offering vessels. Types 3-4 and 6-8 appear to be classic Garamantian, covering the early centuries AD. Type 5 may span the latter centuries BC and early centuries AD (since in the areas where it is found burial types show less variation or development).



(c)

SUMMARY OF CHANGING BURIAL TRADITIONS

Burials of Neolithic/late Pastoral date (c.3000-1000 BC)

The earliest formal burials appear to be of the later Pastoral period, involving a variety of forms, from cairns to antenna tombs. The earliest monuments appear to be communal, sometimes containing numerous skeletons. The later preference for individual graves (sometimes shared with one other person) may reflect social evolution, tending towards the emergence of new concepts of status in these societies (Di Lernia *et al.* 2001; Di Lernia and Manzi 2002).

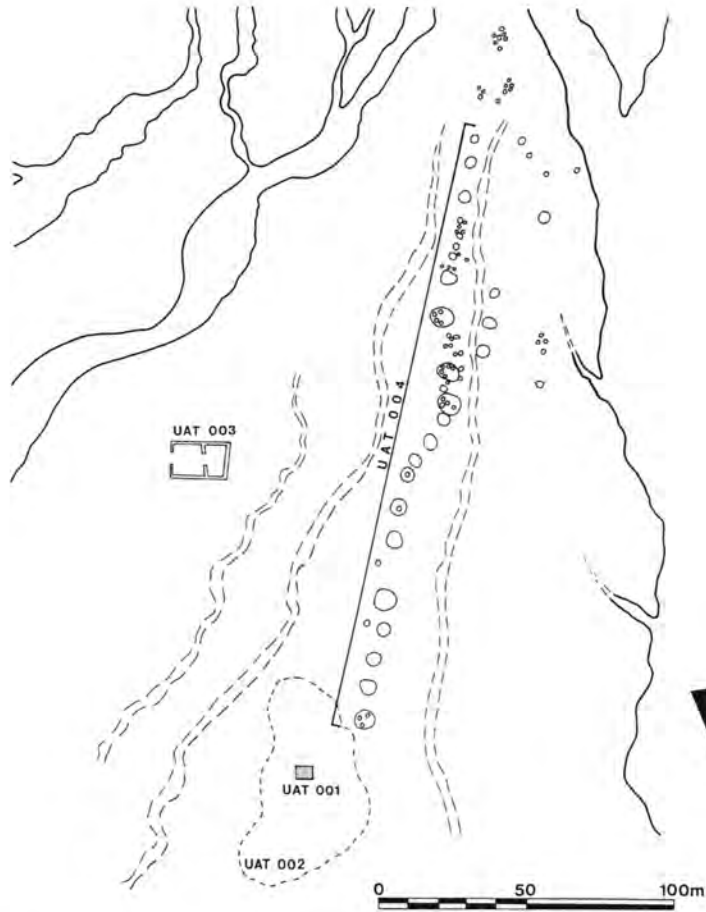


Fig. 6.38. Plan of Waṭwāt cemeteries (UAT 1-4).

Burials of protohistoric/early Garamantian date (c.1000-500 BC)

The trend towards individual internment appears to have intensified in the protohistoric period, though grave goods remain a comparatively rare phenomenon (two iron artefacts in a tomb at Tīn Abūndā are a rare exception: Caputo 1951, 384-86). Burials still tended to take place within broad zones of the escarpment along the Wādī al-Ajāl, rather than in discrete cemetery areas. It is possible that the escarpment still had some active springs at this time and that the burials here were in part to establish territorial water rights.

Burials of early-mid Garamantian date (c.500-1 BC)

The intensification of burial activity and the first steps towards more nucleated clusters appears to date to the latter centuries BC, but certainty is impossible given the dependence of rare imported diagnostics and a continuing low frequency of grave goods in general. Important changes in burial activity are the appearance of larger and more elaborate 'elite' burials and the use of proto-stele and offering-vessels in association with some burials. The eastern side of tombs was favoured for stele and offerings. Some cemetery areas of this date are cut through by foggara channels, but there are examples of drum cairns and stepped tombs overlying foggara shafts also. The intensification of cemetery construction along the escarpment may in part have related to the exploitation of the underlying aquifer for irrigation and an increased desire to stake out clan or sub-tribal rights to the water.

Burials of Classic Garamantian date (c.AD 1-500)

The nucleated escarpment cemeteries mark the culmination of the process begun in the preceding phase. Social status was reflected and augmented by funerary display, involving the type and scale of monument constructed, the wealth and number of grave goods included, and the erection of prominent markers and tables for regular offerings to the deceased. The fine-quality stoneworking of many of the stele and offering-tables attests to specialist craftspeople supplying the market. The very high density of tombs in these cemeteries suggests other changes as well, since there was still ample space around the cemeteries for burials to have been more spaced out. On the one hand, this might indicate tighter social controls, where the limits of burial grounds were closely defined and tomb construction controlled. On the other hand, it might also reflect closer social bonds between elite and non-elite elements in society, or a belief that the power of ancestors was enhanced by strength of numbers.

The reasons for tight nucleation of Wādī-centre burial grounds are easier to explain, in view of the extensive irrigated agriculture in that zone, which would in all likelihood have imposed real limits on the outward growth of cemeteries. Linear arrangements of burials, both in the nucleated cemeteries and the single-file alignments, are further indications of increased social controls on the use of space (reflected also in aspects of regularity in urban and village plans).

The overall distribution of cemeteries along the Wādī al-Ajāl is impressive testimony to the scale and extent of Garamantian settlement in the Wādī. It is clear that most cemeteries were reasonably close to settlements, and the richer cemeteries offer valuable clues to the location of the larger settlements within the oasis zone – for example the cemeteries of ZOU 1-2 lie due south of the small town of Qaṣr bin Dughba (GBD 1).

However, there appears to be a strong correlation between the most extraordinary of the monumental cemeteries and the centre of Garamantian power around Garama. All the mausolea, the pyramid tombs and the largest stepped tombs are found within a 30 km radius of the Garamantian capital. Although there are important monumental cemeteries in the eastern part of the Wādī al-Ajāl, they are not on a par with the most prestigious of the elite burials closer to the centre of power.

Garamantian burials in other parts of Fazzān do not always closely follow the model established for the Wādī al-Ajāl, though Ghuddwa is an example of an oasis that adopted the elements of the classic Garamantian cemetery wholesale (stepped tombs, ‘hand’ stele and offering-tables). Most of the other outlying districts controlled by the Garamantes appear to have followed a less expansive mortuary tradition, based to a greater extent on drum tombs and large cairn burials (Qaṣr ash-Sharrāba, Qaṣr Māra and Ghāt: Caputo 1951, 386-91, 455-58; see also Liverani 1999, 32-33 for a photo of the cemetery at Aghram Nadarif to the south of Ghāt). At all these sites, imported Roman wares show their contemporaneity with the Wādī al-Ajāl cemeteries, but their less densely nucleated plans and the lack of the developed offering-tables and stele suggest that specific regional cultural differences existed. Where we have air photographs (as for the ‘Utba/Barjūj/Murzuq area), it is clear that ancient cemeteries are similarly dense as the pattern observed in the Wādī al-Ajāl (Edwards 2001).

Burials of probable Post-Garamantian date (c.AD 500-1200)

The latest burials excavated in the Wādī al-Ajāl appear to date to the 5th or 6th centuries AD and questions remain about what happened in the succeeding centuries. CMD believed that at least some of the dispersed simple cairns along the Wādī could date to this phase. This is certainly possible, though it would imply significant changes in funerary practice (the abandonment of nucleated cemeteries and a switch in grave type). It is possible that burials continued at some of the nucleated cemeteries for a

considerable period, though the ending of significant imports from the Mediterranean renders this activity undatable.

A group of burials excavated by Pauphillet at the southern Fazzān oasis of Tajirhī suggests that in many respects there was broad continuity with earlier phases. The trench burials (elongated versions of type 2c) contained skeletons in crouched position, several exhibiting traces of red ochre and headrests, along with beads (Bellair *et al.* 1953). Radiocarbon dating of leather from one of these burials gave a date of the 9th century AD (Bellair and Pauphillet 1959).

Burials of probable/certain Islamic date (c.1100-1900)

Various types of *murābit* monuments exist in Wādī al-Ajāl, from domed square monuments to small enclosures to low mounds of stone or brick. These are normally white-washed and many are still marked with flags and incense burners/votive pots (Figs 6.5-6.6). Most evidently date to the Awlād Muḥammad period (16-17th centuries AD or later), when there was an intense phase of recognising people as *murābiṭūn* (el-Hesnawi 1990, 41-54; Lethielleux 1948, 20, n. 56).

Islamic cemeteries are often located on the outskirts of the villages in the Wādī, sometimes in walled areas, but more commonly in non-demarcated areas. Many cemeteries were established around a *murābiṭ* tomb. Most burials are aligned north-south, preserved as low oval mounds of stones or earth marked at each end by slabs set upright (Fig. 6.47). Many of the older Islamic cemeteries are now obscured beneath recent growth of the villages. Denham and Clapperton noted the dense cemeteries all around the walls of Murzuq (1966, 283; cf. Nachtigal 1974, 84 [map], who shows these cemeteries situated on the eastern, southern and northern sides of the town), with the shallow burial in sand leading to frequent unintended exhumations (a feature still visible in 1998).

At Old Jarma, interviews with surviving members of the last families to have lived in the town by both CMD and the FP established the position of several cemetery areas within the walled circuit (notably in the sparsely occupied northern and north-eastern areas. There was evidently a separate child cemetery by the southern mosque (GER 1.15).

Although the survey has not systematically collected data on the Islamic cemeteries of the Wādī, the key point to note is that these appear to have been located in the oasis area, rather than on the escarpment, close to or even within the villages and major settlements.

Dotted about the Wādī al-Ajāl, there is a considerable number of what appear to be isolated burials, additional to interments in cemeteries. These most commonly comprise small mounds of stone or earth over a burial, with vertical headstones and footstones in the Islamic tradition (burial type 6). Some of these burials may relate to isolated rural habitations, but many could equally relate to the passage of caravans along the Wādī. Deaths of merchants, but more often slaves, were quite common on the Saharan trade routes (Richardson 1848, 265-68).

EXCAVATED TOMBS IN THE WADI AL-AJAL AND NEIGHBOURING AREA

There have been over 200 tombs excavated in Wādī al-Ajāl, but none has been published hitherto to modern standards. Caputo stated that he excavated 102 tombs (1951, 312), but his account suggests that at least 109 were investigated: UAT 1 – no burial found below; UAT 2 – 2 cremations, plus 12 other burials?; UAT 3 – 1 tomb; UAT 8 – 52 burials; GSC 1-9 – 5 tombs; GSC 30 – 3 tombs; GSC 31 – 2 tombs; FUG 1 – 1 (but not below mausoleum); Tuwīwa – 2 tombs; CHA 1 – 9 tombs?; Takarkība – 3 tombs; al-Qrāya – 2 tombs; al-Abyaḍ – 3 tombs; TAG 1 – 3; ad-Dīsa – 2 tombs; Tīn

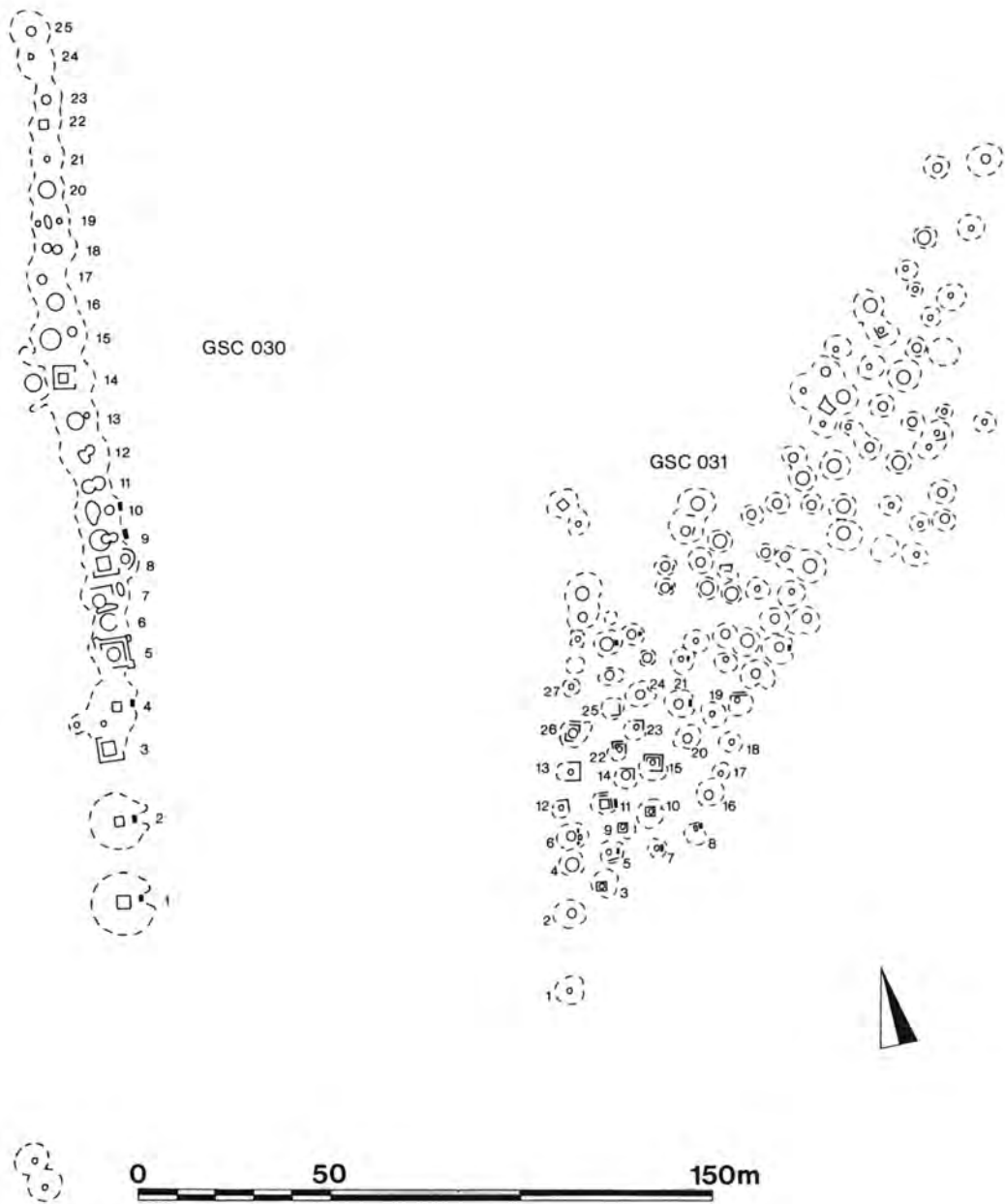


Fig. 6.39. The so-called 'Royal Cemeteries' (GSC 30-31).

Abūndā – 3 tombs; Ghāt – 4 tombs. Another member of the early Italian expeditions, Scarin excavated at least 1 tomb (1934, vol. 2, 25-29). Ayoub is known to have excavated at least 22 tombs (Ayoub 1967a) as follows: Sāniat bin Huwaydī (GER 11) – 14 tombs, nos 1a-6a, 1b-4b, 1c-3c, 1d; 'Royal Cemetery' (GSC 30) – 4 tombs, nos 4, 14, 20 and 25; 'Queen's Cemetery' (GSC 31) – 4 tombs nos 3, 30, 33, 96.

CMD is believed to have excavated at least 68 burials as follows: GSC 30 – 1 burial, tomb 5; ELH 1 – 1 tomb (burial not reached) and possibly 2 at ELH 2; ZIN 1.13 – 8 burials; GER 11 (Sāniat bin Huwaydī) – 54 burials; FUG 1 – below mausoleum (no burial located); TWE 1 – below mausoleum (no burial located).

The French expedition in the 1950s excavated 5 skeletons in 4 tombs in the vicinity of al-Fjayj and al-Qšīr and at-Tanāḥma (as well as seven skeletons in four tombs of late antique/early medieval date in the southern Fazzānī oasis of Tajirhī: Bellair *et al.* 1953). A group of French doctors are known to have excavated at least one tomb at

GER 11, prior to CMD's excavations there (unpublished note held in Jarma Museum archives). Ziegert has also excavated numerous tombs at different places in the Wādī (unpublished), including some at GER 11 and in the Būdrinna area (GBD/ZOU area). Finally, the Italian mission in the region of Ghāt and the Tadrart Akākūs have excavated a number of burials of Neolithic date (Cremaschi and Di Lernia 1998a, 217-41;



a)



b)



c)

Fig. 6.40. The 'Royal Cemeteries': a) huge offering table from GSC 30; b) stepped construction of tomb in GSC 31; c) plaster coating of tomb GSC 30.3.

Di Lernia *et al.* 2001) and also Garamantian-period burials in the Wādī Tanzzūft at Aghram Nadarif and at In Aghalasham – where there is a huge drum tomb with an associated series of cairns laid out in grid fashion (Di Lernia and Manzi 2002; Liverani 2000d, 41; Liverani *et al.* 2000, 131-33).

The most detailed information from the Wādī al-Ajāl comes from the Italian excavations along the escarpment, and from Ayoub's and CMD's excavations at Sāniat bin Huwaydī and the Royal Cemetery. However, a fundamental problem of all these excavations is the extremely variable state of preservation of the skeleton and grave goods/grave furniture, whether due to the activities of later grave robbers or to soil conditions. Many burials in the oasis zone (for instance, at Sāniat bin Huwaydī) yielded poor or negligible traces of the skeleton, because of the wetter ground conditions.

The so-called Royal Cemetery (GSC 30-31) has a number of interesting features (Figs 6.39-6.40), notably the extremely large scale of the series of stepped tombs in the western part (GSC 30). These are the largest of the stepped monuments thus far known in Fazzān (dimensions of largest example: 7.5×7.5 m, preserved H: 2.10 m) and the stone-lined corbelled funerary shafts below the surface markers are also of extraordinary size (3.6×3.3 m; depth: 2.2+ m). The cemeteries GSC 30-31 also stand out amongst the known cemeteries containing large numbers of

rectangular stepped stone tombs because of the fine quality of the plaster coating on the exterior. However, it is clear from TAG 1, for instance, that other stepped monuments built of stone may well have been coated with a mud plaster (Fig. 6.22*d-e*) and have looked much like the GSC 30-31 tombs when seen from a distance. Similarly, wadi-centre tombs made of mudbrick may also have been regularly covered in mud-plaster and even painted. Both at GSC 30 and at TAG 1, the available dating evidence suggests that the tall and well-constructed stepped tombs may be a late Roman feature, though the stepped form in general is clearly earlier.

The cemetery of Sāniat bin Huwaydī (GER 11) is one of the most important oasis cemetery sites, because of CMD's excavations that allow the main phases to be distinguished and the process of lay-out and infilling of the cemetery to be in part at least understood (Figs 6.41-42). The predominant forms of tomb (Fig. 6.43) at GER 11 were:

1. Large rectangular or square tombs (typical dimensions: L: 5 m, W: 3 m, H: 1 m), over rectangular grave shafts (e.g. tombs 1, 6, 9, 17, 42);
2. Large rectangular or square tombs with attached 'forecourts' (e.g. tombs 15, 50, 52);
3. Square or rectangular tombs (typical dimensions: L: 2.5 m, W: 2.5 m, H: 0.5 m), with a circular grave shaft (e.g. tombs 21, 25, 43);
4. Square or rectangular tombs, with small attached forecourts (typical dimensions: L: 3 m, W: 3 m, H: 0.5 m), and a circular grave shaft (e.g. tombs 27, 28, 29, 38);
5. Circular drum tombs inside square funerary enclosure walls (typical dimensions enclosure: L: 2.6 m, W: 2.6 m; typical dimensions drum: D: 2 m, H: 0.30 m), over circular shafts (e.g. tombs 8, 11, 24, 30);
6. Circular shaft burials inside square enclosures (typical dimensions, enclosure : L: 2m, W: 2 m, H: 0.30 m, shaft: D: 1 m), (e.g. tomb 22), also paralleled at ELH 2.
7. Circular drum tombs without enclosures (typical dimensions: D: 2.3-3 m, H: 0.5 m), over circular corbelled shafts (e.g. tombs 12, 13, 14, 16, 33, 36, 40-41, 45).

It is likely that some of these were originally stepped constructions (e.g. tombs A4.1 = CMD 6).

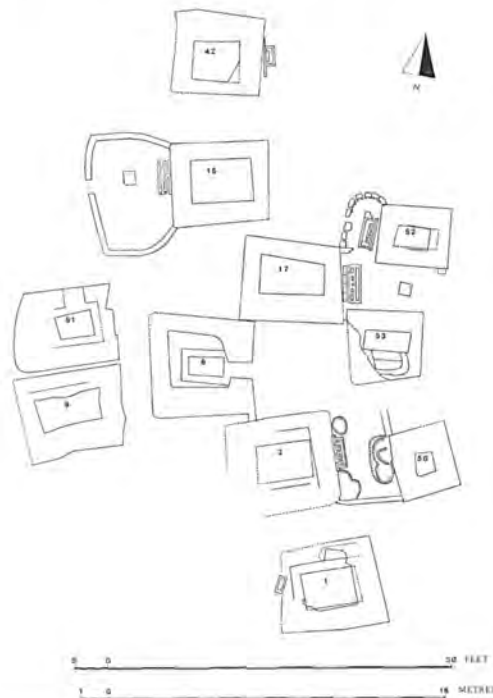


Fig. 6.41. Early Phase of Sāniat bin Huwaydī cemetery (GER 11).

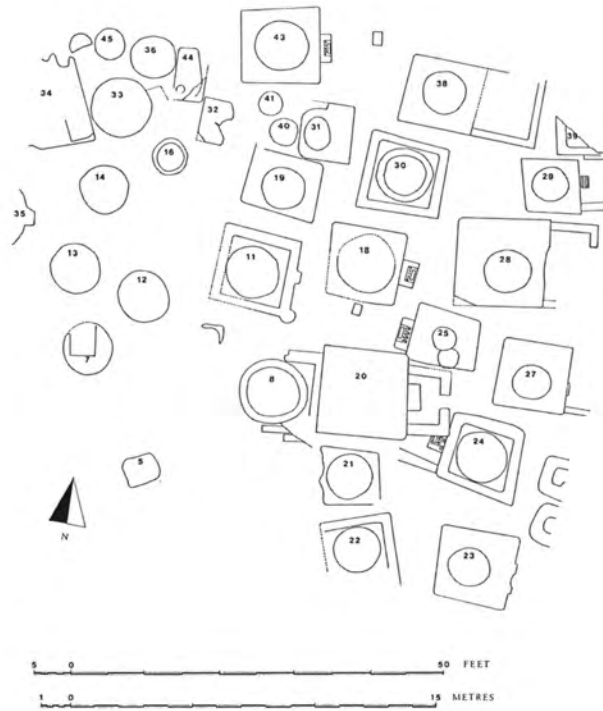


Fig. 6.42. Later Phase of Sāniat bin Huwaydī cemetery (GER 11).



Fig. 6.43. The mound of Sāniat bin Huwaydī (GER 11), showing the exposed area of tombs.

BURIAL RITE

The predominant form of burial was inhumation, in a crouched position lying on either the left or right side (and occasionally on the back) (Table 6.1). Cremation burials were exceedingly rare and seem to be limited to the Garamantian period – there was only one discovered in the Sāniat bin Huwaydī (GER 11) excavations and two were found by the Italians in amphorae buried adjacent to the Waṭwāt mausoleum (UAT 1) (Ayoub, 1968d, 7-9, tomb A2.3; Caputo 1951, 268-70; el-Rashedy 1988b, 95).

The earliest burials of Neolithic date appear to have been made in natural rock crevices, sometimes in rock shelters, with the body wrapped in animal hides or basketry (Aumassip and Tauveron 1993, 77; Cremaschi and Di Lernia 1998a, 217-41). Some burials show signs of mummification by desiccation before interment (Cremaschi and Di Lernia 1998a, 219). By the later millennia BC, burials were being

Cemetery	Tomb type	Sex	Position	Head to (facing)	Double inhumation	Red ochre	Date (AD unless stated)	Reference
GSC 30	5b	M					4 th c	Caputo 1951, 292-320
GSC 30	5b	M					4 th c	Caputo 1951, 292-320
UAT 8 (2)	2c	M	Crouched L.	WNW (E)		?	1 st -4 th c	Caputo 1951, 336-38
UAT 8 (14)	2c		Crouched L.	N (E)			1 st -4 th c	Caputo 1951, 339-40
UAT 8 (33)	2c	M	Crouched L.	E/NE (S)	*		1 st -4 th c	Caputo 1951, 346
UAT 8 (34)	2c	M?	Crouched L.	E/NE (S)			1 st -4 th c	Caputo 1951, 346
UAT 8 (35)	2c		Crouched L.	NE (S)	*		1 st -4 th c	Caputo 1951, 346-47
UAT 8 (38)	2c		Crouched L.	S (W)			1 st -4 th c	Caputo 1951, 348-49
UAT 8 (47)	2c		Crouched L.	E/NE (S)			1 st -4 th c	Caputo 1951, 351
UAT 2 (1)	2c	F?	Crouched L.	S (W)	*	?	1 st -4 th c	Caputo 1951, 321-22
UAT 2 (2)	2c	?	Crouched R	E? (N)			1 st -4 th c	Caputo 1951, 323-24
UAT 2 (6)	2c	?	Crouched ?	NW (?)			1 st -4 th c	Caputo 1951, 324-25
TAG 1 (1)	5b	M	Crouched R	N (W)			1 st -4 th c	Caputo 1951, 381-84
TAG 1 (2)	5b		Crouched ?	N (?)			1 st -4 th c	Caputo 1951, 381-84
CHA 1	Pyr.		?				1 st -4 th c	Caputo 1951, 363-73
Takarkība	2a?	M	Disarticulated				?	Caputo 1951, 373-76
Takarkība	2a?	M	?				?	Caputo 1951, 373-76
al-Abyad(2a)	1a?	F	Crouched R	E (N)	*		2 nd c.	Caputo 1951, 378-81
al-Abyad (2b)	1a?	M	Crouched ?	?	*		2 nd c.	Caputo 1951, 378-81
Ghāt	3a?	M	Crouched ?				1 st -4 th c	Caputo 1951, 386-91
GER 11.15	4b		Crouched ?			*	1 st -2 nd c	<i>Arch of Fazzān 3</i>
GER 11.17	4b		Crouched ?	-		*	1 st -2 nd c	<i>Arch of Fazzān 3</i>
GER 11.25	4b		Crouched R	W (S)			2 nd -3 rd c.	<i>Arch of Fazzān 3</i>
GER 11.33a	3b		Crouched R	N (W)			2 nd -3 rd c.	<i>Arch of Fazzān 3</i>
GER 11.33b	3b		Crouched R	N (W)			3 rd -4 th c.	<i>Arch of Fazzān 3</i>
GER 11.34	4b		Crouched L.	E (S)			2 nd -3 rd c.	<i>Arch of Fazzān 3</i>
GER 11.37	3b		Crouched ?	-			3 rd -4 th c.	<i>Arch of Fazzān 3</i>
GER 11.40	3b		Crouched R	N (W)			3 rd -4 th c.	<i>Arch of Fazzān 3</i>
GER 11.42	4b		Crouched L.	E (S)		*	1 st -2 nd c	<i>Arch of Fazzān 3</i>
GER 11.43	4b		Crouched R	E (N)			2 nd -3 rd c.	<i>Arch of Fazzān 3</i>
GER 11.45	3b		Crouched L.	W (N)			3 rd -4 th c.	<i>Arch of Fazzān 3</i>
GER 11.46	2a		Supine contracted	-			3 rd -4 th c.	<i>Arch of Fazzān 3</i>
GER 11.49	2a		Crouched R	SE (E)			3 rd -4 th c.	<i>Arch of Fazzān 3</i>
GER 11.50	4b		Crouched R	SW (SE)			1 st -2 nd c	<i>Arch of Fazzān 3</i>
GER 11.52	4b		Crouched R	W (S)			1 st -2 nd c	<i>Arch of Fazzān 3</i>
GER 11.53	4b		Crouched L.	E (S)			1 st -2 nd c	<i>Arch of Fazzān 3</i>
GER 11.54	2a		Crouched L.	SE (W)			3 rd -4 th c.	<i>Arch of Fazzān 3</i>
GER 11.A1.2	3b		Crouched	E		*	1 st -2 nd c	<i>Arch of Fazzān 3</i>
GER 11.A1.4	5b		Crouched ?			*	1 st -2 nd c	<i>Arch of Fazzān 3</i>
GSC 1-8 (1)	2c		Crouched R	NW (W)			?	Caputo 1951, 352-57
GSC 1-8 (3)	2c		Crouched R	W (S)			?	Caputo 1951, 352-57
ZIN 13.44	2c		Crouched R	N (W)			3 rd -1 st BC?	<i>Arch of Fazzān 3</i>
ZIN 13.45	2c		Supine contracted				3 rd -1 st BC?	<i>Arch of Fazzān 3</i>
ZIN 13.54	2c		Crouched R	?			3 rd -1 st BC?	<i>Arch of Fazzān 3</i>
ZIN 13.170	2c		Crouched L.	E (S)			3 rd -1 st BC?	<i>Arch of Fazzān 3</i>
ZIN 13.171	2c	F	Crouched L.	W (N)			3 rd -1 st BC?	<i>Arch of Fazzān 3</i>
ZIN 13.202	2c	M	Crouched L.	N (E?)	*		3 rd -1 st BC?	<i>Arch of Fazzān 3</i>
ZIN 13.204	2c	F	Crouched R	W (S)			3 rd -1 st BC?	<i>Arch of Fazzān 3</i>
ZIN 13.209	2c	F	Crouched L.	S (W)	*		3 rd -1 st BC?	<i>Arch of Fazzān 3</i>
at-Tanāhma (A1)	1a	F	Crouched R	N (W)		*	?	Bellair <i>et al.</i> 1953, 85-86
at-Tanāhma (A2)	5b	M	Crouched R			*	1-4 c.	Bellair <i>et al.</i> 1953, 86-89
al-Qrāya (A3)	2b	M	Crouched L.	E (S)		*	3-1 c. BC?	Bellair <i>et al.</i> 1953, 89-91
al-Qrāya (A4)	1d	M	Crouched R	?			1-4c. ?	Bellair <i>et al.</i> 1953, 91-92
Tajirhī 1	2c	F	Crouched R	E (N)			7 th -9 th c. ?	Bellair <i>et al.</i> 1953, 72-73
Tajirhī 2	2c	M	Crouched R	W (S)		*	7 th -9 th c. ?	Bellair <i>et al.</i> 1953, 74-75
Tajirhī 3a	2c	M	Supine contracted	W	*	*	7 th -9 th c. ?	Bellair <i>et al.</i> 1953, 75-76
Tajirhī 3b	2c	F	Crouched L.	E (SW)	*		7 th -9 th c. ?	Bellair <i>et al.</i> 1953, 75-76
Tajirhī 3c	2c	M	Crouched L.	E? (S?)	*	*	7 th -9 th c. ?	Bellair <i>et al.</i> 1953, 75-76
Tajirhī 4a	2c	M	Crouched L.	W (N)	*	*	7 th -9 th c. ?	Bellair <i>et al.</i> 1953, 76-77
Tajirhī 4b	2c	F	Crouched R	E (N)			7 th -9 th c. ?	Bellair <i>et al.</i> 1953, 76-77

Table 6.1. Burial position, orientation and ritual.

placed below tumuli or cairns of piled stone, frequently with multiple burials in the same monument (Aumassip and Tauveron 1993, 77; Di Lernia *et al.* 2001, *Encyclopédie berbère*, s.v. *baḡinas*, 1404-06). However, by the protohistoric period the more common pattern was for individual monuments to be constructed, though groups of closely abutting tombs may in part be a result of grouping families or clan groups in death. Most of the excavated tombs in Wādī al-Ajāl have only one burial, though it was not uncommon to find a secondary interment added later – excavated tombs at ZIN 13 and GER 11 had secondary burials inserted in the grave shaft above the primary interment and similar double burials were encountered by earlier Italian and French excavators (Pace *et al.* 1951, 377-78; Bellair *et al.* 1953, 75-76). Some of the tumuli in linear arrangement at UAT 4 evidently contained more than one cist. There are hints that bodies were sometimes moved around long after death. Caputo (1951 375) found the mixed bones of at least two individuals in a grave at Takarkība, where they had been rearranged in the rough semblance of a human skeleton! Some unrobbed graves have also lacked some parts of the skeleton (Bellair *et al.* 1953, 87-88, 95-96).

Child burials have been noted in the main cemeteries, occasionally as secondary insertions into existing monuments, alternatively between larger tombs. There is also evidence that infants were buried on settlement sites – at least 2 neonate burials were recorded at Sāniat Jibrīl.

Several burials of Garamantian date have yielded traces of textile, leather or basketry/matting wrapped around the body by way of shroud (initially noted by the Italians, Caputo 1951, 313-14; cf. GER 11, burials A1.1, A1.2, A1.3, A2.1, A2.4; ZIN 13.45, 13.54, 13.170, 13.202, 13.204, 13.209 – see *Archaeology of Fazzān* 3).

Most of the burials at Sāniat bin Huwaydī had the head oriented either to east or to west and in all but one case the choice coincided with the side on which the stele and offering table was placed (Fig. 6.44). It would appear from this that the head was generally placed as close as possible to the offering table (or similar structure). In seven cases the body was laid on its right side and in five on its left side, with one case supine with legs drawn up to the chest. The choice of which side to lay the body on may have been affected by a preference for facing the corpse towards the southern horizon (six examples, against two for north, one for east and three for west). However, our sample is small. Caputo (1951, 406-08) provides several cases of head to north (facing east) or south (facing west) – in each case with the body lain on its left side. But he also records some cases of the body being lain on its right side, with head to west, north-west or west-north-west (Caputo 1951, figs 142-43, 145). Furthermore, some bodies were clearly lain on their backs, with head on headrests and legs drawn up to chest (Daniels 1971a, pl.vii).

Several burials have yielded traces of headrests below the skull (el-Rashedy 1988, 108, 111; Daniels 1971a, 267). Caputo (1951, 406) noted the unusual position of several skulls, angled upwards in the fill of the tombs as though supported at the time of burial on something – presumably evidence of further headrests. Pauphillet's excavations of late antique burials at Tijirhī also yielded evidence of at least three wooden headrests and these may be assumed to have present in many other graves of Fazzān (Bellair *et al.* 1953, 79).

A significant difference between Fazzān and many of the oases closer to Egypt is the lack of evidence for systematic mummification (with textile wrappings) in Fazzān, whereas it seems to have been practised on a large scale at al-Jaghbūb, Sīwa, Barḡaria (Mohammed 1997; Fakhry 1974). However, we should note that some attempts may have been made to preserve bodies. The mummified body of a young girl displayed in the Jarma museum was evidently preserved as a result of being covered with a dense layer of tamarisk leaves.

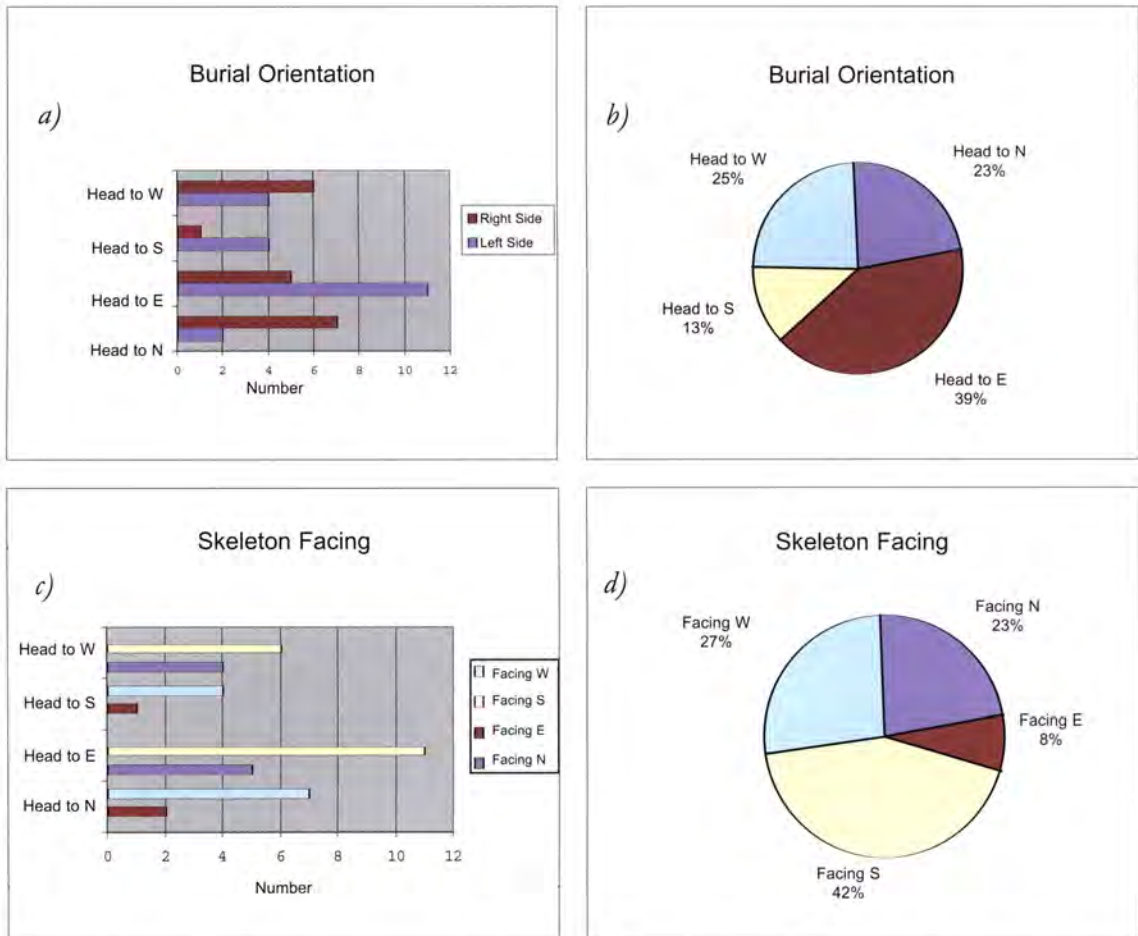


Fig. 6.44. a)-b) Burial orientation in excavated tombs; c)-d) direction in which skeleton facing.

In addition, several graves have yielded traces of organic substances on excavation, including an example at al-Abyaḍ with a resinous substance over the two skeletons (Caputo 1951, 377-80, 408). More significantly, a large number of burials have been recorded with red ochre staining on the bones (Caputo 1951, 336-38; Bellair *et al.* 1953, 95; cf. Camps 1997b, 187, 190; Reygasse 1950, 98, for red ochre in the Tin Hinan burial). At Sāniat bin Huwaydī this was noted in tombs GER 11. A1.4?, 11.15, 11.42 (see *Archaeology of Fazzān* 3). Pauphillet suggested that the red colouring was originally a liquid compound placed over the corpse in leather containers (Bellair *et al.* 1953, 76-78). The importance of the colour red in Garamantian mortuary beliefs is emphasised by the frequent use of red inside tombs as well as on stele and outer surfaces. The importance of red ochre to the Libyans was noted already by Herodotus (Bates 1914, 140; Herodotus 4.191; 4.194).

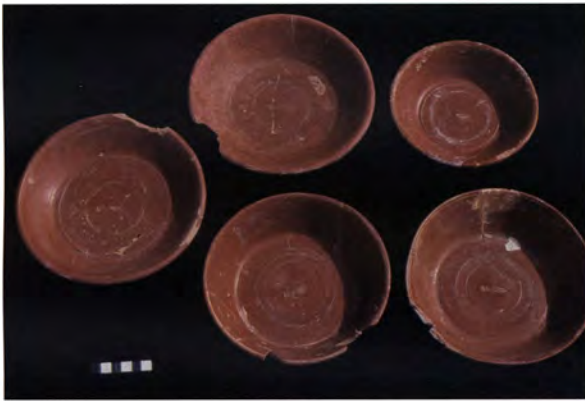
Grave goods were an important element of the classic Garamantian funerary tradition and reveal much about the nature of one side of the commercial contact between the Fazzān and the Roman empire (Table 6.2; Figs 4.45-4.46). A wealth of Roman pottery, amphorae, glass and faience has been recorded by the various excava-



a)



b)



c)



d)



e)



f)

Fig. 6.45. Imported grave goods from burials near Jarma: a) GER 11 contents of burial 15; b) lamps; c) Italian sigillata; d) glass; e) Tripolitanian amphora; f) jewellery.

tions (see, *inter alia*, Caputo 1937, 320-30; 1951, 247-49 [glass and jewellery], 252-391 [descriptions of individual tombs]; 391-99 [glass]; Fontana 1995; Ruprechtsberger 1997, 65-67; Tagart 1982; 1983). In a recent and illuminating study, Fontana (1995) has observed that the range of imports included in the tombs exhibit a marked uniformity in key respects. Although the richness of the grave assemblages varies considerably, the chief components commonly included wine amphorae and the panoply of drinking utensils – jugs, cups and glass beakers. Oil amphorae and oil lamps



a)



b)



c)

Fig. 6.46. Saharan material culture in burials: a) incense burner; b) painted pottery; c) headrest.

are another distinctive element. Yet another aspect concerns the intrinsic fragility of the material carried over the desert. The preference for glass vessels, especially large open forms (the same is true of the ceramic finewares also) must have tested the ingenuity of the traders who brought the material. Overall, one suspects that the established pattern of these funerary assemblages reflects Garamantian choices and preferences for certain aspects of Roman material culture.

Gold is surprisingly absent in the excavated tombs, though the extent of robbing suggests that the larger burials included such material. The Tin Hinan burial near Abalessa in southern Algeria, contemporary with the late Garamantian period and with a number of cultural affinities, contained over 40 gold items, including 7 large bracelets weighing a total of 1.7 kg (Camps 1997b, 189-90 for the full inventory). This may give some idea of what has been lost from the richest Garamantian burials.

Previous work on the grave goods has emphasised imported goods and perhaps tended to overlook the evidence of other elements in the material culture that reflect Saharan traditions (Fig. 6.46). Elaborately painted ceramic incense-burners are present in a number of burials, alongside the headrests, mats and leather shrouds already mentioned above. Necklaces of ostrich eggshell, glass, carnelian and amazonite beads are common in many tombs, along with stone amulets.

Some graves contained a decidedly idiosyncratic assemblage. In the necropolis meridionale (UAT 8), tomb 48 yielded a few glass beads, a seashell, a stone spatula and two blocks of pumice. A piece of pumice stone (imported from some distance away) was also found in one of the Sāniat bin Huwaydī burials (GER 11.9). At Takarkiba, two tombs contained small tablets of distinctive black stone and quartzite (Caputo 1951, 375-76).

Grave	Imported fineware	Coarseware	Lamp	Amphora	Glass	Faience	Ivory	Incense burner	Ostrich eggshell beads	Stone beads	Glass beads	Metal	Stone rubber	Rotary Quern	Textile	Basketry/Matting	Leather	Headrest
GER 11.A1.1			3	1													*	
GER 11.A1.2	3	*	2	3	1				*	*	*						*	
GER 11.A1.3	7		1	3	2				*							*		
GER 11.A1.5	1	1	1	2														
GER 11.A1.6	1		1	2	1				8		2							
GER 11.A2.1	2	3	1	7										1				
GER 11.A2.2	3	2	1	7		1								1				
GER 11.A2.3	9	4	2	5	1				*	*	*			1				
GER 11.A2.4	10	6	2	6	1				*		*							
GER 11.A3.1	7	4	1	7	2		1											
GER 11.A3.2	6	3	2	5	1				*					1				
GER 11.A3.3	9	7	2	6	1				*		*			1				
GER 11.A4.1		8		8														
GER 11.A4.2	5		2	6	1													
GER 11.1		1		1		1												
GER 11.3	1	*		1	3	1												
GER 11.6		*	1	3					1									
GER 11.9	1	*	1	3	3	1	1	1	*									
GER 11.11	1	*																
GER 11.12		2	1															
GER 11.13		*																
GER 11.14	1	*		1?														
GER 11.15	8	*	1	3			1	1	*			*	1					
GER 11.17	31	*	1	8	5	9												
GER 11.18	1	*	1	4				2										
GER 11.19		*																
GER 11.21	1																	
GER 11.22		*																
GER 11.23	1	*		1		1												
GER 11.24	1																	
GER 11.25		1							299	2								
GER 11.27		*																
GER 11.28	1	*																
GER 11.30		*		1														
GER 11.31									1	1								
GER 11.33	1			1					*			1						
GER 11.34	*	*					1											
GER 11.36	1			1														
GER 11.38				1														
GER 11.40		*																
GER 11.41		*					1											
GER 11.42	2		1	5	7	2							1					
GER 11.43	1				2		1											
GER 11.45		1																
GER 11.49			1									1						
GER 11.50		*		2														
GER 11.51	2	*		2	9	3	2	2	*	*								
GER 11.52	6	*	2	5	5		1						1					
GER 11.53			1	5	2	1							1					
GER 11.54	1	*		1	1				*	*								
UAT 2 (1)											31							
											8							

Grave	Imported fineware	Coarseware	Lamp	Amphora	Glass	Faience	Ivory	Incense burner	Ostrich eggshell beads	Stone beads	Glass beads	Metal	Stone rubber	Rotary quern	Textile	Baskery/Matting	Leather	Headrest
UAT 2 (3)				*														
UAT 2 (6)				2														
UAT 2 (8)	1			*	1													
UAT 2 (9)	1		1															
UAT 2 (10)	1	1	2		4	1												
UAT 3	2	6		12	4													
UAT 8 (2)		1			2				*∅	*∅								
UAT 8 (21)	5				3													
UAT 8 (22)	*			*	*										1			
UAT 8 (24)	*		*	*														
UAT 8 (26)		1			2													
UAT 8 (27)	*				*													
UAT 8 (29)					*													
UAT 8 (30)	*								*							*		
UAT 8 (38)		1							*			1						
GSC 1/8 (1)															*	*		
GSC 1/8 (3)										2		3						
GSC 30 (1)			2		6			2										
GSC 30 (2)		1	1	2	1		1	1		3		4		1		*		
GSC 30 (3)	7			2	6		1			5					*		*	
GSC 31 (1)	*			*	*													
GSC 31 (2)				1	*					2	1							
CHA 1 (7)	*																	
al-Abyad(2a/b)	1				1										*	*	*	
TAB 1 (2)												2						
Ghât (1)																	*	
Ghât (2)															*		*	
Ghât (4)	1				4													
ZIN 13.44		*							*∅									*
ZIN 13.45																*	*	*
ZIN 13.170															*	*		*
ZIN 13.171											1							
ZIN 13.202															*			
ZIN 13.204																*		
ZIN 13.209								1							*	*		*
at-Tanāhma (A1)																	*	
at-Tanāhma (A2)															*		*	
al-Qrāya (A3)											1						*	
al-Qrāya (A4)																	*	
Tajirhī 1									*	1								
Tajirhī 2																	*	*
Tajirhī 3b																	*	*∅
Tajirhī 3c										1							*	*
Tajirhī 4a											*						*	
Tajirhī 4b								1									*	

Table 6.2. Finds from excavated Garamantian burials. * = present in unspecified quantity.

The fragments of textiles, leather and matting or basketry present in the best preserved burials, suggest that organic materials were an important component of the burial assemblage. One burial at Ghāt contained a fragment of a wooden bowl (Caputo 1951, 387) and three others were found by CMD in grave ZIN 13.209; such wooden artefacts, in addition to the headrests already noted, may have been a feature of many burials originally. Several burials excavated by Caputo contained food remains and cinders, possibly from food offerings made at the grave side and incorporated in the burial (1951, 407-08). CMD found at least two graves with deposits of carbonised dates in (GER 11.50; ZIN 13.202)

Grave goods were associated with all ages of burial, including children. Several child burials had associated beads or necklaces (GER 11.9, 11.31) or amulets (GER 11.40). Several of these child burials with grave goods at Sāniat bin Huwaydī were simple pit inhumations alongside the tomb, including GER 11.49 which contained an iron ring and a lamp.

FUNERARY RITUALS: DISCOURSE WITH THE DEAD

The offering-tables, stele, 'altars' and funerary enclosures must have had significant roles to play in Garamantian funerary ritual. These features suggest that contact was maintained between the living and the dead. Divination through dreams at tombs of ancestors was a recognised African trait from early antiquity to recent times (Brett and Fentress 1996, 343-36; Camps 1986; Daniels 1970a, 32; Mattingly 1995, 207; 1999, 394-95). The Libyan practice of sleeping by tombs to divine the future was reported by Herodotus (4.172) and Mela (1.8.45) and was still observed among the Tuareg in the 19th century by Duveyrier and others, though interestingly it was pre-Islamic monuments (*idabnen*) that were selected for this practice, not Islamic burials (*Encyclopedie berbère* s.v. *adebni*, 124). The practice of making offerings at tombs has continued to the present day (Fig. 6.47).

SKELETAL ANALYSIS

Characterisation of the Garamantes on the basis of the excavated skeletal material still rests largely on the work of Sergi (Sergi 1951, 443-522). Of the 29 most complete



Fig. 6.47. Modern grave offerings at Ghuddwa

Cemetery	Tomb types	No.	Sex	Age	Sergi group	Chamla classification
CHA 1	Pyramid	1	M	Adult	Group I (euraffrican)	Non-negroid
GSC 1-8 (3)	2c?	1	M	Adult	Group I	Non-negroid
GSC 30	5b	2	M	Adult?	Group I	Non-negroid
TAG 1	2a/5b	1	M	Adult	Group I	Non-negroid
Takarkiba	-	1	M	Adult	Group I	Non-negroid
al-Qrāya	-	1	-	Adolescent	Group II (euraffrican)	Non-negroid
Ghāt	1d/3a	1	M	Adult	Group II	Non-negroid
Takarkiba	-	1	M	Adult	Group II	Non-negroid
TAG 1	2a/5b	1	M	Adult	Group II?	Non-negroid
UAT 8	2c	1	M	Adult	Group II	Non-negroid
al-Abyaḍ (2a)	-	1	F	Adult	Group III (negritified euraffrican)	Mixed
CHA 1	Pyramid	1	M	Adult	Group III	Mixed
Ghāt	1d/3a	1	M	Adult	Group III	Mixed
GSC 1-8 (1)	2c?	1	M	Adult	Group III	Mixed
UAT 8	2c	2	M/F	Adult	Group III	Mixed
al-Abyaḍ (2b)	-	1	M	Adult	Group IV (Negroid)	Negroid
Ghāt	1d/3a	2	M	Adult	Group IV	Negroid

Table 6.3. Racial type of skeletons from Garamantian burials (after Sergi 1951; Chamla 1968).

skeletons recovered by the Italian mission of the 1930s, about half were sufficiently complete to allow Sergi to propose a racial attribution (Table 6.3). He proposed a four-fold division of the material, with Type I and Type II being variants of Euraffrican type (closely related to the Berbers), Type III comprising a mixed Euraffrican negroid stock and Type IV a more predominantly negroid group.

The results have been reviewed more recently by Chamla (1968, 192-94) who has confirmed the broad classification. Of the 15 individuals ascribable to type according to Chamla, 7 were of Type I/II (46.6 percent), 4 were of Type III (26.6 percent) and 4 were of Type IV (26.6 percent). Chamla (1968, 193-94) also reviewed the material presented by Pauphillet from his excavations of post-Garamantian graves at Tajirhi and classified those skulls as belonging to the non-negroid group. The sample is small and potentially unrepresentative and one of the great disappointments of CMD's work at Sāniat bin Huwaydī is that it did not produce well-preserved skeletal material to enhance this picture.

Nonetheless, several important observations can be made:

- The Garamantes contained a significant component of light-skinned Libyans and some at least of these people were buried in monumental graves.
- This picture differs from the situation in the Sahara in the late Neolithic, as Chamla's work suggests a higher proportion of negroid types at that date, which might suggest that the creation of Garamantian civilisation involved the in-migration of at least some part of the population from regions to the north or north-east.
- The cemeteries contain a substantial number (over 50 percent) of individuals of either mixed blood or full negro physiognomy. Some of these individuals may have been in poorer graves, but not all of them, suggesting that some individuals of mixed race or black skin were prominent within Garamantian society.
- Given the literary testimony of Garamantian raids against their 'Ethiopian' neighbours, it is likely that some of the negroes present were slaves or descendants of slaves.
- The maintenance of strong non-negroid traits into late and post-Garamantian contexts would seem to indicate that intermixing of the races was not completely open and may have been structured within Garamantian society.

Chamla's work on the late Neolithic population of the Sahara (1968, 199-201) suggests a far stronger negroid presence at that date, a point also supported by rock art which depicts many negro types (Barker 1989, 38-39). In the rock art, the arrival of Berber groups is heralded by new, more recognisably Berber facial types, and also by the appearance of the horse and the chariot (Lutz and Lutz 1995a, 140-43 and below, Chapters 8-9).

FORMATIVE INFLUENCES ON GARAMANTIAN FUNERARY PRACTICE

The funerary practices of the Garamantes, in theory, could shed light on their origins. The theory that some Berber Libyans migrated into Fazzān from the eastern Sahara in the late second or early first millennium BC is plausible on a variety of grounds. However, there are both parallels and divergences between Garamantian funerary traditions and those of other oases of eastern Sahara. Similarly, in seeking links with the area to the north of Fazzān, there are common traditions and major differences. As so often in human activity, cultural identity does not appear to have been imported as a fully developed package. Insofar as we can identify a particular Garamantian cultural complex, it would appear to be something formed within Fazzān (and indeed within a specific part of Fazzān focused on the Wādī al-Ajāl). In developing a cultural identity, the Garamantes borrowed ideas, structural forms and iconography from a variety of sources and blended them in a unique way.

El-Rashedy (1988a/b) has stressed the parallels with Egyptian funerary practices (use of head-rests, offering-tables, stele) and tomb-types (*mastaba* and pyramid tombs) and posits close cultural links between the two areas – perhaps as a result of westward migration of people. But he concluded that the precise funerary rite followed was unique to Fazzān and must have been developed *in situ*. That seems the only safe conclusion. Garamantian culture and society was something that came together in Fazzān, uniting diverse influences and being subsequently affected by contacts between the Garamantes and their neighbours.

Appendix: Concordance of cemetery data

FP Gazetteer no.	Name (ref) in Caputo 1951	Name (ref) in Ayoub
GER 11 Sāniat bin Huwaydī		Saniat Ben Howedi (Ayoub 1967a, 27-48; 1968d)
GSC 30 Jarma escarpment	Necropolis monumentale (1951, 292-320)	Royal Cemetery (kings) (1967a, 11-18; 1967b, 217-18)
GSC 31 Jarma escarpment	Necropolis Orientale (1951, 357-60)	Queen's Cemetery (1967a, 18-20; 1967b, 217-18)
UAT 3 Waṭwāt	Sacello con cella funeraria (1951, 320-34)	
UAT 8-9 Waṭwāt escarpment	Necropolis meridionale (1951, 334-52)	
Probably covers GSC 1-8 Jarma escarpment.	Necropolis centrale (1951, 352-57)	
UAT 2 Waṭwāt	Necropolis del mausoleo (1951, 320-34)	
FUG 1 Ibrayk	Brek necropolis (1951, 360-61)	
Probably one of FUG 10-12 Tuwiwa	Tuiua necropolis (1951, 361-63)	
CHA 1 al-kharāfiq	el-Charaig (1951, 363-73; plan on p. 363-64 shows 12 on east side)	
Probably TEK 4 or 5 Takarkība	Tickertiba (1951, 373-76)	
Probably GRE 2 or 10 al-Qrāya	el-Gheraia (1951, 376-77)	
Possibly ABD 6 al-Abyaḍ	el-Abiod (1951, 377-81)	
TAG 1 Taḡallit	Taglit (1951, 381-84)	
Probably EDS 1 or 11 ad-Disa	Necropolis of Disa (1951, 384)	
TAB 1? Tin Abūndā	Necropolis of Tin Abunda (1951, 384-86)	
Quqamān (Ghāt) Not in Gazetteer	Necropolis of Gat = Cocaman (1951, 386-91)	

Table 6.4. Concordance of nomenclature of cemetery sites in Fazzān.

CHAPTER 7

IRRIGATION TECHNOLOGIES: FOGGARAS, WELLS AND FIELD SYSTEMS

By Andrew Wilson,
with David Mattingly

INTRODUCTION

The extreme aridity of Fazzān poses considerable challenges for human settlement, and raises the question of how the Garamantes and later peoples were able to practise settled agriculture in the area. That problem is now thrown into sharper relief by the FP's discovery of many wādī-centred settlements of Garamantian date in the Wādī al-Ajāl, showing that the Garamantian population of the area in antiquity must have been very substantial (see below, Chapter 9). The remains of numerous subterranean irrigation channels along the southern edge of the Wādī al-Ajāl must provide part of the answer. This type of system is widespread across the world in arid lands, and goes under many names: *foggara* (pl. *feggagirt*; the anglicised plural *foggaras* will be used here) is the term commonly used in Syria, Palestine and North Africa including Libya; in Iran *qanāt* (pl. *qanawāt*) or *kariz* is used, and in Oman *falaj* (pl. *aflāj*); in Morocco *khattāra* (pl. *khattarāt*). The Tamahaq term for *foggara* is *efeli*, pl. *ifelan* (*Encyclopédie Berbère*, s.v. *foggara*, fasc. 19, 2868; Keenan 1977, 338. On *foggaras/qanāt* in general, and their diffusion, see Balland 1992; Cressey 1958; *Encyclopédie Berbère* s.v. *foggara*, fasc. 19, 2868-80; English 1968; Goblot 1979. For the question of origins, see Goblot 1979, 66-71).

A *foggara* is an underground channel that taps groundwater, usually within a hill-side or a piedmont zone, and leads it out to the surface of the landscape further downhill via a slightly inclined tunnel (Fig. 7.1). Some scholars have misunderstood the functioning of *foggaras*. Scarin (1934, 71-3) and Caputo (1951, 213-8) thought they were for collecting rainwater from the hamada, and a curious reconstruction drawing by Ziegert (1969, Taf. IV.8) seems to show a *foggara* terminating in a deep well, from which water would have to be lifted out. This negates the whole purpose of a *foggara*, which is to deliver a gravity-fed flowing stream at the surface of cultivable land.

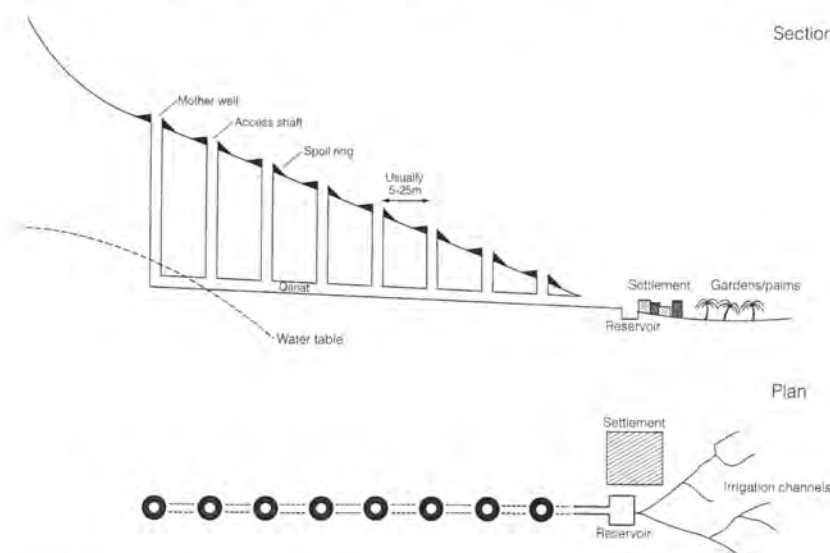


Fig. 7.1. Schematic section and plan of a *foggara*.



Fig. 7.2. Tuwash foggaras (TWE 16, F13) showing large clay spoil rings.

A version of Ziegert's drawing on display in Jarma museum implies that the foggara is collecting rainwater from the surface, rather than from a subterranean aquifer, and shows infiltration down the access shafts as a source of supply. Again this is incorrect; efforts are made to *prevent* water running down the access shafts and eroding their sides, and one of the main reasons for piling the spoil around the mouths of the shafts is to prevent run-off water entering them. A characteristic feature of foggara construction is that the tunnel is not driven horizontally from the side of the hill, but instead vertical access shafts are dug at frequent intervals and the tunnel is dug in short stretches between the bottom of pairs of shafts. The shafts allow for removal of spoil and ventilation of the tunnel during construction, and enable several digging teams to work simultaneously; subsequently they also provide access for maintenance and channel-clearing operations. The spoil from the shafts and tunnel is piled up around the mouths of the access shafts, creating a distinctive line of rings—"molehills on a human scale" (Goblot 1979, 25) (Fig. 7.2). The spoil rings, as noted above, prevent surface run-off water from washing sand, soil or debris into the foggara.

The technique is well suited for supplying water in arid zones; it seems to have been invented in Persia, perhaps during or shortly before the Achaemenid period, and spread east eventually to China, and west to Egypt (by the 5th century BC) and later to the Roman Mediterranean (Birebent 1962; Boulaine and Boulaine 1957; Castellani 1999). Foggaras were introduced to Spain by the Moors, and later to Latin America by the *conquistadores*. Besides Fazzān, foggaras are also found in southern Tunisia, the Algerian Sahara and parts of Morocco. Most scholars up to now have considered that they were introduced into Fazzān in either Roman or Islamic times, and that they spread to Algeria in the middle ages after their introduction into Morocco from Spain (Goblot 1979). However, the FP fieldwork shows that they were introduced to Fazzān at an earlier date; and it now seems likely that foggaras spread to the Algerian Sahara from Fazzān (below, 276). The foggaras of southern Algeria provide an important source of comparison for Fazzānī examples, especially since many examples in the former region continued in use into the 20th century, unlike those of Fazzān (Balland 1992; Capot Rey and Damade 1962; Chaintron 1957/1958; Champault 1969; Cornet 1952; *Encyclopédie Berbère*, s.v. foggara, fasc. 19, 2868-80; s.v. Akabli, fasc. 3, 396-96, Aoulef, fasc. 6, 805-07, Gourara, fasc. 21, 3188-98; Laureanno 1991, 151-61; Lô 1953/1954; Rouvillois-Brigol *et al.* 1973; Voinot 1909).

THE HYDROLOGY OF FAZZĀN

As outlined already (above 3-6), Fazzān consists essentially of three main oasis belts, the Wādī ash-Shaṭī in the north, the Wādī al-Ajāl in the centre, and the Murzuq oasis and Wādī Barjūj in the south. Table 7.1 summarises the hydrological resources of Fazzān region-by-region from the period of the Italian censuses in the 1930s.

Area	Springs	Wells (Predomin. type)	Total no. of irrigated gardens	Total palms	Foggaras
Wādī ash-Shaṭī	277	612 (<i>dalw</i>)	1400	479,500	1+
Wādī al-Ajāl	12	1176 (<i>dalw</i>)	736	140,250	550+
Murzuq/Hufra ash-Sharqiyāt	21	1022 (2:1 <i>dalw</i> , <i>khattāra</i>)	837	276,000	65+
Wādī Hikmah	3	220 (<i>khattāra</i>)	172	66,850	1+
Ghāt/Tanzzūft	74	217 (?)	240	21,150	0
Totals	387	3,247	3,385	983,750	617+

Table 7.1. List of springs and wells by region of Fazzān, along with numbers of gardens and palms listed in 1930s census data (after Sahara Italiano 1937; Scarin 1934; NB there are minor differences between these figures and those of Lethielleux 1948, 27). Total numbers of known foggaras are also listed, though in no case were these still properly functioning in the 1930s. Compare also Table 7.5 below.

The Wādī ash-Shaṭī has an abundant supply of springs, deriving from a Devonian sandstone aquifer capped by compact crystalline sandstone which keeps the water under slight pressure. Natural or artificial fissures in the capping layer allow the water to flow out in either natural or artesian springs (Despois 1946, 20; Lethielleux 1948, 110-12). The flow of many of these springs was already diminishing by the mid-20th century and many are now defunct (Despois 1946, 130-34; el-Hesnawi 1990, 21-22). Springs are much rarer in the other wādīs, and, with the exception of the isolated cluster of oases in the Wādī Tanzzūft close to the Algerian border, in most areas water has traditionally been drawn from wells where aquifers lie close to the surface. In the Wādī al-Ajāl the aquifer exploited by wells in the centre of the valley consists of aeolian sands overlying an impermeable clay layer only a few metres below the surface (2 m around Jarma, up to 15 m at al-Fjayj and al-Qrāya: Despois 1946, 22). At the foot of the ḥamāda escarpment alluvial deposits contain water, and at greater depth lie aquifers in fissured limestone, sandstone and marl strata. These are thought to form part of the large regional Saharan system known as the Continental Intercalaire, but they may be locally discontinuous.

Rainfall is minimal – a theoretical average of 10 mm p.a. in the Wādī al-Ajāl, which in practice varies considerably from one year to the next – and evaporation rates are high. Consequently, rainfall plays no direct part in agriculture; occasionally violent cloudbursts occur, which can ruin crops and cause damage to property as run-off forms erosive torrents (Despois 1946, 15-17). Recharge of the aquifers relies heavily on rainfall in more remote areas.

Further work is required on the ancient climate of the region, but although there clearly was a wetter phase in the Sahara between 10,000 and 3,000 BC, current indications suggest that the climate between c.500 BC and the present has not changed substantially. But the available water resources have decreased during this period; geomorphological studies show that the water-table in the area has progressively fallen over time (Chapter 2).

DISTRIBUTION OF FOGGARAS IN FAZZĀN

The remains of hundreds of foggaras are to be found along the Wādī al-Ajāl, for some 160 km from al-Abyaḍ in the east to Tīn Abūndā beyond Ubārī in the west (Fig. 7.3). A conservative tally of those traceable from a series of air photographs taken by Hunting Air Surveys in 1958 and 1968 gives a total of c.531, plus c.100 tributary or feeder branches; investigation on the ground revealed further foggaras not visible on the air photographs. An estimate of c. 550 main channels, plus tributaries, is a minimum for the Wādī al-Ajāl (cf. the significantly underestimated totals of c.150 or 200, suggested by Scarin 1934, 71-73; Despois 1946, 56). To put this figure in perspective, the total number of foggaras known in the Algerian Tidikelt is 176 spread between 14 main groups (with only 89 still functioning by the 1950s: Lô 1953, 161). In other parts of Fazzān, Despois mentions several groups of foggaras to the east of Murzuq: 2 at aṭ-Ṭawīla, others in the Ḥufra and ash-Sharqīyāt, more than 12 near al-Bdayir, at least 6 at Misqwīn, c.15 to 20 around Zuwīla (Figs 7.4, 7.5), 4 or 5 at Tirbū and 15 or 16 at Zuwīya (Despois 1946, 56; cf. Daniels 1973, 37), and many of these have now been plotted from air-photographs in the CMD archive (Edwards 2001; see sites SCH 28, MAR 11, GDD 10, NSH 30, UTB 3; ZUL 11). CMD's expedition in 1968 also reported a foggara complex near Qaṣr Māra (Daniels 1973, 36; see *Archaeology of Fazzān* 2, Gazetteer). Foggaras are also reported from north-eastern Fazzān, at the oasis of Umm al-ʿAbīd on the route leading north from Sabhā (Bruce-Lockhart and Wright 2000, 286), at Zāla (Ward 1968, 33-35) and in the al-Jufra oasis group (al-Mahdī al-Azrak, pers. comm.). No foggaras are known near Ghāt (Goblot's statement, 1979, 117, to the contrary is based on a misreading of Despois 1946, 55). However, CMD located at least one example in the Wadi ash-Shaṭī, to the north-east of Brāk, notwithstanding the abundance of natural springs in that area.

Despite the large number of foggaras in the Wādī al-Ajāl, they have been largely neglected in previous work, or mentioned only in passing (Caputo 1937b; Caputo 1951, 213-18; Daniels 1970a, 42; 1973, 36-37 and 40; Despois 1946, 55-57 and 59-61; Lethielleux 1948, 71-72; Scarin 1934, 71-73). Goblot's (1979, 116-17) discussion of foggaras in Fazzān is summarised from these and a few other sources, but contains a number of careless errors.

There are a few precious references to foggaras in the accounts of early European travellers. Clapperton (Bruce-Lockhart and Wright 2000, 53-55 and 286) described foggara at 'Tawela' (aṭ-Ṭawīla) near Trāghan and at Umm al-ʿAbīd, north-east of Sabhā oasis: "The well of Om la beed is old – and there is a continuation of wells all connected by a drain below to the spring head – at distances of about 10 or 14 yards from another – such like I have seen in other parts of Fazzān near sites of old castles – the Arabs or Fazzaners of the present day know not who made them!"

Richardson (1848, 289) was shown by Haj Omar "what he 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 [south]. Along these lines of embankment were large fields of cultivation, showing the country had declined in its agricultural industry... it is probable these earlier cultivators of the soil were colonists from the coast."

Although Barth, surprisingly for so competitive an observer, does not appear to have noted the foggaras himself, he collected a pertinent local tradition about one near Takarkība. "There is a curious tradition in Tekertiba that from the highest peak of the cliffs bordering the valley on the southern side, a rivulet or brook, issuing from a spring, runs down into the valley underground. There were, it is related, originally several canals or stream works leading down to this subterranean aqueduct; but they have all filled up" (Barth 1965, 148).

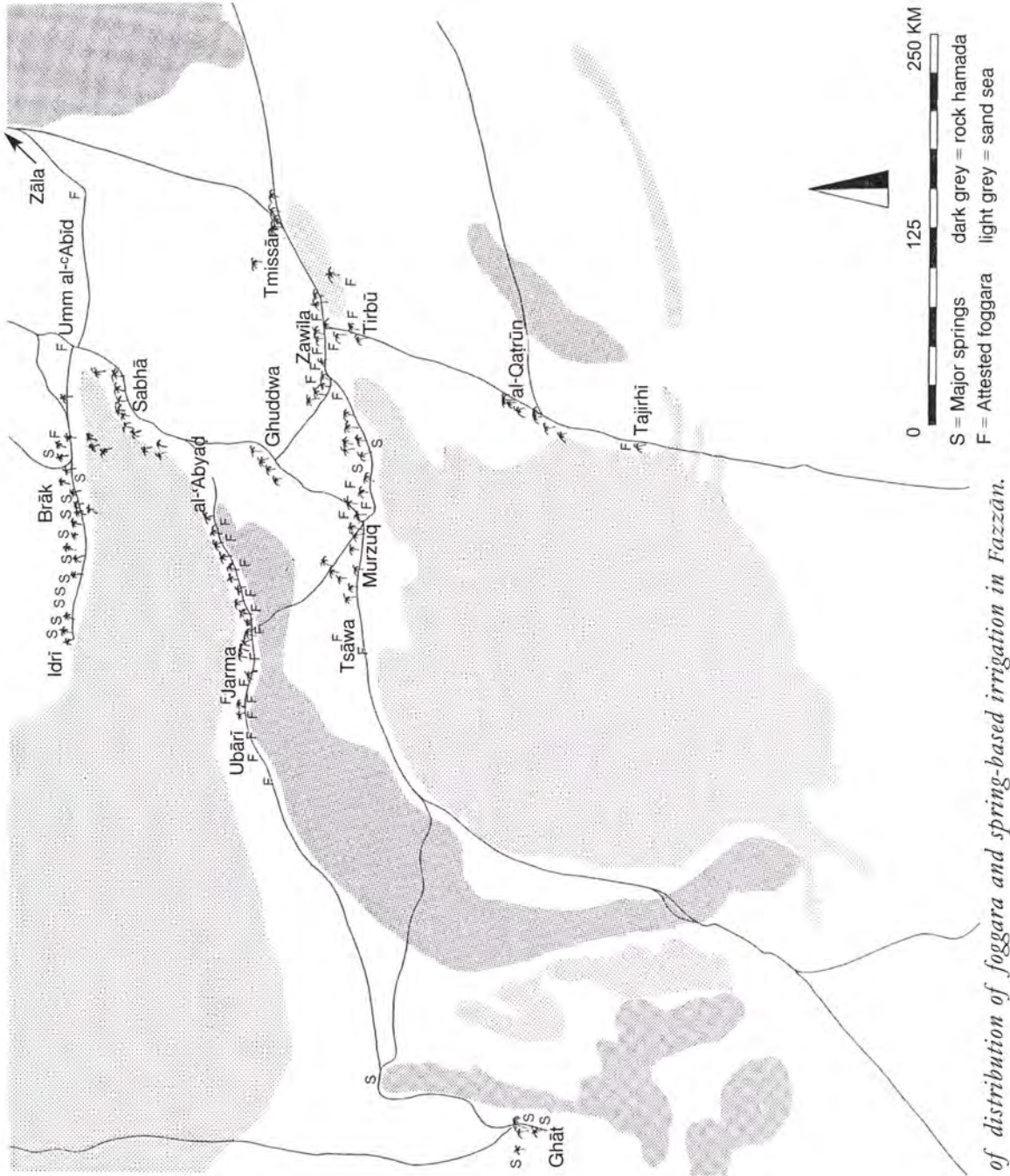


Fig. 7.3. Map of distribution of foggara and spring-based irrigation in Fazzān.

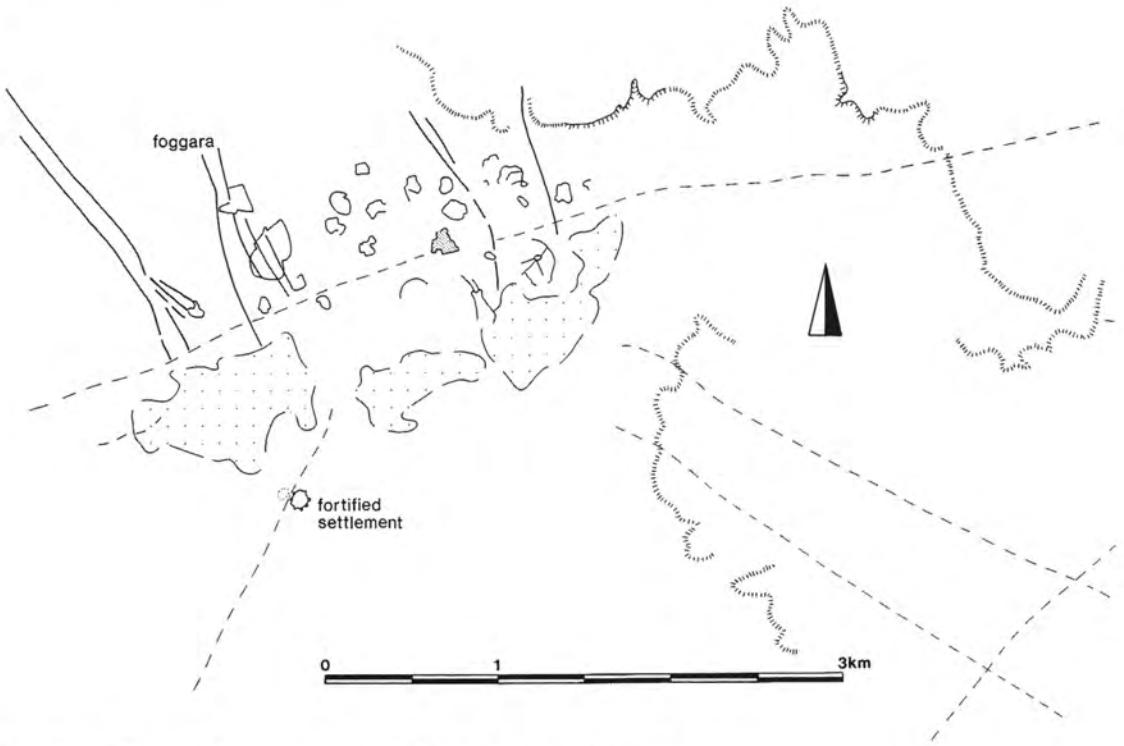


Fig. 7.4. Plot of foggara system c.14 km west of Zuwila.



Fig. 7.5. Ground view of foggara c.14 km west of Zuwila.

Duveyrier (1864, 68, cf. also 27-28, 279), mentioned the existence of foggaras near Jarma and assumed they related to the Garamantes but gave no specific details. Nachtigal, who travelled through the Murzuq and Ḥufra regions, but not the Wādī al-Ajāl, like Clapperton saw the “Ain Omm el-Abid ‘gallery well’” (1974, 61, cf. also 107, 216). The relative lack of information reported by early travellers serves to emphasise that the foggaras were long abandoned before the first European exploration of Fazzān in the 19th century, when already the local population had lost all memory of their use.

CMD's project plotted many foggaras from aerial photographs, and conducted some investigation on the ground, but hardly a systematic study, and they are treated only very briefly in his publications (Daniels 1970a, 17-18 and 42; Daniels 1973, 35-37; cf. now Edwards 2001; Edwards *et al.* 1999). Despite various theories, many questions were still outstanding: when were the foggaras built, and by whom? What was their period of use? When and why were they abandoned? The problem of the foggaras is evidently closely linked to the settlement history of Fazzān.

THE FOGGARAS IN THE WĀDĪ AL-AJĀL

An estimated 550 foggaras are spread more or less continuously along the Wādī al-Ajāl from al-Abyaḍ to Tin Abūndā, but they sometimes occur in particularly dense clusters. Sadly many are now destroyed or obliterated, but they can be plotted from air-photographs taken in 1958/1968. There are evidently a series of different phases in some areas – low-level air photographs taken near the village of Tuwash show one set of foggaras cutting another set on a different alignment (TWE 16; Figs 7.8, 7.22).

The two westernmost foggaras are at Tin Abūndā, west of Ubārī, marking the western outlier of Garamantian settlement in the Wādī al-Ajāl (TAB 5, TAB 10). A group of 8 more are associated with ancient settlement and cemeteries at In Ṭafarāt (ITF 4-9, ITF 15, ITF 17), and then further to the east a group of c. 30 long foggaras (TMT 4) between Tāmalālat and Tinda runs towards an area of intensive modern agriculture immediately west of Ubārī (Fig. 7.6).

Several clusters of shorter foggaras flank the headland of Tinda (TIN 9, TIN 11-12; Fig. 7.7) and one originates within the Garamantian enclosure at Tinda, although bulldozing has destroyed any stratigraphic relationship between it and the enclosure bank (TIN 7). To the east, between Tinda and Tāqallit where the escarpment recedes to the south of ad-Dīsa, are two dense clusters of some of the longest foggaras in the Wādī, running for c.4.5 km from the escarpment to the centre of the oasis (EDS 7-8; Fig 7.7). Some have dendritic tributaries, and three foggaras of a later phase run diagonally across several of the others. Further east again, a group (TAG 8) of shorter, largely parallel foggaras, with some Y-shaped tributaries, runs from the cairn cemeteries at the foot of the western side of Tāqallit headland towards the wadi floor where traces of Garamantian occupation and a mudbrick pyramid cemetery were found. To the east of Tāqallit, dense clusters of long foggaras, several with dendritic tributary systems, show at least two phases, of which the second cuts across the first, curving round to the north-north-west (ELH 12-13). East of these, to the south of al-Ḥaṭīya, is a simpler group of c.14 nearly parallel foggaras (ELH 13, one of which crosses another), ending near the mudbrick pyramid cemeteries of ELH 1 and ELH 2. Further east still, a cluster of c.26 parallel foggaras is visible south of al-Ghrayf on the air photographs (LGR 5), but now largely destroyed by aggregate extraction and modern agriculture. About another 16-18 closely-spaced parallel foggaras run from the base of the north-western side of Zinkekrā promontory towards al-Ghrayf (LGR 4), while to the east of Zinkekrā the foggaras are more widely spaced and form a partially dendritic system with some 11 tributaries converging on 8 outlets in the vicinity of Qaṣr Waṭwāt (UAT 20) (Fig. 7.7).

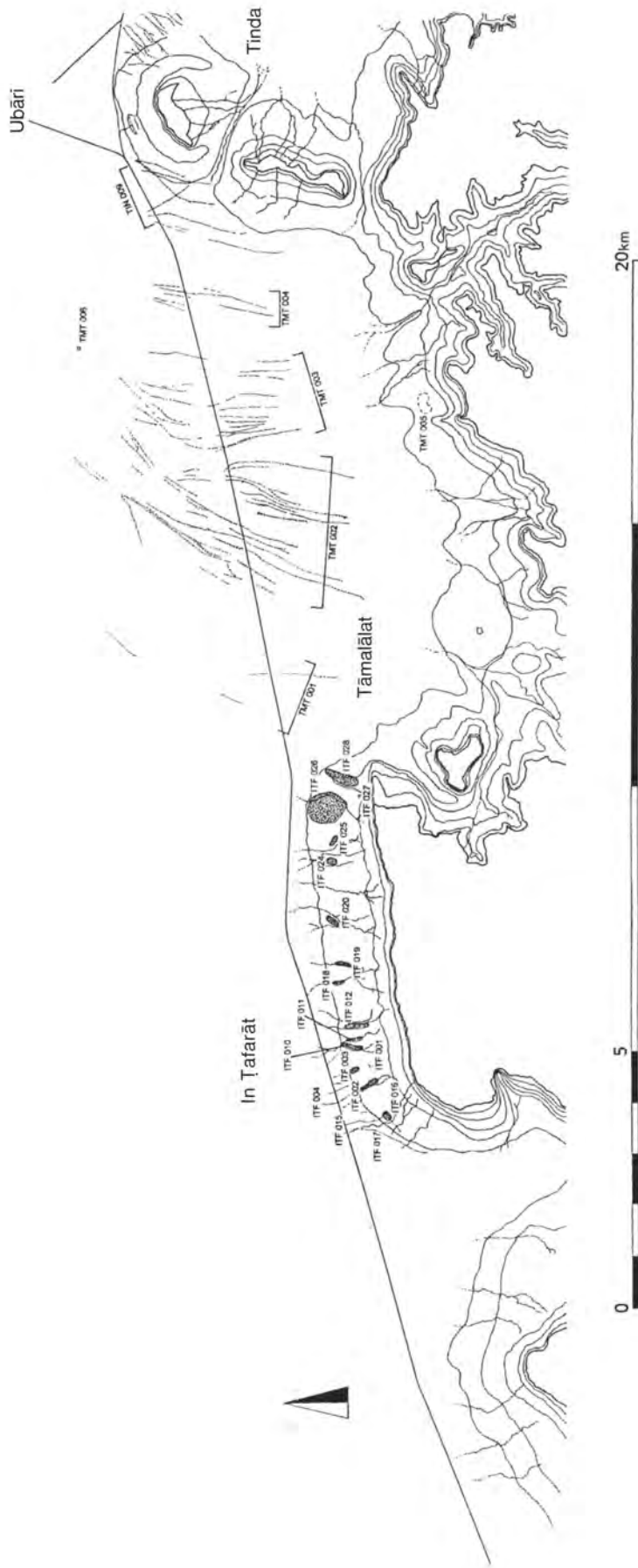


Fig. 7.6. Foggaras in Wādī al-Ajāl: In-Tafarāt to Tinda.

Foggaras in western Wādī al-Ajāl

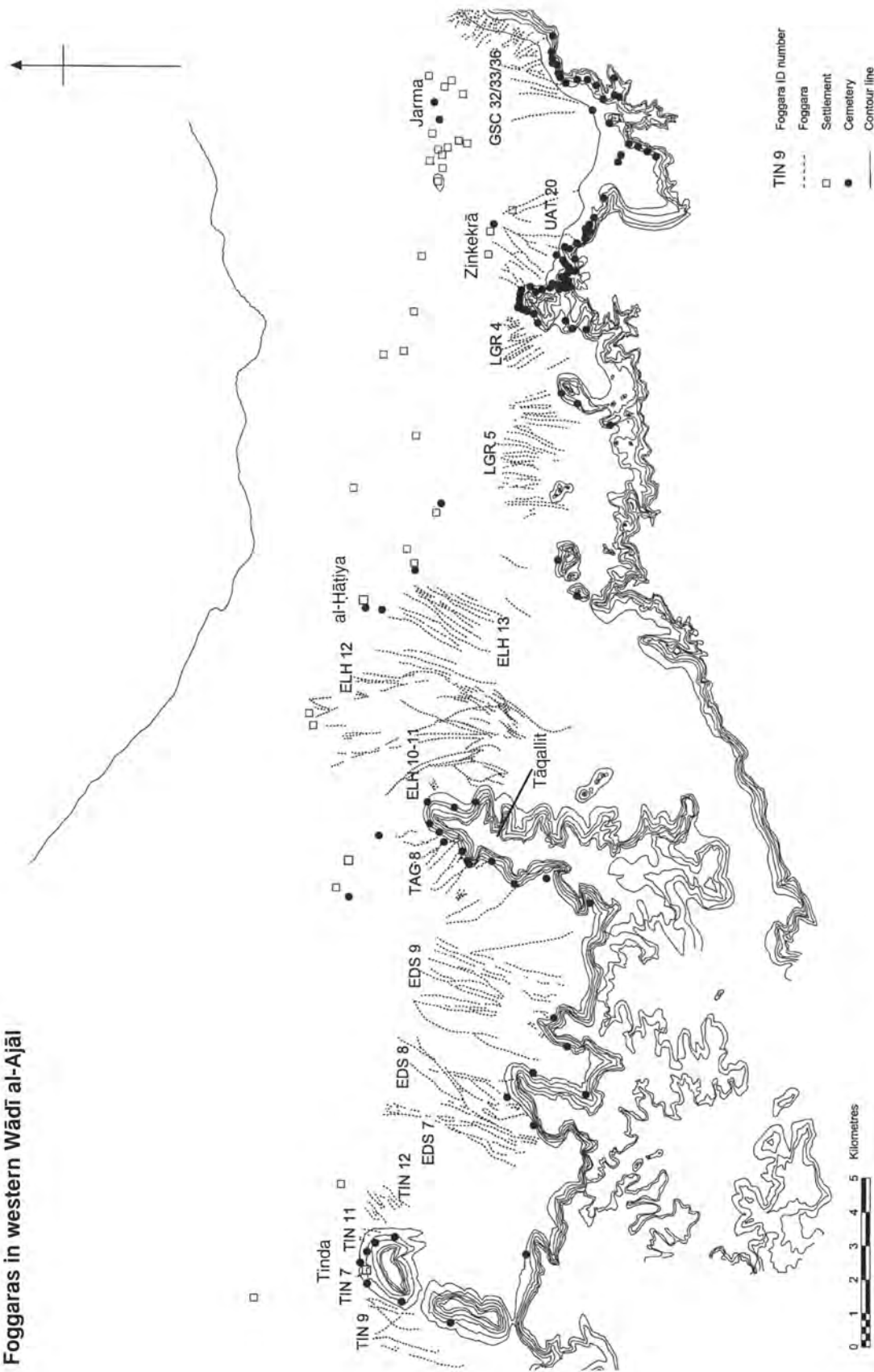


Fig. 7.7. Foggaras in Wādī al-Ajāl: Tinda to Jarma.

Where the escarpment recedes to the south of old Jarma there are few foggaras – a particularly high water-table in the Wādī floor perhaps enabled agriculture without them – but they resume again along the escarpment towards Tuwash, with a series of dendritic systems (GSC 32-33) and a very dense and complex cluster by Tuwash itself (TWE 16), with two main phases and a third phase of amalgamation (see below) (Figs 7.8-7.9). To the west of al-Fūgār is a group of more widely spaced foggaras with several long tributaries (FUG 17), and another dense cluster west of al-Kharā‘iq (CHA 11). East of al-Kharā‘iq a group of five foggaras originates south of the hillfort (CHA 9), and one curves round the fort to the north-west; another short foggara (CHA 31), not visible on the air photos, originates north of the fort to the west of the pyramid cemetery. Two further groups lie between al-Kharā‘iq and Qarāqra (CHA 10, GRA 3) (Fig. 7.9).

Between Qarāqra and Larkū the foggaras are less closely spaced: a small group west of Takarkiba (TEK 12), a complex dendritic system (TEK 9) just east of the narrow gap dividing the Wādī al-Ajāl into its eastern and western parts, and then a group of largely dendritic systems south of al-Fjayj (FJJ 16) and others with simpler tributaries (FJJ 17). Beyond the route up to the escarpment south-east of al-Fjayj, we find only the three widely-spaced parallel foggaras heading towards Qaṣr Larkū (LAR 5-7) (Fig. 7.9). Then follows a very dense series of closely-spaced, mainly parallel foggaras in several clusters around al-Qrāya – ≈ 60 in 6 km (GRE 17-19, LEK 14) (Fig. 7.10). But to the east of the promontory by al-Qṣīr they become sparser again – a foggara and a pair of tributaries curving around the al-Qṣīr headland (LEK 16), and then three more 2 km further east (LEK 20); then nothing further until ar-Rqayba, ≈ 11 km to the east,

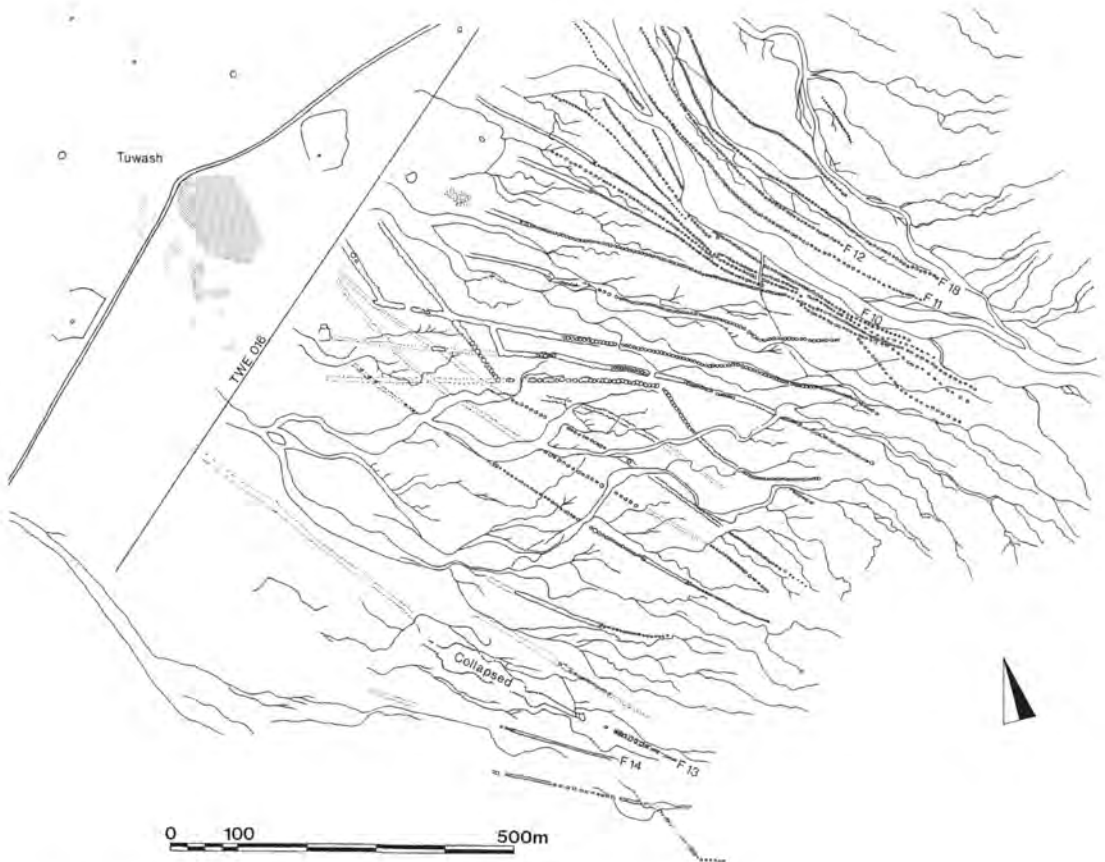


Fig. 7.8. Map of Tuwash foggaras (TWE 16).

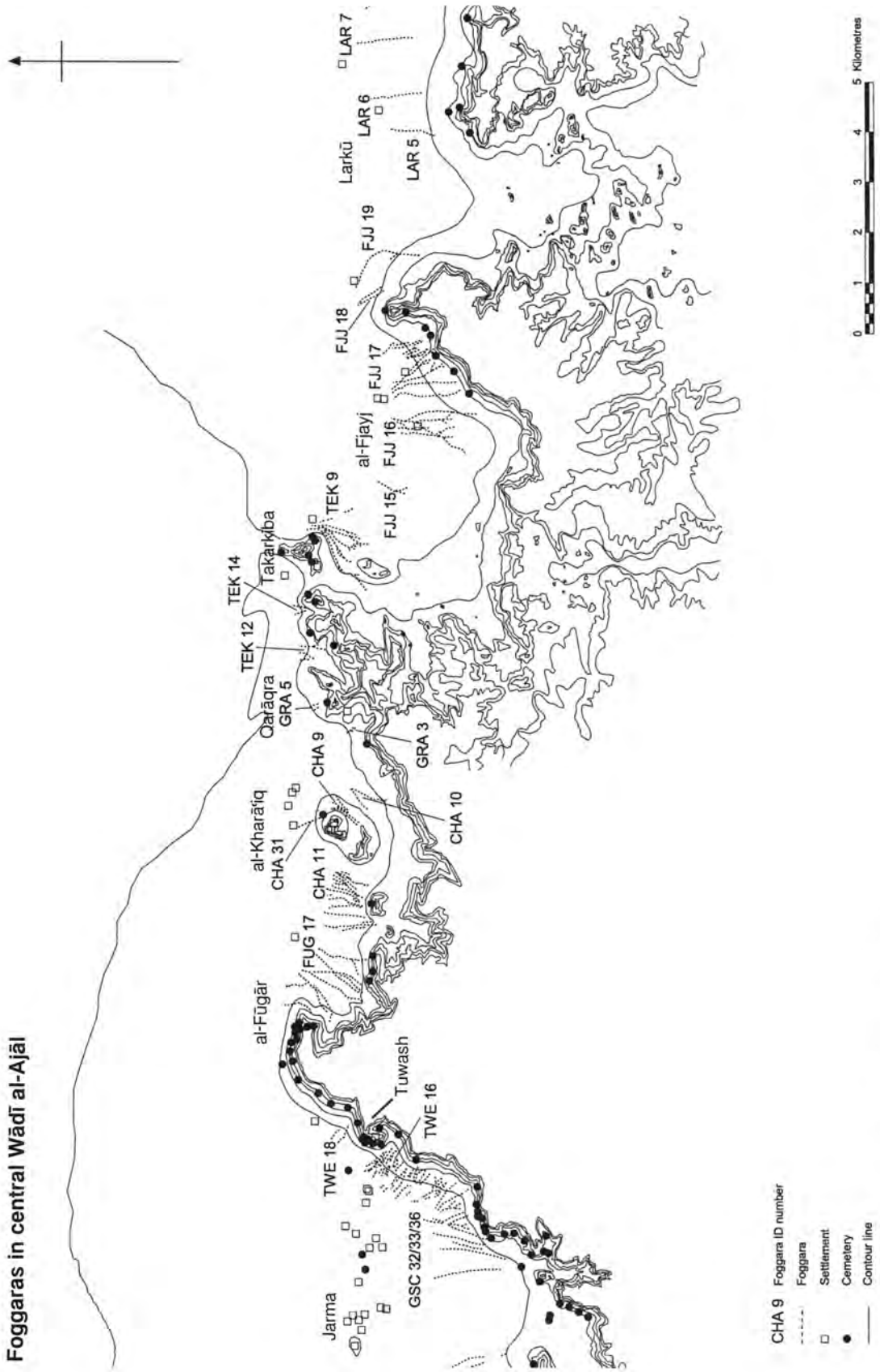


Fig. 7.9. Foggaras in Wādī al-Ajāl: Jarma to Larkū.

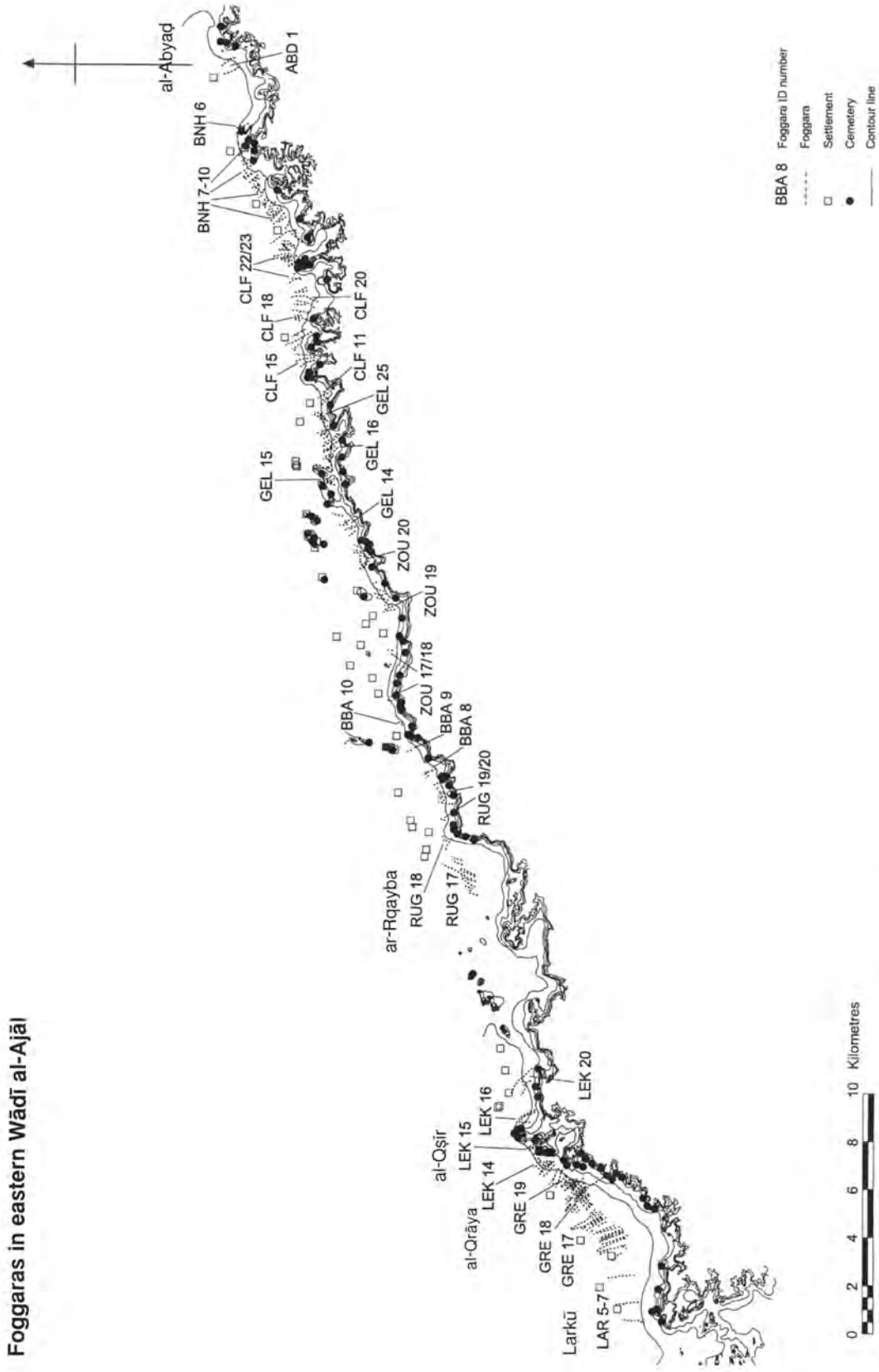


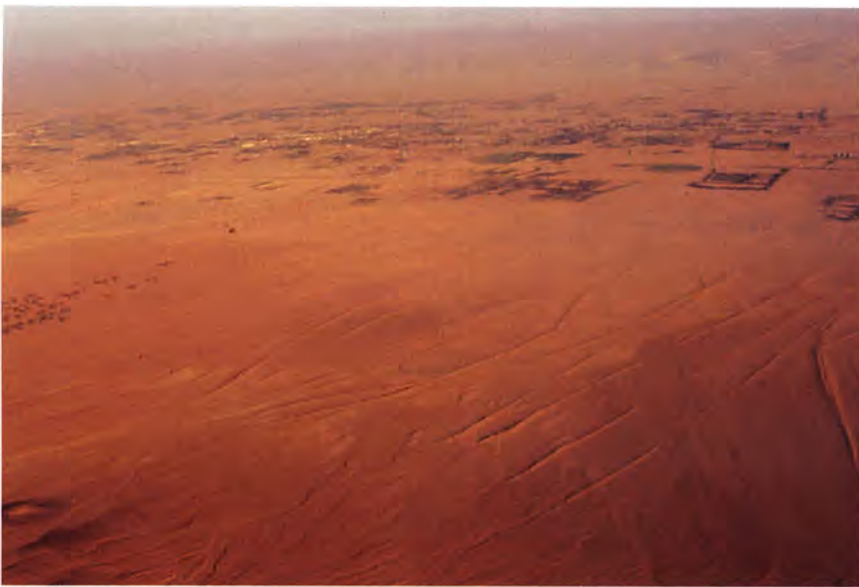
Fig. 7.10. Foggaras in Wādī al-Ajāl: Larkū to al-Abyad.



a)



b)



c)

Fig. 7.11. a) – b) foggaras originating among cairn cemeteries at foot of escarpment (TAG 8); c) Foggaras running north from the escarpment towards the oasis floor, between Tāqallit and ad-Dīsa (EDS 9).

where the air photographs show 10 parallel foggaras (and a tributary) running for a maximum length of ≈ 2 km (RUG 17). After this the foggaras are almost continuous again until al-Abyaḍ, with the exception of a gap around Būdrinna; but the systems are simpler, with few tributaries or cross-cutting phases, and until al-Abyaḍ none of the 166 foggaras east of ar-Raqayba exceeds ≈ 1.8 km in length (CLF 20), with many only 300-800 m long. The easternmost foggaras in the Wādī al-Ajāl are a pair near al-Abyaḍ (ABD 1); the air photographs indicate that one reaches ≈ 2 km in length (Fig. 7.10).

Some notable clusters of foggaras seem to be associated with areas of known Garamantian settlement (for example, near al-Ḥaṭīya and Tīnda), and with oasis floor settlements of Garamantian date discovered by the recent survey work. The point of origin of the foggaras is generally the alluvial gravels at the foot of the escarpment on the southern edge of the Wādī, where cairn cemeteries of Garamantian date are also located (Fig. 7.11a–b). Between al-Ghrayf and Tāqallit, where the escarpment recedes southwards in a large bay, the foggaras originate well to the north of the escarpment, but there are no escarpment cemeteries here either (Edwards *et al.* 1999, 113). In the western part of the Wādī, between Tīn Abūndā and Tuwash, the foggaras tend to be



Fig. 7.12. a) Destruction of TWE 16 foggara group by modern bulldozing; b) Qarāqra, floor of bedroom collapsed into foggara shaft.

longer (1-4.5 km) than in the east between al-Fūgār and al-Abyaḍ, where the Wādī is narrower and the escarpment is closer to the settled zone in the Wādī centre; here the foggaras (as traced from the air photographs) seem usually to have been from 100m-1.8 km long.

Preservation

The expansion of modern settlement in the region, with agriculture irrigated from drilled wells in the centre of the Wādī, and large-scale bulldozing for aggregate extraction near the escarpment, is destroying the surface traces of the foggaras at an alarming rate. The foggaras are best preserved between Tāqallit and ad-Disa, and to the west of Ubārī where there has been little or no modern development. The construction of the modern road through the Wādī, and the spread of agriculture around it, has

particularly affected the northern ends of most of the foggaras. Destruction has been particularly severe around Tuwash, where perhaps half of the foggaras shown on Fig. 7.8 have been bulldozed away near the escarpment or have disappeared under gardens nearer the modern road (Fig. 7.12*a*), and at al-Qrāya, where nearly all of the dense cluster of 60 foggaras reported by CMD had disappeared under intensive agriculture by 2000.

The need to document foggara locations and courses in advance of modern development is vividly illustrated by the case of a modern house at Qarāqra where in 1998 a bedroom floor collapsed into a foggara shaft suddenly during the night; we measured the shaft as 9.5 m deep to the collapsed fill (Fig. 7.12*b*). Mercifully the two people who fell part-way down the shaft survived, but such buried channels pose evident dangers of subsidence and building collapse which need to be assessed in development planning.

Construction details

Most of the foggaras in the Wādī al-Ajāl are between 0.5 and 4.5 km long, cut through friable sand and gravels with closely-spaced access shafts, generally 5-10 m apart, sometimes as far as 15 m or as close as 3.6 m (Fig. 7.13). This is much closer than the norm in Syria (15-25 m), or Iran (where shaft spacing is often 20-30 m and may reach up to 50 m); but comparable with the foggaras of the Algerian Sahara (Goblot 1979, 36 48, 165). In places the spoil rings are so close together as to be contiguous (Fig. 7.14*a*), or even to merge into a continuous bank of spoil 10-20 m wide – this is particularly common in the middle and downstream parts of their course (Fig. 7.14*b*). In general, the most northerly (downstream) sections of the foggaras, lying to the north of the modern road, are now destroyed by intense modern cultivation.

The foggaras near Tuwash (TWE 16) provide a good illustration of the variability of surface remains, starting at the foot of the escarpment with a series of gravelly spoil rings among a Garamantian cairn cemetery, and then running through a belt of bluish-grey clay – on one foggara, F13 of the group TWE 16, this forms seven large spoil heaps up to 1.5 m high and 7 m in diameter (Fig. 7.2). After this F13 runs through gravels again, and a long section of collapse is evident, where spoil has been heaped up either side of the channel in two parallel banks, apparently after the channel roof had fallen in (Fig. 7.15*b*; 7.22).



Fig. 7.13. Foggara with closely-spaced access shafts (TAG 8.F207).



a)



b)

Fig. 7.14. a) Foggara with contiguous spoil rings around access shafts (ITF 6); b) foggara with continuous spoil bank (LGR 4.F1).

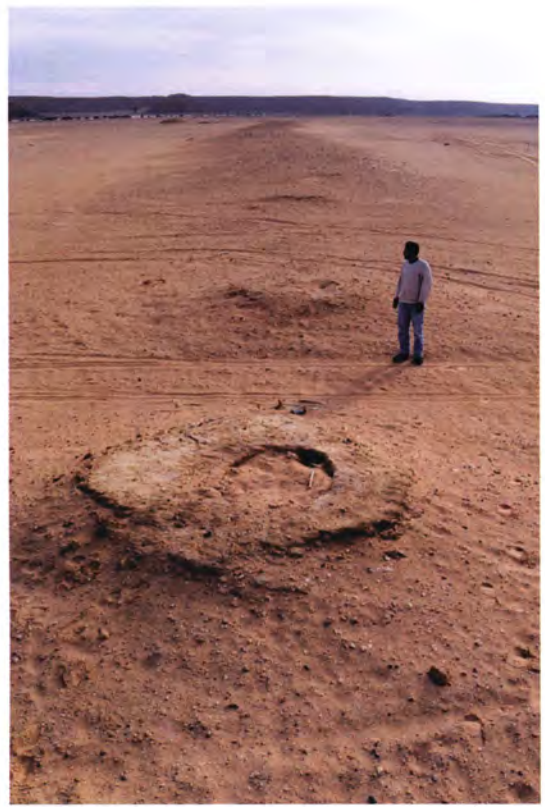


Fig. 7.15. TWE 16, Foggara F13: a) general view; b) showing section of collapsed channel.

In most cases the access shafts are filled with collapsed soil, but occasionally they are still clearly visible and unobstructed. They may be oval or sub-rectangular in plan (dimensions vary from 67×57 cm to $1.30 \text{ m} \times 75$ cm), and are usually not lined, but the upper few metres of some are steined with rough blocks (e.g. TWE 16.F10, ITF 4; Fig. 7.16*a*), or lined with mudbrick (e.g. ELH 13, TMT 3; Fig. 7.16*b*). In some places shafts are cut directly into the rock, with footholds visible in the sides (EDS 8, TAG 8.F203; Fig. 7.16*c*). Depths of 9-10 m were commonly measured, and shafts between 30 and 40 m deep were recorded at the origin of foggara TAG 8.F200 at the foot of the escarpment at Tāqallit and TWE 16.F13 by Tuwash. Obviously the shaft depths decrease along the course of the foggara until the channel eventually emerges at the surface.



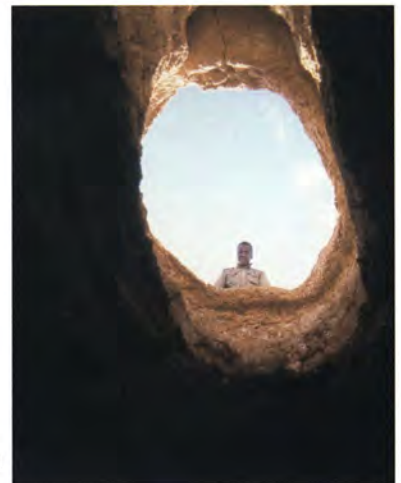
(a)



(b)



(c)



(d)

Fig. 7.16. a) Steined shaft on ITF 4; b) remains of mud brick shaft revetment on foggara near ELH 13; c) foggara F203 (TAG 8) with rock-cut footholds; d) view up unlined shaft of CHA 31.

Limited investigation of underground foggara channels was carried out at several points where they were visible in modern wells or trenches associated with road construction, and two access shafts on different foggaras were excavated to examine deposits in the channel. The channels investigated were generally ≈ 0.50 m wide by ≈ 1.30 - 2.00 m high, having an irregularly-shaped cross-section cut through the rock without lining or reinforcement (Fig. 7.17). In two cases (FJJ 16.F29 near al-Fjayj and LGR 5.F20 near al-Ghrayf) rockfalls from the channel roof prevented accurate obser-

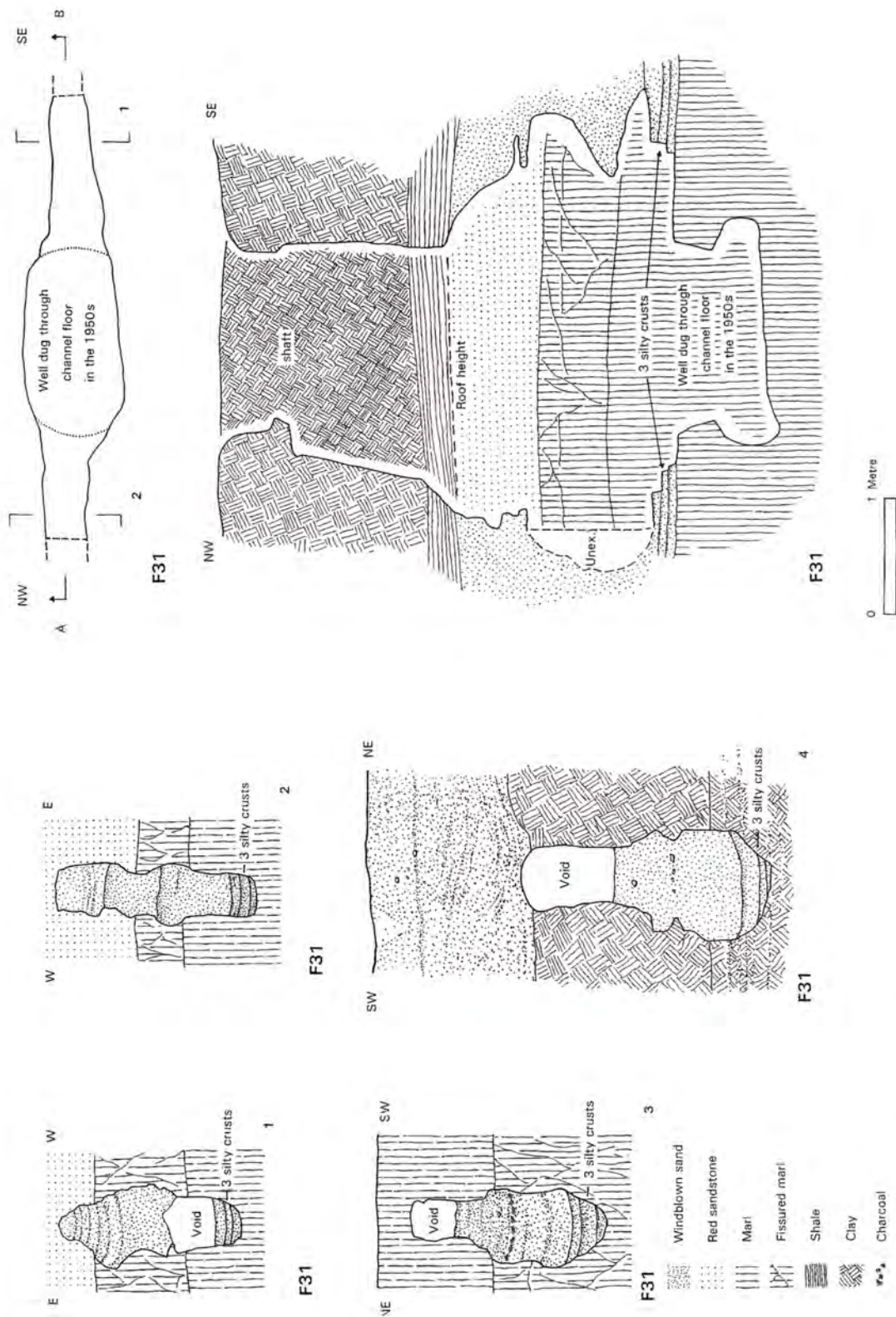


Fig. 7.17. Foggara channel cross-sections.



Fig. 7.18. Channel of foggara CHA 31, exposed in pit (collapsed section).

vation of the original cross-section or dimensions, but in three others the shape of the channel was clear. One (ELH 13.F21 near al-Ḥaṭīya) was in the form of a low arch ≈ 0.80 m wide and 1.10 m deep to fill, the top of the channel lying some 2.20 m below the surface. Another (CHA 31 by the ancient cemetery at al-Kharā‘iq) was much narrower – 0.30-0.55 m wide and 1.25-1.30 m high (Figs 7.17-7.18). As the top of the channel here lay only 0.80 m below the surface the narrowness of the channel may be due to a need to minimise the risk of collapse of the thin crust above; the same characteristics were also apparent at GER 47 near Jarma.

In the sections examined, near al-Kharā‘iq and al-Fjayj, the lower part of the channel was cut into a marl layer that would have acted as an aquaclude (an impermeable stratum preventing water from percolating deeper), with the upper part in a fissured marl stratum that would have allowed water to permeate into the channel. The roof was formed by a sand-



Fig. 7.19. Air photo trace of features to north of end of foggaras at Tuwash (TWE 23) – probably related to salt production.

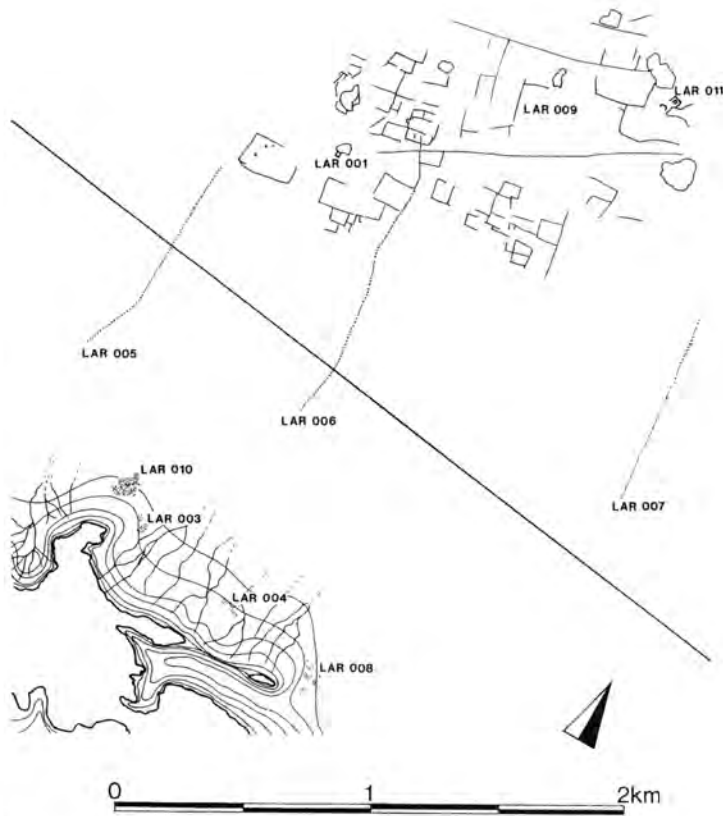


Fig. 7.20. Plot of Larkū foggaras (LAR 5-7).

stone layer, which in some places had collapsed and enlarged the channel. The close spacing of the shafts is probably partly explained by the friable nature of the rock and the consequent risk of collapse of the channel. For reasons both of safety during initial construction and ease of locating blockages in the channel, it would have been desirable to keep shaft intervals short, despite the extra labour entailed in digging a greater number of shafts.

No certain evidence was recovered for collecting basins or distribution structures at the end of the foggaras, as modern cultivation occupies the zone where they probably terminated. Comparison with the better preserved foggaras of the Algerian Sahara would suggest that the terminal structures may have comprised catchment basins (*tihemt*), with a flat pierced stone (*anefif*) controlling outflow into surface channels (*tabaft* or *teguhant*) feeding gardens (Capot Rey and Damade 1962, 100-13; Keenan 1977, 338; Laureano 1991, 154-58). In many cases, irrigation is carried out at night, with the basin refilling during the day (Lô 1953, 146-49). Attempts to locate such features in Fazzān are inconclusive at present. By the north-eastern edge of Tuwash a large depression (34 × 23 × 4 m deep) may have been a terminal basin, but more likely represents a large collapsed early modern well. The air-photos of the oasis north of Tuwash show a number of rectangular or sub-circular features at the end of foggara lines, which may be distribution basins, though clearly in a number of cases they have been deepened and developed as shallow wells later. On the salt flat to the north of this area there appear to be channels or embankments fanning out from central features (TWE 23; Fig. 7.19). It is unclear whether these are connected with foggaras – surface inspection suggests that an association with salt-making is more likely, though they may have made use of surplus water from foggara irrigation. As the foggaras are often spaced fairly close together (sometimes 40-100 m apart) it might seem that the area of land irrigated by each was relatively restricted, assuming that they

were in use simultaneously. The alternative possibility, that the destination points of the foggaras varied and some, running at greater depth, supplied parts of the oasis further north, is not supported by the aerial photographs, which indicate that traces of foggaras in a particular group usually end around the same point.

Foggara Groups

Although a foggara is generally a self-contained system, the foggaras in the Wādī al-Ajāl are found mainly in groups. Most commonly they run parallel to each other, heading north (or sometimes north-north-east or north-north-west) from the escarpment foot, and may be very close together. CMD recorded 60 foggaras across a front of 6 km near al-Qrāya, (Daniels 1970a, 17: GRE 17-19 and LEK 14, now largely obliterated). Other such groups include TMT 4, EDS 7, ELH 12-13, LGR 4-5, TWE 16 (in its first phase) and CHA 11. Parallel arrangements like these, where the foggaras seem to respect each other's course, imply simultaneous use, in contrast sometimes to a later phase of foggaras running at an angle across the parallel ones. Such closely spaced groups represent a considerable investment in labour to deliver water to settlement and fields across a relatively short front of the oasis floor.

Occasionally foggaras are much more widely spaced, as at Larkū where 3 foggaras (LAR 5-7) run parallel, c.1-1.5 km apart, towards the area of Qaşr Larkū (Fig. 7.20). Although the field systems visible here on the air photographs are only a few hundred years old, Qaşr Larkū (LAR 1), the only stone-built *qaşr* in the Wādī, dates back to the (late?) Garamantian period, and the foggaras are likely to have some connection with it or an immediately preceding settlement. It is not clear why there should be such a contrast between Larkū and the dense cluster of foggaras at al-Qrāya, just to the east; perhaps the aquifer was easier to tap at al-Qrāya, or the reason may be connected with different land-holding patterns related to the control of the *qaşr*.

While most of the foggaras have a single channel, a significant number have one or more tributaries. These commonly take the form of a Y-branch near the head of the foggara, and are a classic sign that the draining gallery of the foggara had been further developed, usually as a response to declining discharge and a fall in the water-table (Bisson 1989, 183, for the Algerian Sahara). The Y-shaped tributaries dug from the mother well higher up the escarpment base penetrate more deeply into the perched aquifer, and their extra length increases the surface area of the draining gallery through which water can infiltrate. Examples can be seen near Tuwash (TWE 16.F15: Fig. 7.21a) and Tāqallit (TAG 3.F201: Fig. 7.21b/c).

In some cases developments of a foggara by the addition of several tributaries led to dendritic systems (ELH 11, UAT 20, GSC 33, FUG 17, FJJ 16, and some examples at the west end of GEL 25). These maximise the catchment area relative to the area irrigated: GSC 33 is a system with a total channel length of c. 8 km, drawing on c. 1.6 km of escarpment edge to feed into only three main channels whose eventual outlets were very close together.

Tributaries and dendritic systems provide indications of efforts to maintain flow in response to a falling water-table, but this is seen even more clearly in cases where one phase of foggaras is superimposed on another. The aerial photographs of group TWE 16 (Figs 7.8, 7.22) show that here the first phase consisted of c.20 foggaras running roughly north-west from the escarpment base. Later, another series of 5 or 6 foggaras was constructed, running west, three of which cross three of the original group, by then presumably abandoned. In a third phase there is evidence for the disrepair and subsequent amalgamation of some of the foggaras of the second phase: the downstream portions of channels are abandoned and cross-links divert the flow into adjacent channels. This might be due either to collapse of the downstream portion of a channel, or to a continued fall in the water-table, necessitating amalgamation to



a)



b)



c)

Fig. 7.21. a) Y-shaped tributaries at TWE 16.F15; b) Y-shaped tributaries at TAG 3, from escarpment above. The foggara on the left has Y-shaped tributaries: one of which captures the flow from the right-hand foggara; c) foggaras on the east side of the Tāqallit promontory, showing multiple phases and additions of branch tributaries (ELH 10).

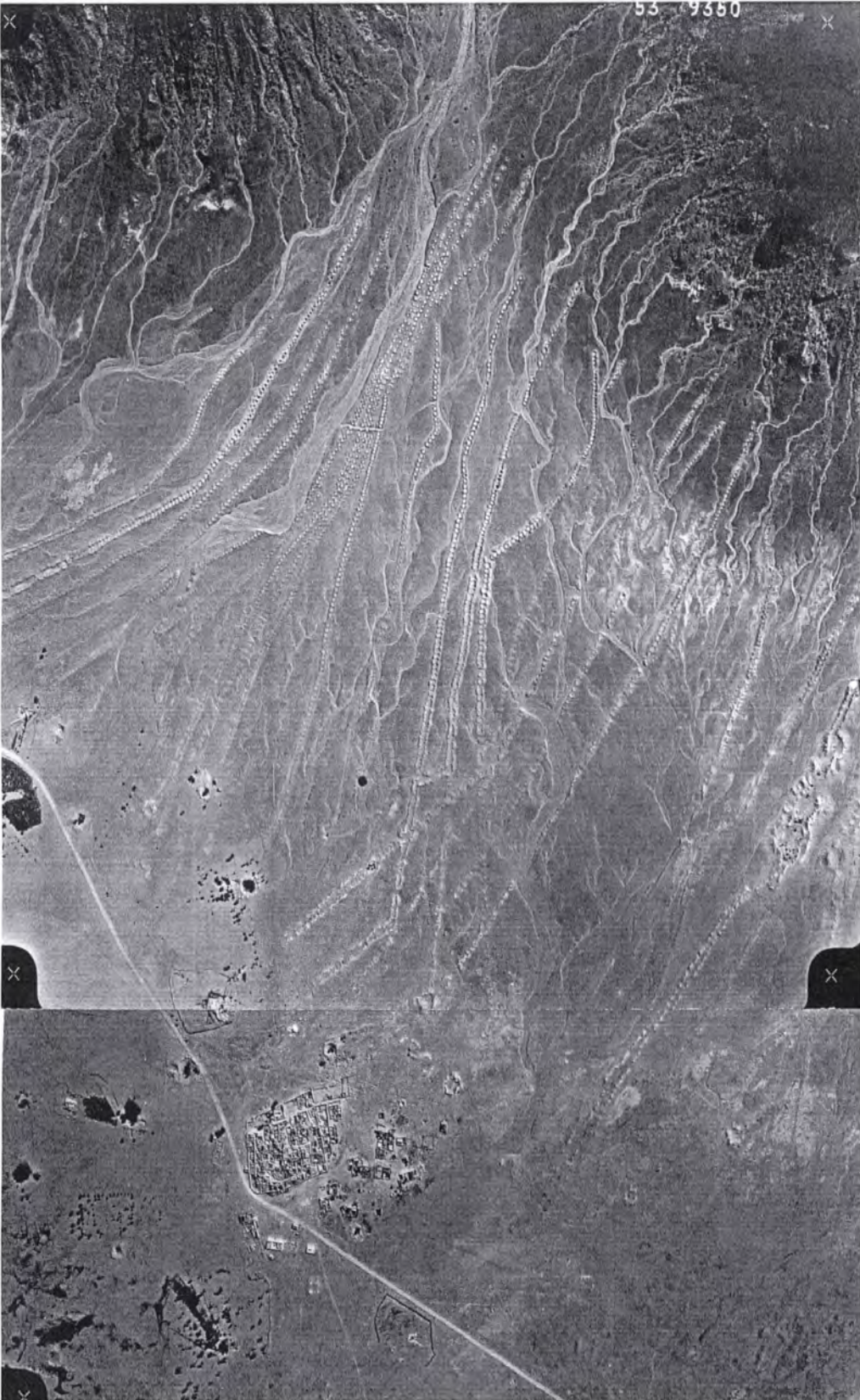


Fig. 7.22. Aerial photograph of TWE 16 foggara group. The mudbrick village of Tnwasb is to the left. North is towards the top of the picture (cf. Fig. 7.8).

increase the catchment for a single channel. Other, less complex, superimposed phases of this sort are visible in groups TIN 9, EDS 7-8, ELH 12 and FUG 17. In EDS 7-8 one foggara runs diagonally across 11 others; if their channels intersected, then the later foggara would effectively have captured the tributaries of a dendritic system drawing on several kilometres of the escarpment front. In many of the superimposed phases, a smaller number of later foggaras cross numerous earlier ones, which they seem either to use as tributaries or to have put out of action. It thus appears that the amount of water supplied, and therefore the land irrigated, decreased in these later phases, testimony to a declining water-table and pressures on population sustainability.

The scale of the foggara system: flow rates and abstraction

We cannot calculate with any confidence the discharge rates of the abandoned foggaras of Fazzān. The nature of the aquifers is not sufficiently understood, and we would need to know the volume in antiquity of the now exhausted water-table, and the gradients and channel cross-sections (widely variable) of the foggaras. To assess their output over time we would also need to know how much the aquifers were recharged from local rainfall and how much from rainfall on remote areas; the average annual rainfall during the first millennium AD; and the number of foggaras simultaneously in use, as their combined discharge would affect the level of the water-table. Nevertheless, we can confidently propose that the total discharge would have exceeded recharge rates and that over time the foggaras would have lowered the water-table, until eventually many no longer functioned.

Table 7.2 shows a series of possible figures for the combined discharge in m³/year of the foggaras in the Wādī al-Ajāl, for different numbers of foggaras simultaneously active and average discharges per foggara varying from 0.1 to 10 litres/second (the range of recorded discharges for foggaras in the Algerian oases – Goblot 1979, 164-65; cf. also Capot Rey and Damade 1962; Chaintron 1957/1958; Champault 1969; *Encyclopedie Berbere* s.v. Akabli fasc. 3, 396-96, Aoulef, fasc. 6, 805-07, Gourara, fasc. 21, 3188-98 – for oases with foggaras still in use recently; Lô 1953/1954; Voinot 1909). Table 7.3 shows the possible extents to which the alluvium at the foot of the ḥamāda escarpment might be recharged from local rainfall. It assumes that a strip between 100 and 500m wide along the escarpment base will collect rainfall that can percolate through the alluvium into the aquifers tapped by the foggaras; but that the ḥamāda itself is not a major impluvium source, as it slopes away from the escarpment edge and most surface drainage runs south towards the Wādī Barjūj. Evaporation, which in

No of foggaras	<i>Flow rate in litres/second</i>				
	0.1	0.5	1	2	10
100	315,360	1,576,800	3,153,600	6,307,200	31,536,000
200	630,720	3,153,600	6,307,200	12,614,400	63,072,000
300	946,080	4,730,400	9,460,800	18,921,600	94,608,000
400	1,261,440	6,307,200	12,614,400	25,228,800	126,144,000
500	1,576,800	7,884,000	15,768,000	31,536,000	157,680,000

Table 7.2. Combined annual discharge in m³/year for varying combinations of foggara numbers and flow rates.

Annual rainfall (m)	Width of recharge zone (m)				
	100	200	300	400	500
0.01	160,000	320,000	480,000	640,000	800,000
0.015	240,000	480,000	720,000	960,000	1,200,000
0.02	320,000	640,000	960,000	1,280,000	1,600,000
0.05	800,000	1,600,000	2,400,000	3,200,000	4,000,000

Table 7.3. Annual quantities in m^3 of potential local recharge along the escarpment foot in the Wādī al-Ajāl, assuming a front of 160 km, under various conditions of width of recharge zone and annual rainfall figures.

reality would prevent a large proportion of rainfall entering the aquifer, is not taken into account in the table, which therefore over-estimates potential recharge. A range of possible annual rainfall figures is given, from 10 mm per year (as today) to 50 mm per year. Comparing the two tables, it is clear that on most scenarios the combined discharge of the foggaras will have exceeded local recharge. If the deficit were made up from recharge of the aquifer from more remote sources – e.g. flow through the Continental Intercalaire – the system may have been sustainable; but if remote recharge could not meet the deficit then over time the foggaras would have depleted the aquifer, lowering the water-table. How long this would have taken depends on the initial size of the fossil water reserves and the amount by which discharge exceeded recharge, but eventually the water-table would have dropped below the level needed for some of the foggaras to function. At this point flow could be restored only by deepening the foggaras, or by adding tributaries that extended towards the escarpment under the water-table; processes repeated until eventually the foggaras were abandoned. Although we cannot estimate the scale of recharge from remote sources, the evidence for abandonment and amalgamation of foggaras in groups – (explicit in the group TWE 16 (Fig 7.8) – strongly suggests decline in the level of the aquifer over time and human efforts to follow the water downwards.

According to Keenan (1977, 338) the area cultivated by one foggara in the Algerian Sahara varies greatly, but he suggests an average of *c.*12 gardens per foggara. The size of gardens also varies, in part in relation to the sophistication of the irrigation available, but in Fazzān today they normally fall in the range 0.15-0.6 ha. For the sake

Wādī al-Ajāl	0 foggaras	100 foggaras	200 foggaras	300 foggaras	400 foggaras	500 foggaras
No of gardens	714	1200	2400	3600	4800	6000
Area (ha)	144.6 ha	480 ha	960 ha	1440 ha	1920 ha	2400 ha
No of gardens in al-Ajāl as % of 1930s total for entire Fazzān (n = 3066)	23%	39%	78%	117%	157%	196%

Table 7.4. Hypothetical totals of gardens supportable under foggara irrigation in the Wādī al-Ajāl. The figures in the column headed '0 foggaras' are those for the well-fed irrigation of the 1930s (after Lethielleux 1948, 27).

of this argument, we shall assume that foggara-irrigated gardens would be towards the upper end of the size range at 0.4 ha (a size consistent with even the closest foggara spacings of 40-100 m apart if gardens were say 40 m wide and 100 m long). Therefore one foggara might irrigate an area of *c.* 4.8 ha. This is obviously a very crude estimate, but it allows us to consider the potential impact of foggara irrigation on the cultivation of the Wādī al-Ajāl (Table 7.4). In the 1930s, there were around 700 irrigated gardens in the Wādī, fed by wells (on average each well supported a garden of *c.* 0.2 ha). As an order of magnitude figure we might envisage each foggara thus irrigating an area equivalent to that irrigated by 24 wells. If we imagine an earlier situation in which, say, only 100 foggaras were in operation, the total number of gardens would be significantly larger and the overall area under cultivation perhaps more than three times greater. A total of 300 active foggaras would have allowed irrigation of a larger number of gardens in the Wādī al-Ajāl alone than was cultivated in the entire Fazzān in the 1930s, with a corresponding increase in the area under crops.

The implications for the economy of Fazzān are clear – flourishing foggara irrigation in the Wādī al-Ajāl could have supported a several-fold increase in regional agricultural production over that possible using only irrigation from wells. Or, to put it another way, the loss of the foggara irrigation systems has led to significant shrinkage in the regional economy over time. By way of comparison, the Algerian oasis of Tabelbala has yielded traces of more than 100 foggaras, but only *c.* 20 were still active in 1961, with an evident loss of well over half the gardens that had at one time been cultivated (Champault 1969, 9 (map), 94-95).

Dating

Like most tunnelled or rock-cut structures, foggaras are extremely difficult to date. Once developed, the basic construction technique did not change over time, so no stylistic guides are available. Three main periods of origin have been proposed for the foggaras of Fazzān:

1. One theory proposes an Islamic origin, based on their proximity (in some cases) to *qsur* of presumed early medieval date. Accordingly, Klitzsch and Baird (1969, 73-80) suggested the technology was imported by the Arabs after the 7th century AD. Despois (1946, 59-60) dated the square *qsur* to the Roman period or a little later and considered the foggaras to be early medieval, suggesting that they would not have outlasted the successive waves of invasion in the 11th, 13th and 15th centuries.
2. Caputo (1937a, 309-10; 1951, 216-8) believed the foggaras were introduced to Fazzān by the Romans. No evidence was given, besides their use elsewhere in the Roman world, and the other indications of Garamantian trade and cultural contact with Rome. The supposedly Roman introduction of foggaras to Fazzān is presented as part of a wider dissemination by the Romans of irrigation and water-control technology throughout north Africa, a view doubtless influenced by the political context in Italy in the late 1930s when Caputo wrote. A Roman origin for the foggaras of Fazzān is also assumed by Goblot (1979, 116-17).
3. Daniels (1970, 42), on the basis of broad spatial correlation between the foggaras and Garamantian settlements and cemeteries, argued that their origin probably lay in the Garamantian period, and was not necessarily due to contact with Rome.

Despite the difficulties in dating, fieldwork in 1997-2000 produced a number of indicators for the date of the foggaras:

First, in several areas – Tāqallit, ad-Dīsa and In Ṭafarāt – foggaras cut through aceramic cemeteries of dispersed cairn and drum tombs, which provide an (undated) relative *terminus post quem*. At In Ṭafarāt at the west end of the Wādī, two foggaras

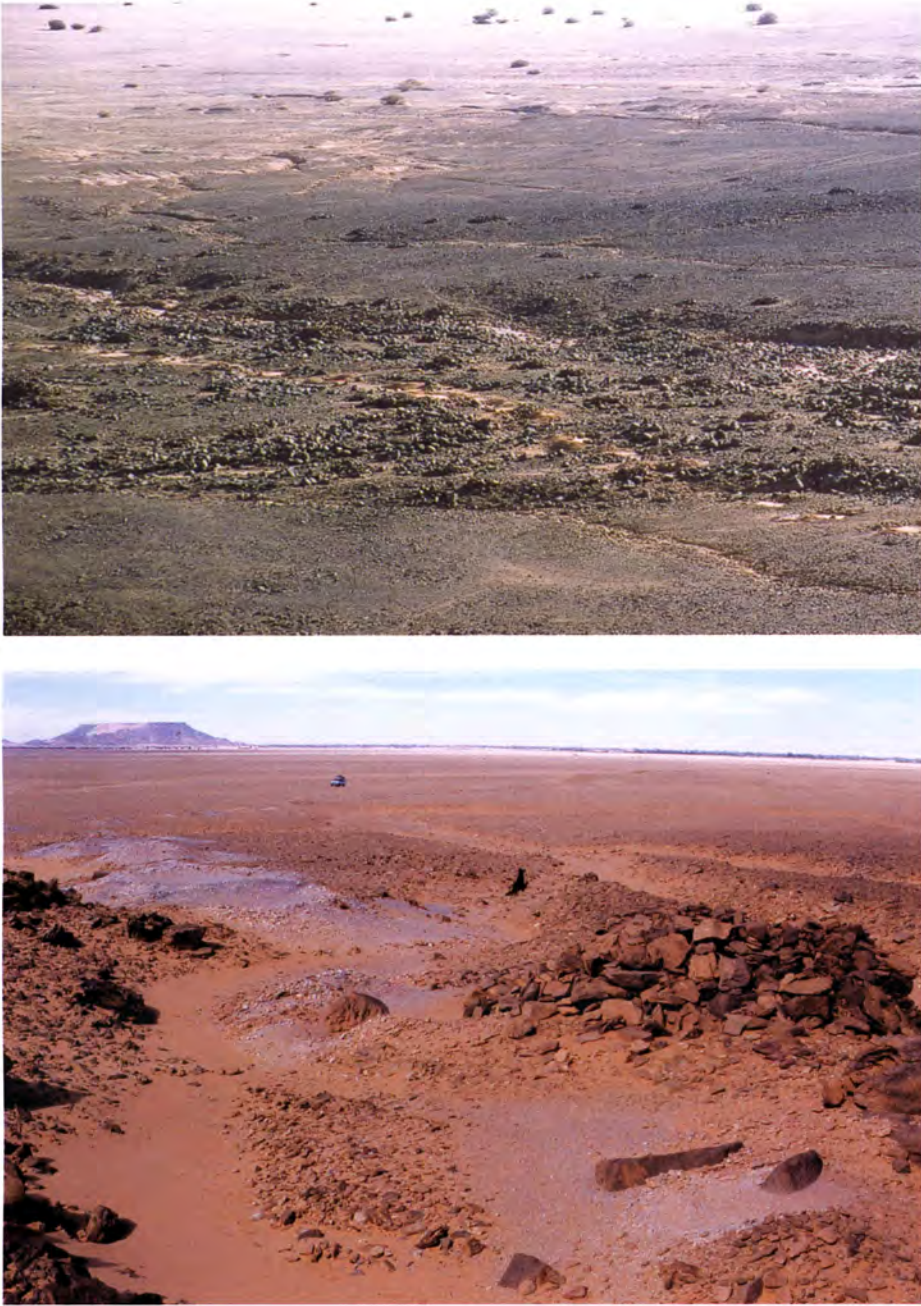


Fig. 7.23. a) Foggara ITF 4 running through cemetery ITF 2; b) tomb overlying foggara upcast (TAG 8, F206).

(ITF 4, ITF 15) cut through two different cemeteries of well-built circular stone tumuli (Fig. 7.23*a*). These drum tombs are relatively common in Berber north Africa from the late Neolithic onwards; but the absence of any pottery in these cemeteries suggests an early date. It is clear that some of the dispersed cemeteries pre-date the foggaras which run right through them, and in some cases the spoil from the foggara shafts is cast up against the tombs (Fig. 7.23*a*). The same phenomenon is apparent at ad-Disa (EDS 8) and at Tāqallit (TAG 8), between Jarma and Ubārī, where foggaras also cut through cemeteries of dispersed drum or cairn tombs, without pottery scatters; Ziegert (1969, 54) records foggaras cutting through cemeteries near Zinkekrā (UAT 20). However, some drum cairns overlie foggaras of group LGR 5 and TAG 8 (Fig. 7.23*b*).



Fig. 7.24. FJJ 1 settlement overlying foggara FJJ 16.F29.

Secondly, the foggaras do not cut, and either avoid or are avoided by cemeteries of known Garamantian date (e.g. TAG 1, ITF 12, with pottery from 2nd century BC–2nd century AD). At In Ṭafarāt, a few hundred metres from where foggara ITF 4 cuts through the aceramic cemetery of dispersed cairn tombs ITF 2, lies another cemetery (ITF 12) of clustered drum tombs, with a stone altar to the east of each tomb. Around the altars was a fair quantity of imported Punic and Roman amphorae from the 2nd century BC–2nd century AD. Although another foggara (ITF 8) has its origin near this cemetery, it does not cut into it.

At Tāqallit the situation is similar; while the aceramic cairn cemeteries (TAG 6) are more widely dispersed along the escarpment foot, later cemeteries (e.g. TAG 1) have large stepped drum tombs tightly clustered together, with stone altars and offering-tables. TAG 1 also produced significant quantities of imported Roman and late Roman pottery and amphorae (1st–5th centuries AD). Whereas all along the Tāqallit escarpment the foggaras cut through the dispersed cairn cemeteries to reach the aquifers at the foot of the escarpment, they seem to avoid the clustered cemeteries of the early centuries AD.

It seems therefore that the foggaras were built after the aceramic cemeteries had largely fallen out of use, but either before or during the period of use of the more tightly grouped cemeteries of the 2nd century BC–4th century AD. The foggaras might pre-date these cemeteries, which in that case would have been sited to avoid the foggaras, or they were dug while people were still being buried in the clustered cemeteries, which were therefore respected.

Thirdly, a settlement site at al-Fjayj (FJJ 1, with pottery dating between the 1st and 4th centuries AD) overlies a foggara spoil bank (FJJ 16, F29) and hearth scoops of the settlement are cut into the bank (Fig. 7.24). This settlement provides a *terminus ante quem* for this foggara, which, at the very latest, cannot be later than the 4th century AD and may be much earlier.

More generally, there is an association of foggara clusters and their points of emergence with Garamantian settlement sites in the wādī floor. Although there is some correlation of foggaras with locations of *qsur*, as noted by Klitzsch and Baird

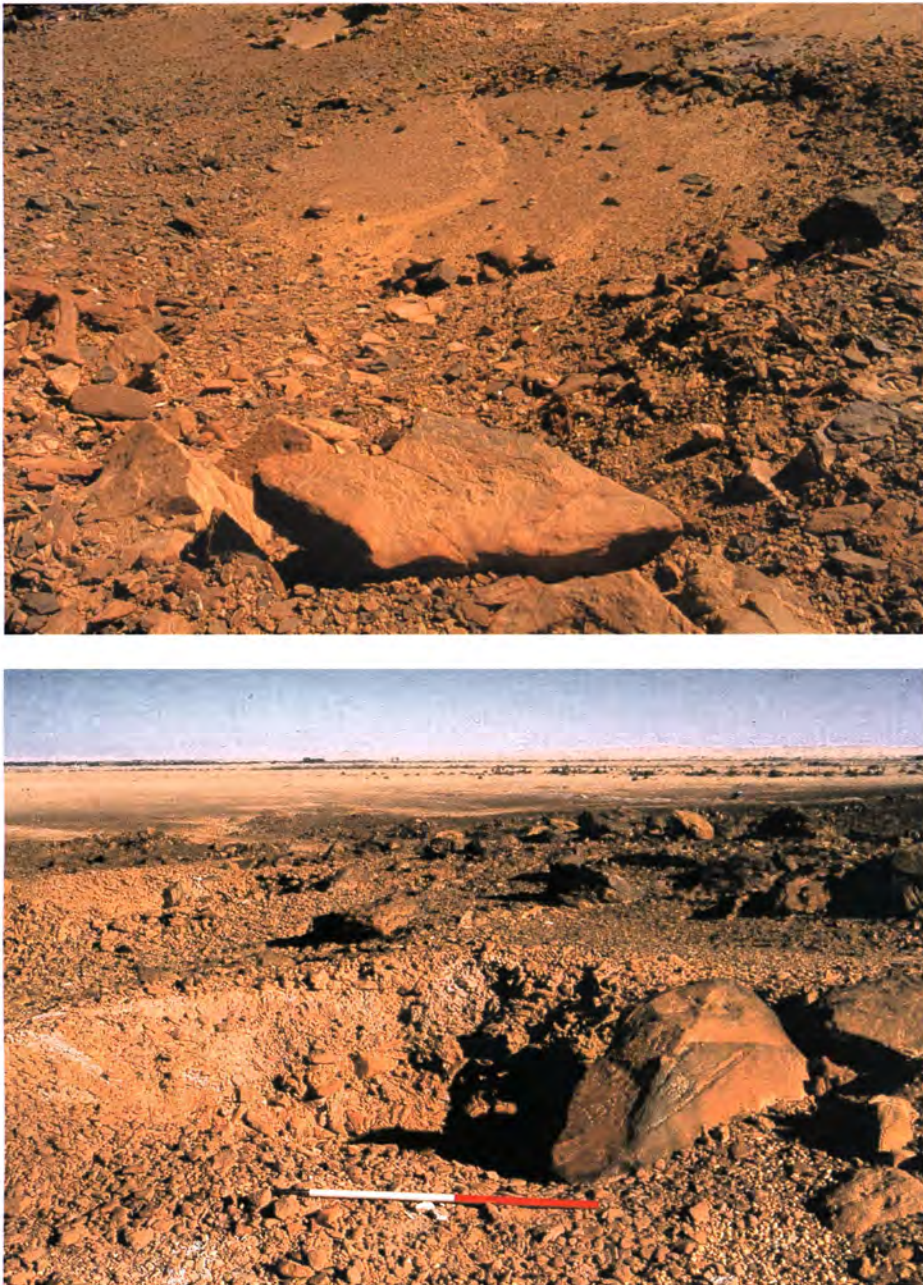


Fig. 7.25. a) Libyan/Tifinagh inscription on *ræk* by shaft of *foggara* TA G 8.F200; b) Libyan/Tifinagh inscriptions on *ræk* by shaft of *foggara* TA G 8.F202, cf. Fig. 8.36 for details.

(1969, 73-80), this is less evident than the correlation with Garamantian settlement and cemetery sites; and west of Ubārī at In Ṭafarāt and Tin Abūndā there are *foggaras* and Garamantian cemeteries, but no *qšūr* or other post-Garamantian settlement. Fieldwalking of many of the *qšūr* elsewhere has revealed that they commonly succeed Garamantian settlements in the same locations, and in some cases the *qšūr* may have inherited still-functioning pre-existing *foggaras*.

Several inscriptions in the Libyan/Tifinagh alphabet seem to be associated with *foggara* shafts near the origin of several *foggaras* (Fig. 7.25). Although there are Libyan/Tifinagh inscriptions and scenes of rock-art on a number of large rocks around the Tāqallit escarpment, the inscriptions by the *foggaras* are some distance

from the others. Instead, they are on rocks immediately adjacent to foggara shafts, and should therefore have some meaning in relation to the foggaras. Their interpretation remains obscure, although some contain the letter group NK, literally ‘It’s me’ in the Tamahaq language, which usually serves to introduce the writer’s name in Tifinagh inscriptions; many Tifinagh inscriptions simply record personal names, although some convey more information (see Chapter 8).

It is very possible, therefore, that these inscriptions, especially the group of several inscriptions on one rock by TAG 8.F202 (Fig. 7.25*b*), may record the names of people involved in the construction, maintenance or ownership of these foggaras. Unfortunately, though, we are not yet able to date these inscriptions; the Libyan alphabet appears on inscriptions from at least the 2nd century BC, and is still used today for recording the Tuareg language Tamahaq, the script now being known as Tifinagh. However, at least one of the foggara inscriptions (at F202 in group TAG 8; Fig. 7.25*b*) incorporates letter forms present in the bilingual Libyan and neo-Punic inscription on the 2nd-century BC mausoleum at Dougga (Horn and Ruger 1979, 156-58 and 576-77), but which had fallen out of use before 19th-century travellers to Libya recorded the Tifinagh alphabets then current (e.g. Duveyrier 1864, 386-90). Study of Tifinagh inscriptions is still in its infancy, and we do not know at what point between these chronological extremes the letter forms in question ceased to be used.

Other factors support a pre-Roman date for the introduction of foggaras to Fazzān. Excavations in the 1960s and 1970s by CMD discovered remains of wheat, grape, fig and dates, together with plants including celery, dill and fennel, in contexts dating from the 9th-4th centuries BC at the hillfort of Zinkekrā (van der Veen 1992, 7-39). As the climate in the mid-first millennium BC was probably too arid to grow these crops without irrigation, and dates from the travertine deposits at the escarpment foot indicate that the springs here had dried up, this is suggestive evidence for some form of artificial irrigation in Fazzān in the early Garamantian period. This is supported by the spatial associations already noted of clusters of foggaras with Garamantian settlement in the oasis floor, and perhaps also with the Garamantian cemeteries at the foot of the escarpment. More generally, the number of Garamantian sites discovered by the field survey implies substantial population levels supported by settled agriculture, and the foggaras would seem to be necessary to sustain these levels of population.

Altogether, it is certain that foggaras were introduced to Fazzān before the 4th century AD, and there is a strong case for dating the introduction of foggara technology to the earlier Garamantian period in the final centuries BC before the development of close trading contact with Rome. It is not necessary to look to the Roman empire as the source from which foggara irrigation was introduced to Fazzān; foggaras had been used in the Western Desert of Egypt from at least the second half of the 5th centuries BC, in the Achaemenid period. Recent studies in the Kharga Oasis have determined that the *qanāṭ* systems there date to the reign of Artaxerxes I (466-426 BC): the evidence includes Achaemenid structures built over the construction mounds of a *qanāṭ* and with material from subsequent maintenance heaped up against it, and ostraca in demotic referring to water distribution (Wuttmann *et al.* 2000). Given the cultural and trading connections between Egypt and Fazzān at an early date, it is most likely that foggaras were introduced to Fazzān from Egypt during the second half of the first millennium BC (for other evidence of foggaras in the Egyptian deserts, see Ball and Beadnell 1903, 78-79 [al-Baḥarīa]; Beadnell 1901, 11-12 [Farafāra]; Bousquet 1996 [south of Kharga oasis]; Fakhry 1974, 34-35 [al-Baḥarīa]; Vivian 2000, 97-100 [Kharga], 192-93 [al-Baḥarīa]).

WELLS

Early modern travellers report that almost all irrigation in Fazzān was carried out from wells (the major exception being the springs in the Wadi ash-Shaṭī), and evidently at some point after the Garamantian period wells replaced foggaras as the primary form of irrigation. This change must have had far-reaching implications in social relations, land tenure, and the scale and type of agriculture practised. Traditional agriculture in Fazzān is so reliant on wells that the same word, ‘as-sāniat’, is used to mean both ‘well’ and ‘garden’ (Lethielleux 1948, 82).

The major studies of the traditional well-based agriculture of Fazzān are by Lethielleux (1948) and Despois (1946). When CMD first visited Fazzān, the substantial superstructure of many wells was still in place and in use. Today, many of the traditional wells have been converted to drilled wells with motorised pumps, and often subsequently abandoned after over-extraction, but in a few cases the remains of traditional technology can still be seen. Although neither CMD nor the FP systematically recorded these wells, they clearly constitute one of the most important categories of monument from the medieval and early modern period, with more than 700 known to have existed in the Wādī al-Ajāl alone (see Table 7.5). A representative sample of wells was recorded during the FP fieldwork and included in the gazetteer, though the preservation of the superstructure of wells was very poor by the 1990s (see GER 12, 40-49, TWE 25, 38-39). Most of these features constitute a circular depression c.5-10 m in diameter, by 4-8 m deep, with little remaining trace of the superstructure for the lifting mechanism.

Before the introduction of modern motor pumps, the wells and the gardens they irrigated were concentrated in the centre of the wadi floor where the water-table lay closest to the surface. Lethielleux distinguished two main types of machinery used for lifting water to the surface: the Egyptian *shādūf*, or *khattāra* as it is known in Fazzān (‘puits à balancier’: Lethielleux 1948, 93, 105; Despois 1946, 142-5); and the *daw*.

Area of Fazzān	No. of gardens	<i>Daw</i> wells	<i>Khattāra</i> wells (balance wells)	Springs	Donkeys	Surface area of cultivated gardens
ash-Shaṭī west	500	330		79	367	20.1 ha
ash-Shaṭī east	900	166	12	198	733	19.5 ha
al-Ajāl west	524	524			720	94.5 ha
al-Ajāl east	190	190			680	50.1 ha
Sabhā	181	185			560	116.1 ha
al-Bawānis	75	75			210	30.3 ha
Wādī ‘Utba	140	158			300	27 ha
Murzuq	140	94	99			46.2 ha
al-Ḥufra	199	150	21	20	595	46.2 ha
ash-Sharqiyāt	117	117			400	23.4 ha
Wādī Ḥikma	100	80	70	3	200	20.1 ha
Total	3066	2069	227	300	4765	493.5 ha

Table 7.5. Distribution of different types of wells in Fazzān in the 1930s (after Lethielleux 1948, 27, with corrections). The surface area under cultivation is calculated on the basis of the number of irrigation squares (jawl) of c.3 m² area. Note the total area of cultivated gardens in the 1930s was c.2,300 ha, so under 25 percent of this was under irrigation in any one year (Lethielleux 1948, 26).

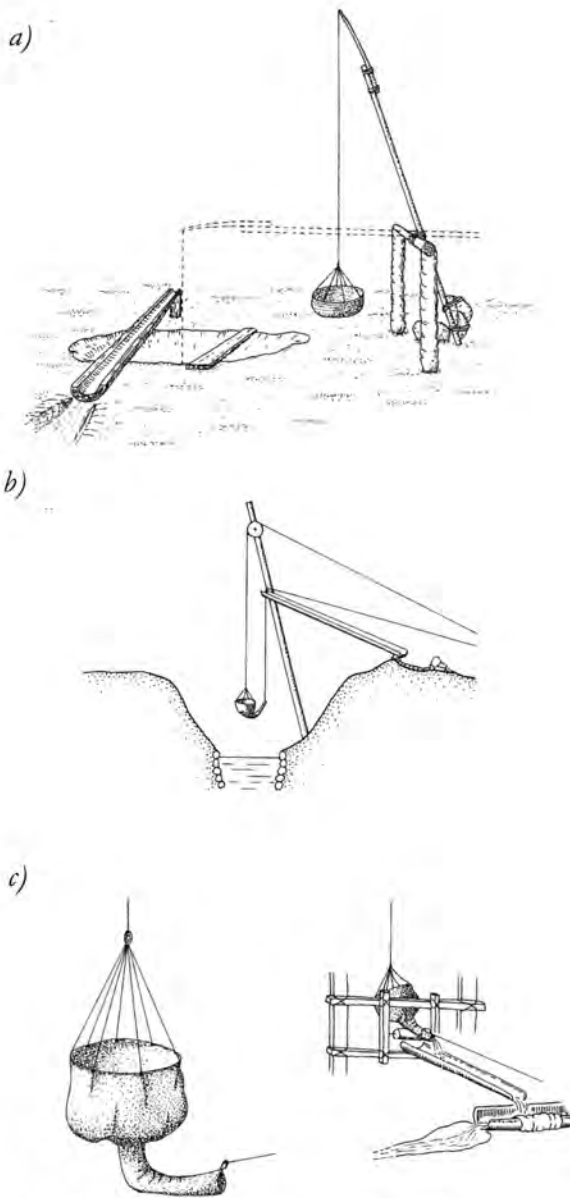


Fig. 7.26. a) Diagram of a khattāra well; b) diagram of a dalw well; c) details of the dalw, showing its operation (a-b after Despois 1946, c after Lethielloux 1948).

The khattāra type well

The *khattāra* consists of a counterweighted arm with a bucket suspended from a rope on one end. The operator pulls the bucket down into the well until it fills with water, and then lets the counterweight pull the bucket up, and empties it into a tank by the top of the well (Oleson 2000, 225-29). The *shādūf* or *khattāra* is one of the oldest kinds of water-lifting machines, used in ancient Mesopotamia and still in use in parts of Egypt and North Africa today. Its widespread adoption is largely due to its relative simplicity and low capital cost; its disadvantages are low height of lift and relatively low discharge rate, which limits the area that can be irrigated effectively. With low capital costs, the *khattāra* is the machine of the poor, and because of the relatively low height of lift, the *khattāra* wells in Fazzān were limited to areas where groundwater lay at a very shallow depth, such as the eastern Wādī ash-Shaṭī, Murzuq region, Ḥufra, ash-Sharqiyāt, and Wādī Ḥikma (Lethielloux 1948, 6-7, 27, 105).

The dalw type well

The *dalw* well, by contrast, involves higher capital investment but provides a higher lift, and so could be used more widely than the *khattāra* where water lay at greater depth. The *dalw* well is widely used in the Arab world, from the Middle East to North Africa and was the predominant type in early 20th-century Fazzān (it is described by Despois 1946, 134-35; Nachtigal 1879, 91, and in detail by Lethielloux 1948, 83-104). A skin bag or *dalw* is suspended on a rope looped over a wooden pulley supported by a framework of palm trunks, and raised by either a person or an animal pulling on the rope while walking down an inclined walkway away from the well (Fig. 7.26). The bag has a wide mouth and a tubular open 'tail' (Fig. 7.27) to which a second rope was attached, running over a wooden roller on the superstructure below the pulley. The bag is let down into the well and fills with water, and as it is raised up the second rope keeps the open end of the tail of the bag above the mouth, so that water does not spill



Fig. 7.27. Photograph of a dalw bag (Jarma Museum). Scale: 15cm in 5 cm units.

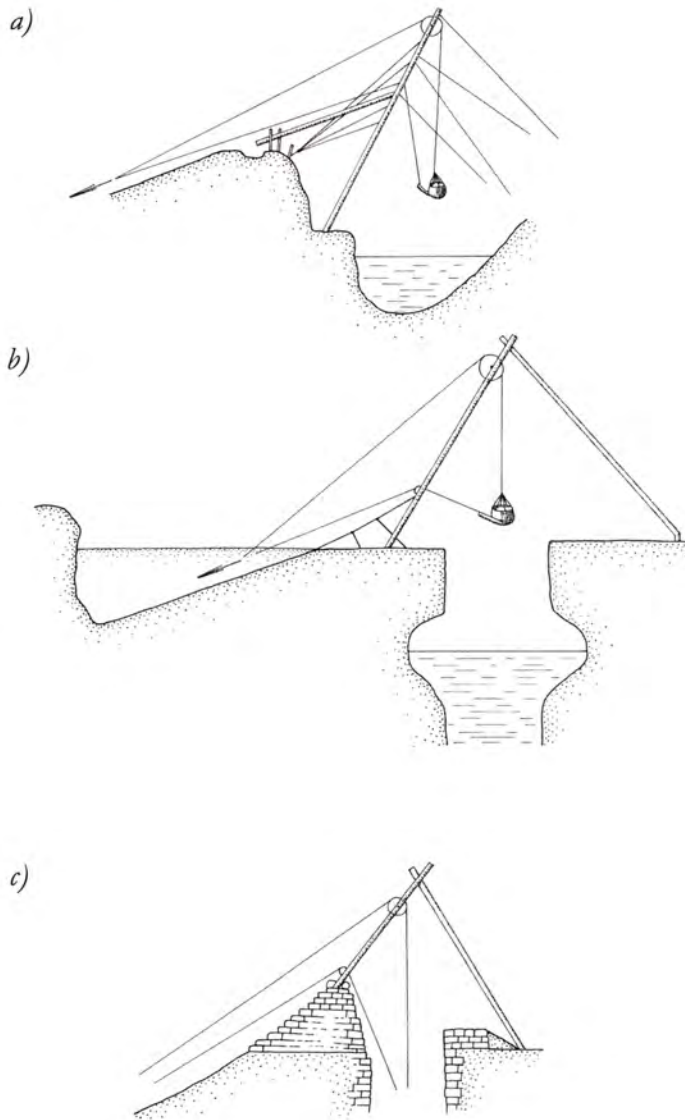


Fig. 7.28. Diagram of Lethielleux's three types of dalw well superstructure: a) single A-frame well (puits à l'échelle); b) Double A-frame Well (puits à chèvre); c) Scaffolding Well (puits à l'échafaudage) (after Lethielleux 1948, 94).



a)



b)

Fig. 7.29. a) Abandoned well with palm trunk superstructure and palm channel for water (GER 43); b) detail of well GER 43, showing large collapsed hole and palm superstructures.

out. At the top of the lift the second rope pulls the tail down so as to discharge the water into a channel made from a hollowed split palm trunk, from where it flows into a network of earthen irrigation channels. The capacity of the bag is usually 15-25 litres; occasionally as much as 35, allowing a maximum extraction rate of ≈ 60 -100 l/minute (Despois 1946, 135, 137).

The superstructure of the wells is formed of a pair of palm trunks leaning out over the well at an angle, which may be supported in three ways (Fig. 7.28): (1) Single A-frame well (*puits à l'échelle*): In sandy areas where continued collapse of the well makes it too large to use bracing supports from the other side of the well, the trunks are set into the ground and supported by rope stays. Cross-bars between the uprights form a sort of ladder and support the pulley and the roller. A hollowed log spans the gap between the point where the *dalw* empties and the edge of the well, conducting the water to the earthen irrigation channels (Fig. 7.29a/b). (2) Double A-frame well (*puits à chèvre*): in firmer terrain a second set of palm trunks, opposed to the first ones, braces the superstructure, the whole structure resting on the ground surface. As the bag discharges closer to the edge of the well, there is no need for a long hollowed log and the water discharges onto a bed of palm fronds laid over clay on a wooden framework. (3) Scaffolding well (*puits à l'échafaudage*): similar to the previous type but where most of the superstructure is a masonry support for a short wooden framework over the mouth of the well (Lethielleux 1948, 93-104; Despois 1946, 135-39).

The type of superstructure is dependent largely on the soil; in the Wādī al-Ajāl the single A-frame well was used in the western part of the Wādī, and the double A-frame well in the eastern area; in the Wādī ash-Shaṭī the single A-frame well was used in the western zone, while in the east the single A-frame well occurs alongside the scaffolding well. According to the quantity of water in the well, and the resources of the owner for hiring labour, wells of any of these three types might have one or two sets of pulleys (Lethielleux 1948, 104).

The *dalw* wells were normally worked by pairs of donkeys, but sometimes by human labour, and labourers were also needed to drive the donkeys – either workers hired in return for a quarter of the harvest, or indentured debt bondsmen, or, before the abolition of the slave trade, slaves (Lethielleux 1948, 70, 73-74, 89; Despois 1946, 139-

42). Labour for drawing water was the major constraint on the size of gardens, which could be no larger than the area that could be irrigated from a well. Watering every part of the garden every five days was considered optimal, but more often available labour only allowed each plot to be irrigated every seven or eight days (Lethielleux 1948, 32-33). Extra labour was hired to supplement the effort of the donkeys for one or two months in winter and two in the summer, usually with two women per *dalw*, working four hours per day in winter and two/three hours at night in summer (Lethielleux 1948, 73).

Irrigation using wells is a workable alternative to irrigation from springs and foggaras, though as we have seen it is not as mechanically efficient as the latter and does not permit as large an area to be held under cultivation. The average number of gardens cultivated per well in the 1930s varied between 0.7-1, as opposed to the 12 gardens that could have been irrigated by a single foggara (Lethielleux 1948, 27). The continuous flow of water in channels at the delivery end of the foggara should easily exceed the stop-start output of even a large *dalw* well. The contest only becomes more equal when the flow in the foggara falls to minimal levels on account of either a falling water-table or of blockages in the channel.

However, the big gain with a pulley well, once established, was the comparatively low maintenance aspect and the technological simplicity of the structure. If part of the well superstructure broke, repairs could generally be made quickly and inexpensively. A hidden blockage of a foggara will always have entailed dangerous and difficult underground work. The dramatic shift from irrigation based largely on foggara technology to well-based technology represents either a major decision or an important response of the Fazzānī farming communities to changing circumstances.

FIELD SYSTEMS OF THE EARLY MODERN PERIOD

The wells were usually placed at the edge of the gardens to facilitate access by the humans or animals drawing the water. Water lifted from the wells was distributed in earthen irrigation channels (Fig. 7.30) to square or rectangular parcels (*jadwal*) of land delimited by low earth banks that retained the water until it had infiltrated into the soil. The size of the *jadwal* varied, but Lethielleux gives 3 m² as a typical size. A well with one pulley might irrigate 500-800 *jadwal*; a well with two pulleys c.1200-1500. The *khattāra*, by contrast, could only irrigate 150-250 *jadwal* (Despois 1946, 144). Only a third or a quarter of the garden was cultivated at any one time, the plots being rotated (Lethielleux 1948, 26-28; Despois 1946, 155-58). While one person drove the donkeys lifting water from the well, an assistant (usually a child) diverted the flow to different *jadwal* by blocking the channels with a spadeful of earth, or knocking a gap in the banks (Lethielleux, 1948, 107-10; Despois 1946, 147-49).

The soils of the Wādī al-Ajāl are good for wheat, while the poorer, more clayey soils of the Wādī ash-Shaṭī are



Fig. 7.30. Earthen irrigation channels near Jarma.

better suited to barley (Lethielleux 1948, 33). As the local groundwater (whether from springs, foggaras or drawn from wells) has a high content of mineral salts, irrigation eventually over-salinates the soil. Herodotus (4.183) said that the Garamantes spread soil over the salt to sow seed in, and irrigated it from a spring rising in a mound of salt – perhaps an echo of the springs of the Wādī ash-Shaṭī, although all of his Libyan oases are said to have springs flowing from salt hills. Salt flats in the Wādī al-Ajāl today mark where evaporation of groundwater has salinated the soil, or sometimes (as at Tīn Abūndā or TEK 9) may mark the former outlet points of foggaras. To maintain the fertility of the sandy soil, gardens must be manured, with human and animal waste (Lethielleux 1948, 34, 129-30).

Palm groves are not manured or irrigated, and are frequently separate from the irrigated garden. Instead, the palms grow where their roots can reach water – including around the ends of abandoned foggaras where some water may yet percolate through the sanded-up channels, as though in long subterranean tentacles from the aquifers under the ḥamāda. Despois considered the palm groves to be descendants of palms that were cultivated in former times (Despois 1946, 161-71).

Altogether, well/garden irrigation produced a very different pattern of land-use from that practised in the Garamantian period. Instead of fields in sometimes nearly continuous strips around the ends of clusters of foggaras, the medieval and early modern fields were discontinuous, separate patches of cultivation each around its own well. Bisson (1989, 185-86) has documented a similar shift in cultivation patterns for the oasis of Tégant in the Gourara (Algerian Sahara). In the Wādī al-Ajāl it appears that many of the areas cultivated from wells lie somewhat to the south of, and at a slightly higher level than, the area formerly irrigated from foggaras; the base of a foggara channel exposed in a well at GER 47 to the west of Jarma lay over 2 m below the present ground surface, and the foggara must have emerged some distance to the north. As foggaras were able to irrigate more land by flowing water than could wells from which water had to be lifted, a lower population is implied after the foggaras had been supplanted by well irrigation. The technological transformation at issue is thus one with negative implications for Fazzānī society.

DATING OF ABANDONMENT OF THE FOGGARAS AND THE TRANSITION TO GARDENS IRRIGATED FROM WELLS

In 1822 Hugh Clapperton, the first European traveller to leave a record of the Wādī al-Ajāl, painted a picture of an impoverished and sparsely populated valley very different from its heyday in the Garamantian period. He mentioned abandoned foggaras in Fazzān and that the local population had no idea of their purpose (Bruce-Lockhart and Wright 2000, 53-55, 286). The FP has recorded graves of Islamic date over filled-in foggara shafts at Tīn Abūndā (TAB 10), In Ṭafarāt (ITF 14) and between ad-Dīsa and Tāqallīt (EDS 25); possibly also to the south of Jarma (GSC 19-20). Some of these are probably connected with the old caravan route to Ghāt, and are sited where it was easier to bury a body in the loose sand of a filled-in shaft than in the surrounding stony plain. The abandonment of the foggaras and the transition to irrigation based on wells had clearly occurred long before the 19th century, but again, the date cannot be fixed with great accuracy. From scattered references to levels of medieval population in the region, and from preliminary archaeological findings which suggest a considerable decline in the number of occupied sites in the early medieval period, a date before or shortly after the Arab conquest would seem likely. Early Arabic sources give some clues as to the date of the appearance of the two forms of wells in Fazzān, the *dalw* and the *khattāra*. Al-Idrisī, writing in the 12th century AD, confirms that by then irrigation in the Wādī al-Ajāl relied on *khattāra* wells, not foggaras. Speaking of Jarma and Tsāwa, he says:

“There one drinks water from wells. Palm trees, millet and barley grow there, which one waters by means of a machine which bears the name of *indjafa*, and which the inhabitants of the Maghrib call *khattāra*.” (al-Idrīsī, from the French translation by Dozy and De Goeje 1866, 42).

This passage has caused some confusion, because *khattāra* is also the word used in Morocco to designate a foggara; Despois accordingly understood al-Idrīsī to be talking about foggaras here (Despois 1946, 57; although he seems to contradict himself on p. 60). But in Morocco the word *khattāra* was applied to foggaras by transfer from other irrigation methods; the word derives from a root k-ṭ-r signifying back-and-forth motion, and its normal meaning in Fazzān and the Maghreb is a *shādūf* well (Colin 1932, 35-39; Despois 1960, 1232; Lethielleux 1948, 93). Al-Idrīsī, referring to a ‘machine’ (*ala*) called the *khattāra*, must be talking about irrigation from *shādūf*-based wells; and the statement that drinking water comes from wells also shows that the abandonment of the foggaras of the Wādī al-Ajāl must have occurred before the 12th century AD. The earliest evidence of the *dalw* well is probably contained in a reference to the fact that wells at Zuwīla in the 11th century were driven by camel power (al-Bakrī 10.16: “There are palm groves and cultivated areas which are irrigated by means of camels”). The area around Zuwīla is another area of Fazzān that has yielded evidence of Garamantian-period foggara systems and this comment by al-Bakrī appears to suggest a quite early date for the changeover to wells in the post-Garamantian period. By the early 19th century and probably much earlier the *dalw* had supplanted the *khattāra* in the Wādī al-Ajāl, although the *khattāra* was still in use in the 20th century in some of the poorer districts of Fazzān, around Tsāwa and especially in the Wādī Hikma (Lethielleux 1948, 27 and 105).

There are suggestions that the abandonment of many of the foggaras had occurred even before the early medieval period. The emergence of *qṣūr* in the Wādī al-Ajāl seems to reflect diminishing central control of the Garamantian state and increasing competition for limited resources – doubtless including water – between different groups in the Wādī. Radiocarbon dates from organic matter incorporated in the mud bricks of several *qṣūr* now suggest that the first *qṣūr* appeared in the late Garamantian period, in the 3rd-6th centuries AD (Mattingly *et al.* 2002, 16). It is possible, therefore, that the emergence of *qṣūr* is an indication that the foggara system was already starting to fail in this period.

During the early medieval period there is a general impression of poverty and sparse settlement in the Wādī al-Ajāl, incompatible with the large-scale construction or even maintenance of several hundred foggaras. For so long as the water-table held out, some foggaras are likely to have continued supplying water provided their channels were not blocked by collapse of the roof or sides; such foggaras as continued functioning into the medieval period may have helped influence the location of medieval *qṣūr*.

In 1944-45 Despois saw two foggaras near Jarma, poorly maintained, still providing some water and being used, in effect, as springs (Despois 1946, 22: “Deux d’entre elles, mal entretenues, fonctionnent encore près de Jerma”; 56: “Dans le Fezzān, les foggara appartiennent à un passé très lointain dont plus personne n’a gardé le souvenir. Deux sont pourtant encore utilisées dans l’Ajal occidental, mais comme des sources, et une autre à été atteinte par un puits à Zouīla.”). Lethielleux (1948, 72, n. 176), writing at the same time, said that only one foggara continued to provide a trickle of water. Both of these references, however, suggest the incidental survival of foggaras that had not been actively maintained for a considerable period of time, and are entirely consistent with the impression of a general abandonment of foggara irrigation in the remote past, and its replacement by irrigation from the *khattāra* and then the *dalw* well, with an ever-decreasing number of foggaras delivering ever smaller quantities of water as channel collapses, silting and a falling water-table took their toll.

There is today no oral tradition about these features, despite the fact that the oral memories of some families go back to the arrival of their ancestors (Islamic missionaries from Morocco) in the 14th-15th centuries.

There seem to be two extreme chronological possibilities for the general replacement of foggara technology with well irrigation in Fazzān. The first possibility relates to the testimony of al-Bakrī that *dalw* wells were already common around Zuwīla by the 11th century, and to the argument proposed above that abandonment of the foggaras may have begun in the late Garamantian period. On the other hand, the continued partial functioning of some foggaras into modern times suggests that if the switch was caused by a declining aquifer level, this was neither a total nor an absolute cut-off. There is an obvious difference, however, between an aquifer that can be relied on to deliver a continuous and substantial flow and one which has started to get close to the mechanical margins of delivering flowing water to the oasis centre. Periodic fluctuation (especially surges) in aquifer levels is a common phenomenon and exploitation of the aquifer by foggaras would depend on both the likely maximum and minimum flow. Even after a drop in the aquifer, a foggara may have in some years delivered useful quantities of water to the oasis, but at other times have been virtually dry. In such circumstances, the incentive to maintain or to construct new foggaras will have been lost, and farming strategies will have prioritised alternative forms of irrigation, even if these were ostensibly far less efficient than the properly functioning foggaras. The abandonment of most of the foggaras may have allowed some recharge of the aquifer to occur, to account for the rare examples noted in mid-20th century with traces of water at their bases at times of peak surge. However, the local farmers were not fooled into reinstating foggara irrigation. It seems most likely that the abandonment of most of the foggaras had occurred much earlier, and before the 11th-12th centuries AD.

REASONS FOR THE ABANDONMENT OF THE FOGGARAS

There would seem to be two main possible causes for the abandonment of the foggaras. Either depletion of the aquifer caused the foggaras to run dry, as a result of which population levels in the Wādī declined; or a population decline or labour shortage (lack of new slaves?) caused by other reasons (political? economic? warfare? nomad raids?) may have led to a manpower shortage and a lack of maintenance, as a result of which the foggaras gradually ceased to deliver water.

It is clear that the work involved in constructing and maintaining a foggara is far from negligible. Lô (1953, 168) estimated that a 4 km foggara, with an average shaft depth of 12 m at a spacing of 10 m would have required 48,000 man days to construct. On this basis, the 550 foggaras in the Wādī al-Ajāl alone would have taken around 72,000 man-years to build (or a team of 1000 people, 72 years). Maintenance of foggara channels will have varied considerably according to the local geology, though figures from Tābalbala in Algeria suggest that as much as several thousand pannier loads of sand and other material may have had to be extracted annually from a single foggara system (Champault 1969, 104). In French studies of the Algerian foggaras in the early 20th century it is clear that some of the low flow rates and numbers of abandoned foggaras cited were attributable as much to poor levels of maintenance as to a falling water-table (Chaintron 1958, 134-38).

Small-scale excavation of three different foggaras was designed to shed light on this question. At Tuwash a modern pit had cut through a foggara channel and the pit was dug out to examine the infill sequence of the foggara where it was exposed in section (TWE 16.F48; Fig. 7.31a). At al-Kharā'iq a similar cleaning and recording exercise was performed where another modern pit had sectioned a foggara (CHA 31), and an access shaft upstream on the same foggara was dug out to investigate the channel infill



Fig. 7.31. a) Silting sequence in foggara channel sectioned near Tuwash (TWE 16.F48); b) infill sequence in foggara channel CHA 31 near al-Kharā'iq, with three levels of silting.

sequence. A shaft on foggara FJJ 16.F29 at the FJJ 1 site was also excavated to examine the channel deposits.

Excavations on all three foggaras suggest the same model: in each case the channels were found to be wholly choked with water-deposited sand, and in the al-Kharā'iq foggara three distinct levels of silt near the bottom of the infill sequence implied ponding in the channel in the early stages of abandonment, probably caused by roof-falls downstream (Fig. 7.31*b*). Water must have continued to flow through the foggaras, depositing sand until they were entirely choked, and their abandonment cannot therefore be entirely due to a falling water-table; instead, in these instances, it must have been due primarily to lack of maintenance. This in turn may imply population disruption or decline. This hypothesis would not preclude the possibility that two of the foggaras in the Wādī al-Ajāl, even though unmaintained, continued to flow until the 1940s. Charcoal from about halfway up the sandy fill of the channel of CHA 31 yielded a radiocarbon date of 152.4 ± 0.5 BP, suggesting that this example still had water penetration within the last few hundred years.

Nevertheless, the evidence for the addition of tributaries, and the instances of several different phases of foggaras in some areas, show clear signs of a response to a falling water-table (above, 259-61). It is perhaps most likely that several factors combined to produce the abandonment of the foggara systems. This fits in with the detailed evidence from the Algerian oases, where some of the records taken by the French authorities show a decline in the yield of foggaras between 1904 and 1950, despite substantial attempts to ameliorate flow through improved maintenance. Though some French officials disputed the figures in the 1950s (Chaintron 1958, 136-39), the trend has continued into the later 20th century (*Encyclopédie Berbère*, s.v. foggaras). The problem was at base due to declining aquifers, though poor maintenance also had its part to play (Lô 1953, 162-65 notes that the output of the In Şalaḥ foggaras had fallen by 1947 to 43 percent of its level in 1904). Over time a falling water-table, the result of long-term environmental change (see above, Chapter 2) exacerbated by abstraction by the foggaras, will have caused some of the foggaras to cease to function reliably, leading to their

abandonment. Periodic surges in the water-table are recorded, however (for instance, causing flooding when the moat around Old Jarma overflowed in the early 20th century), and these might account for some intermittent continued flow and silting. By late antiquity, Garamantian power was waning, and with it their ability to procure new slaves (by trade or raiding) to build and maintain the foggaras. The unstable geology of the Wādī al-Ajāl entailed high maintenance costs, as shown by the evidence for channel collapse and maintenance works. The older a foggara was, the more labour it required to maintain; and the combination of increased difficulty in procuring new slave labour and the effects of a falling water-table could have tipped the balance in favour of well-based irrigation methods. Once these had become the norm, with different land-holding patterns and agriculture now practised on a smaller scale, with gardens corresponding to family/household units, there was no going back to a more complex system of foggara irrigation, even though some of the foggaras may have continued to deliver water for some time.

THE FOGGARAS AND GARAMANTIAN SOCIETY

The demonstration that the foggaras of the Wādī al-Ajāl date from Garamantian times enables a number of inferences to be drawn about Garamantian society. They explain how the Garamantes were able to exploit the Wādī al-Ajāl, and also the Wādī Barjūj, the Murzuq oasis and the Ḥufra. Foggaras were the hydrological basis of Garamantian civilisation, enabling large-scale settled agriculture to support a sizeable population in this arid zone. Intensive foggara-fed agriculture appears to correlate with extensive Garamantian settlement along the Wādī al-Ajāl. Liverani (2000a/b/c) has recently argued that Garamantian culture emerged as a response to changing environmental conditions, as aridification in the Sahara forced a change of life-style from pastoralism to oasis farming and a trans-Saharan trading system linking the Mediterranean world to the sub-Saharan African kingdoms. The foggaras played a vital role in sustaining the new agricultural system. The rise of settlement supported by foggara-irrigated agriculture may coincide with the shift from fortified sites (Tinda, In Ṭafarāt, Tuwash, Zinkekrā) to undefended wadi-floor settlements, in the last few centuries BC. Whether this is an indicator of more peaceful conditions or of unified political control, and whether this is connected with a shift from pastoralism to settled agriculture are open questions; but the introduction of foggaras could have played a significant role in lessening competition between settlements in the Wādī al-Ajāl for water resources and cultivable land. The introduction of foggara technology was probably a significant factor in the emergence of a unified Garamantian state, allowing the irrigation of larger areas and the creation of a larger agricultural surplus, and with labour requirements relying on the acquisition of slaves (see below, Chapter 9).

The technology required for digging foggaras is relatively simple (Goblot 1979, 30-35); the surveying can be done mainly with rope or string; digging implies the use of iron tools (a short-handled pick), and a windlass to haul spoil up to the surface. Some form of lighting or lamps was required to illuminate the gallery during excavation.

What sort of social structures were required to construct and maintain the foggaras? The foggaras are most thickly concentrated in the Wādī al-Ajāl, the heartland of Garamantian territory, containing the capital Garama, with outliers to the east of Murzuq and in the Wādī Barjūj; the absence of foggaras in the Wādī ash-Shaṭī is related to the presence there of abundant springs. The existence of c550 foggaras in the Wādī al-Ajāl, even if built and added to over a long period of time, implies a substantial labour force, and a sizeable population maintained by the irrigated land. While there are many different ways of organising foggara construction, ranging from the specialist skilled *qanāṭ* diggers or *muḥammī* of Persia, who form their own social class, to the slave foggara diggers of the Algerian oases, a strong case from probability

can be made for seeing the Garamantian foggaras of Fazzān as built by slave labour. The main northwards trans-Saharan trade, in ancient as well as in more recent times, is likely to have been in human traffic (Wright 1998), and the Garamantes evidently played a key role in this, either as procurers of slaves (as may be implied by Herodotus 4.183-4: the Garamantes hunting the Ethiopian troglodytes), or as middlemen, providing water, guides and other services along the desert routes, or as both. The slave trade is probably a major factor explaining the quantity of Roman imported goods in Fazzān (Liverani 2000b).

For a society trafficking in slaves to this extent, what is more natural than the use of slave labour for the arduous, difficult and dangerous work of tunnelling underground in unstable sands and gravels? This suggestion is further supported by ethnographic parallels from Saharan oases in southern Algeria. At the Algerian oases of Tidikelt, Touat and Jurara the foggaras were constructed and maintained by slaves until their liberation by the French authorities during the 20th century. These slaves, or *haratin*, formed a distinct social group apart from the Arab and Berber population of the oases. The foggaras of the Algerian Sahara also display the peculiarities of closely spaced access shafts (5-8 m), and an often zig-zag course, the latter betraying a low level of tunnelling skill (Goblot 1979, 162-63, also makes the connection between the close spacing of the shafts and the use of slave labour, although geological factors may be a sufficient explanation for close shaft spacing). Like those of Fazzān, they are also called by the term foggara, rather than *khattāra* as in Morocco.

Oral tradition on the Algerian foggaras variously attributes their origin to introduction by Jews from Palestine in the 9th century, by refugee Persians in the 10th century, or to introduction from Morocco (Goblot 1979, 167-69; Lô 1953, 140-44). But now that the foggaras of Fazzān can be dated to before the 4th century AD, it seems likely that the Algerian foggaras were introduced from Fazzān (perhaps as the Algerian trans-Saharan routes began to supplant the routes through Fazzān?), and it is tempting to wonder if the slave groups of foggara diggers are some relic of a social structure that may have had its origins in the Garamantian period. This would not exclude, of course, Goblot's suggestion of successive waves of introduction or reinforcement of foggara technology, due to various groups of migrant or refugee communities who for one or another reason ended up in the Algerian Sahara, or specialists from Persia called in to revitalise failing foggara systems (Goblot 1979, 167-69).

Keenan (1977, 145-48) provides several insights into the early 20th-century pattern of ownership of some of the Algerian foggaras by nomadic groups of the Tuareg, with the labour of construction and cultivation carried out for them by others. This labour of construction and maintenance was very dangerous, and was assigned to slaves or *haratin*, who received only one-fifth of the produce of the land, whereas the Tuareg owners of foggara took four-fifths. For each new shaft dug to improve a foggara, the owner paid 7 kg of wheat. Though in theory anyone could develop virgin land by constructing a new foggara, in reality, because such systems involved so much work and attracted higher land tax, they were dependent on elite sponsorship and for the most part on communal ventures (Keenan 1977, 147, 174-75, 248-49). How far back in time these systems date is uncertain and highlights the fact that more work on the archaeology of the Algerian and Moroccan oases is badly needed.

The decline of Garamantian civilisation entailed the progressive collapse also of the foggara infrastructure and of regular maintenance; although some channels may have continued to deliver water in decreasing quantities, with a couple still trickling on into the mid 20th century, most had gone out of use by the 11th century if not before, and the medieval and later agricultural systems of Fazzān were predominantly based on the *shāduf* and *dalw* wells, and irrigated gardens (Lethielleux 1948; al-Idrisī in Dozy and De Goeje 1866, 42).

If it is accepted that the Garamantian foggaras of Fazzān were built and maintained by slave labour, this provides another strand of explanation for why the foggaras fell out of use. The Garamantian kingdom was sustained by its control of trans-Saharan trade; the Garamantes exported salt southwards to the sub-Saharan African kingdoms in return for slaves; those slaves that were not used in Fazzān were re-exported northwards to the Roman Mediterranean in return for oil, wine, glassware, ceramics and other goods (Liverani 2000a/c). This triangular trade provided not only profit but also a ready supply of slave labour; but it was reliant on access to Mediterranean markets as well as to the sources of slaves in sub-Saharan Africa. When events in the 3rd century AD caused the decline of the main coastal export ports – Sabratha, Oea and Lepcis Magna – the link between the trans-Saharan trade system and the wider Mediterranean markets of the Roman world was disrupted; imports of Roman pottery and other goods to Fazzān decline from the late 3rd century AD, and northward exports should also have dropped off from this time onwards. Assuming that this change also had an impact on the trade with sub-Saharan Africa, there should not only have been a decline in Garamantian wealth earned by trade with the Roman empire, but also a disruption to the slave trade affecting the supply of slave labour to Fazzān. Under such circumstances the continued maintenance of the foggaras would have become increasingly difficult. It is at this time that the first *qşur* in the Wādī al-Ajāl start to appear, indicative of a less stable and secure society. In the Islamic age, trans-Saharan trade was increasingly focused through eastern Fazzān, well away from the Wādī al-Ajāl. The different socio-political context that this brought about in the Wādī will have reduced the local resources for foggara construction or maintenance, and favoured a long-term switch of the available slaves to working the *dalw* wells.

MODERN SETTLEMENT AND DRILLED WELLS

In the medieval and later history of the region, from the 12th century if not before, agriculture in Fazzān took the form of small gardens irrigated from wells by means of the *dalw* or *shādūf*. Indeed, the Wādī al-Ajāl does not seem to have recovered to



(a)



(b)

Fig. 7.32. a) Drilling a new well near Jarma to tap the receding water table, at c. 70m depth; b) tank at the head of a modern well near Jarma, showing mineral deposits from the water.



Fig. 7.33. Dying palm groves around Old Jarma.

Garamantian levels of settlement until the last 30 years, when the introduction of drilled wells and a new road to the border with Algeria have boosted settlement. This development process underlines the reliance of human populations in Fazzān on techniques of artificial irrigation; but it has also brought its own problems. Since the mid-20th century the introduction of pumped wells to the region has caused a decline in the water-table, and development to support the growing population is rapidly destroying the surface traces of the foggaras. Each year new wells are drilled to chase the receding water-table: Fig. 7.32a shows the drilling of a new well in 2000 to obtain water at a depth of 70 m, as the existing well (at 18 m) was producing a declining quantity of very salty water – leaving heavy mineral deposits where water has leaked or spilled over the outside of its receiving tank (Fig. 7.32b). Despite the new technology, many of the gardens irrigated today seem to be no larger than those which used to be irrigated by traditional methods.

But this over-extraction of the water-table has led to abandonment of many traditional wells and the death of the old palm groves around the medieval mudbrick city of Jarma (Fig. 7.33); the groundwater that nourished the palms has been pumped dry, and palms can only be grown where they are watered from the wells. It is common to see wells with remains of successive technologies to extract water from greater depths: a decaying *dalw* structure at the top, a mechanical excavation where the well has been deepened in recent years, a motorised pump near the bottom and metal tubes drilled through the floor of the well – all now abandoned as the aquifer has run dry even at depth.

The close reciprocal link between water-supply technology and human population levels in Fazzān carries warnings for modern settlement of the region; just as foggara technology made extensive settlement possible in the Garamantian period, so the recent settlement boom is dependent on modern drilled-well technology that can reach the deep aquifers. But the difference is that the modern technology allows extraction rates far in excess of the foggaras: whereas the foggaras drained the aquifers at the base of the escarpment over the course of many centuries, drilled wells are depleting the deep fossil aquifers in a matter of years. In some areas, the usable aquifers are reported to be over 100 m below the surface and as these become exhausted new boreholes are drilled to reach water-bearing strata further down. The aquifers do not have infinite capacity, and when they become exhausted the implications for human population of the region are potentially catastrophic.

CHAPTER 8

THE ENGRAVED HERITAGE: ROCK-ART AND INSCRIPTIONS

By Tertia Barnett,
with David Mattingly

INTRODUCTION

The field survey of rock-art and engraved inscription sites in the Wādī al-Ajāl, conducted as part of the FP 2000 season, identified and recorded a considerable number of previously undocumented engravings. The principal aims of the survey were to collect a representative sample of the rock drawings in the Wādī, establish the range and extent of the art, and record the location of the images with respect to the local topography. This chapter describes the results of the rock-art survey and integrates them into a broader debate about the geographical and temporal context of rock-art in Fazzān. The Wādī al-Ajāl contains an interesting subset of the standard repertoire of rock-art imagery of the Libyan Sahara, which provides important new pointers towards an understanding of Holocene activity (see below, Chapter 9). As we shall see, there is perhaps more imagery here than previously appreciated, its distribution is skewed towards a series of specific topographic contexts, and these appear to be rather different to the locations in which the majority of rock-art in Fazzān was created.

The engravings in this region span several thousand years of human cultural development. The visual symbolism and imagery encapsulated in rock-art represent a powerful form of cultural communication, and a medium for expression of social and cultural identity and belief (Hassan 1993; Jelí ek 1996; Le Quellec 1993; Smith 1968). The images themselves, and the places where they are located, form an integral part of past cultural and conceptual landscapes. In conjunction with other forms of information, such as archaeological, palaeoclimatic and ethnographic data, rock drawings can enhance our understanding of the changing relationship between humans and their environment. This survey was conducted as part of a comprehensive archaeological investigation of the area, which provides a valuable informed context for the rock-art, while the rock-art complements our understanding of the past derived from the archaeological data. There is considerable overlap between the preferred locales for rock-art and inscriptions. It is clear that the distributions within the landscape of both pictorial images and engraved inscriptions are non-random and that long-term preferences have been shown for certain locations.

The rock-art survey was designed as a pilot project rather than a systematic study and documentation of all rock-art sites in the survey area. Much work remains to be done, and the comments made here serve as preliminary observations.

The discussion of the rock-art falls into three main sections, dealing first with the broader context of rock-art studies and dating, then describing the material from the Wādī al-Ajāl and finally offering an interpretation of the material, illustrated by several case studies. The inscriptions are dealt with separately in the final section of the chapter.

A note on terminology

The meaning associated with rock-art terminology can unfortunately be misleading, and requires a qualifying statement. The word 'art', as we understand it, is a post-Renaissance construct developed in the 18th century to refer to an original creation produced by a gifted individual, which is generally an object of aesthetic beauty or appeal, separate from everyday life (for example, Staniszewski 1995). 'Art' in this sense

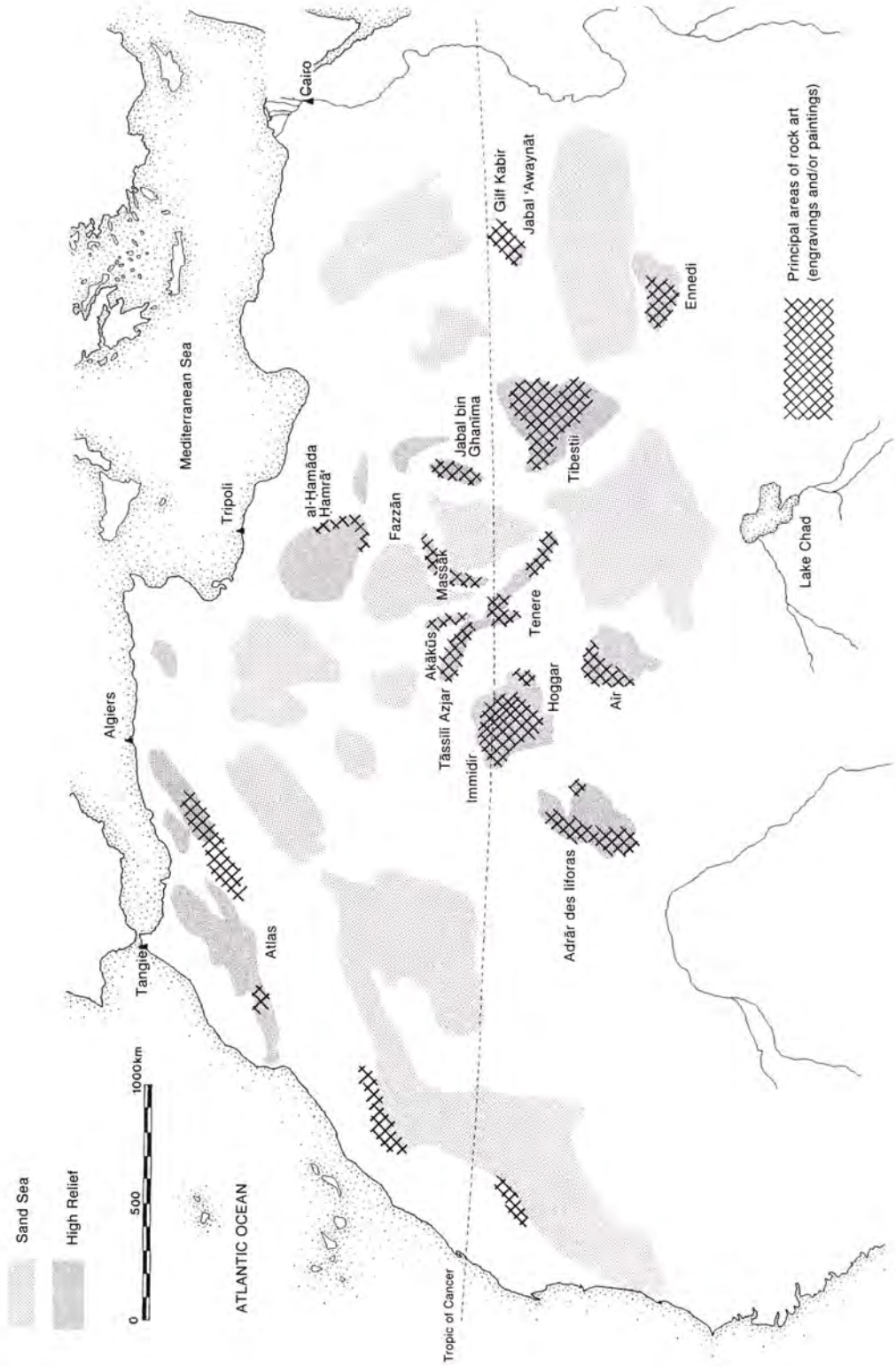


Fig. 8.1. Map of main Saharan rock-art areas

has little to do with the images in the Sahara, or elsewhere in the world, which may have formed an integral part of the fabric of peoples' lives and possibly played specific, often powerful, roles in the way societies and beliefs were structured. The term rock-art therefore has a considerable quantity of conceptual baggage associated with it, but despite considerable 'debate, no suitable alternatives have been accepted (see Tacon and Chippendale 1998). 'Rock-art' is used here interchangeably with 'rock image', 'rock drawing', 'engraving', 'carving' and 'petroglyph'. The meaning of all these terms is intended to be the same in this account. All the images from the Wādī al-Ajāl are engraved, pecked or incised in rock; there are no extant examples of painted rock-art as in some other regions of the Sahara, such the Tadrart Akākūs.

HISTORICAL AND GEOGRAPHICAL CONTEXT

Fazzān contains two outstandingly rich areas of rock-art – the Tadrart Akākūs (Mori 1998) and the Massāk Ṣaṭṭafat/Massāk Mallat (Lutz and Lutz 1995a; Van Albada and van Albada 2000) (Fig. 8.1). The mainly painted repertoire of the Tadrart Akākūs (Fig. 8.2) demonstrates clearest links with the neighbouring massifs of the Algerian central Sahara (such as the Tāssīlī Azjar), although there are thematic links with the engraved art of the Massāk. Overall, the rock-art of the Massāk is now appreciated as being the more typical of Fazzān, and the Wādī al-Ajāl lies on the north-eastern edge of this zone. The Massāk Ṣaṭṭafat contains hundreds of major rock-art complexes, encompassing tens of thousands of images (see Fig. 8.20), though the major concentrations are found in the area south-west of Ūbārī and south of the Wādī Irawān, with fewer sites recorded in the narrower rocky belt south of the Wādī al-Ajāl. The Wādī ash-Shātī and the southern fringes of the al-Ḥamāda Ḥamrā', in northern Fazzān contain further rock-art sites, which can be likened stylistically and thematically to the material further south (Le Quellec 1987; 1993).



Fig. 8.2. Painted Pastoral scene from In Ahad rock shelter in the Wādī Tishūnūt (Akākūs).

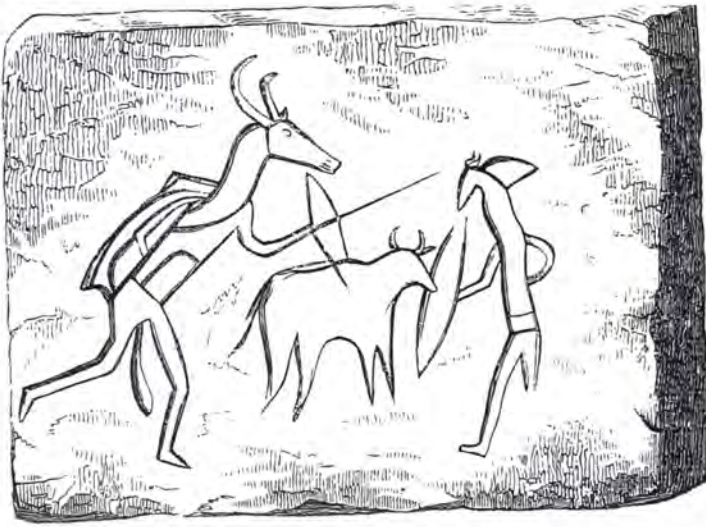


Fig. 8.3. Barth's drawing of one of the Tillizāghan engravings.

(Castiglioni *et al.* 1986; Gauthier *et al.* 1996; Le Quellec 1993; Mori 1998; Muzzolini 1995; 2001a). A substantial quantity of the images are beautifully and painstakingly executed. They are generally well proportioned, naturalistic and full of life; they appeal to our aesthetic sense and our appreciation of the natural environment. Furthermore, they represent an altered world; a landscape teeming with large savanna animals and birds and a richness and proliferation of human culture that is incongruous – and untenable – in the desert of today. This enigma of 'accomplished' art in a barren landscape perhaps explains not only our fascination with the images today, but also the early kindling of interest in them.

Awareness of the Saharan rock-art began to filter into the western world from the mid-19th century, at a time when European explorers and travellers began systematically to penetrate the African interior (Fig. 8.3). They were followed in the early 20th century by a series of scientific expeditions to record methodically and document the art of Fazzān (for example, Frobenius 1937; Jelínek 1984; 1985; 1994; Le Quellec 1987; Graziosi 1962; 1969; Mori 1960; 1967). The work of Lhote (1959; 1976a/b) in neighbouring Algeria, notably on the paintings of the Tassili mountains, inspired a strong tradition of rock-art recording throughout the central and western Sahara (Gauthier and Gauthier 1997; Hamid 1998; Muzzolini 1986; 1995; Soleilhavoup 1988; 1990; 1993a/b). In Libya, as elsewhere, the work of professional archaeologists has been complemented by some outstanding contributions by amateur enthusiasts (Castiglioni *et al.* 1986; Lutz and Lutz 1995a; van Albada and van Albada 2000). The data accumulated by these expeditions illustrate the abundance and variety of rock-art in the Sahara, and they provide the basis of much of what we know today (*Encyclopédie Berbère*, s.v. Fazzān, contains an excellent synthesis on the region's rock-art; cf. also Castelli Gattinara 1998; Jelínek 1989; Mori 1998; Muzzolini 1995; 2001).

Hugh Clapperton was one of the first to recognise Saharan inscriptions in the Libyan language during his visit to the Wādī al-Ajāl in 1822 (Bruce-Lockhart and Wright 2000, 92-93) and then, in 1850, the German explorer, Heinrich Barth, during his four-year Saharan expedition, made one of the first records of engraved art along the southern edge of the Massāk Ṣaṭṭafat (1965, 172-81). It was only in the 20th century that the existence of rock-art sites in the Wādī al-Ajāl started to be recognised, with sporadic expeditions recording a few sites – notably Zoli (1926, 1927) and Pauphillet (1953) in the Bāb al-Maknūsa pass (our sites FJJ 12, 20-26), Graziosi (1942,

The Fazzān rock-art has much in common with other concentrations of paintings and engravings known in all the other Saharan massifs, from the western Maghrib to the Ennedi (Jacquet 2000; Rossi 2000) and as far east as Jabal 'Awaynāt (van Noten 1978), as well as in the Nile Valley and sub-Saharan Africa (Breunig 1994; Caneva 1993; Fuchs 1991). It is hardly surprising that the Sahara has been described as the greatest gallery of pre-historic art in the world

141-43) at Sīdī ‘Alī/al-Fūgār (FUG 18-21) and Ūbārī (TIN 27), Sattin (1965, 76-81) and Ziegert (1969, 56, Taf. V-XI) on Zinkekrā (ZIN 902.1-68), and Pesce (1968) and Jelínek (1994) at the mouth of Wādī Būznā (ELH 018) – but at present there is no comprehensive study of the rock images or their locations. A further site in the Wādī Būznā, c. 11 km south-west of ELH 018, has been recorded by Le Quellec (1985a), though this site was not revisited by the current survey.

Far more work has been done in other parts of Fazzān: notably by Le Quellec in the Wādī ash-Shāṭī (1985b; 1987; 1989); in the Tadrart Akākūs, where both engraved and painted scenes are found (*Encyclopédie Berbère* s.v. Akakus, 400-07; Mori 1960; 1965; 1969; 1988; 1998; cf. Baistrocchi 1993 for a rare glimpse of the Algerian sector of the Akākūs and Soleilhavoup *et al.* 2000, for the northern sector of the Akākūs); and more recently in the Massāk Ṣaṭṭafat and Massāk Mallat where scenes are engraved (Gauthier and Gauthier 1994; Jelínek 1984; 1985; Le Quellec and Gauthier 1993; Lutz 1993; Lutz and Lutz 1991; 1993; 1994; 1995a/b; 1997; van Albada and van Albada 1990; 1993a/b; 1994; 2000). For many years the inhospitable terrain of the Massāk limited investigation to its margins, notably from the south into the more accessible Wādīs Matkhandūsh and Tillizāghan, first investigated by Barth (Jelínek 1984; 1985). Recent oil exploration has facilitated access to the central and northern parts of the plateau, creating an explosion of new knowledge about the distribution, content and context of the engravings. The large numbers of rock-art sites now known in deeply incised wādīs of the Massāk plateau have highlighted this area bordering on the Wādīs al-Ajāl/Irāwan as of the highest importance. A large body of comparative material is known in the Tāssilī Azjar and Hoggar mountains to the west of the Akākūs (Lhote 1959; 1976a/b; Muzzolini 1986; 1995), in the Tripolitanian pre-desert to the north (Barker *et al.* 1996a, 94-109), and some work has also been done in the Air mountains to the south-west in Niger (*Encyclopédie Berbère* s.v. Air, 346-52; Lhote 1972; Roset 1971; 1993;) and to a lesser extent in the Tibesti massif in Chad to the south-east of Fazzān (Boccazzi *et al.* 1995; Huard and Lemasson 1964). It is clear that these zones were also notable centres for rock engravings and even paintings.

CONSTRUCTING A CHRONOLOGY FOR SAHARAN ROCK-ART

Emerging awareness

Since the first discoveries of Saharan rock-art by westerners, the age of the images has been a subject of considerable debate. To the 19th-century travellers and explorers, their weathered appearance and strange style suggested considerable antiquity. Many proposed that the large African savanna animals common in much of the art belonged to an earlier time when the Sahara had a less arid climate. Others believed that the strange costumes and scenes involving humans must depict an ancient people dating to before the Arab invasion. It was also noted that different images were executed in different styles, sometimes with images of one style superimposed on images of another; alternatively images belonging to one particular stylistic range would favour different subjects to images belonging to another stylistic range. Continuing discoveries of rock images during the late 19th and early 20th centuries across the Sahara, particularly in the Saharan massifs including the Tāssilī and Atlas mountains, and investigations of technique, style and form (for example, by the geologist Flamand, who made a detailed study of the incisions used in petroglyphs in the early part of the 20th century), contributed to the development of a pan-Saharan classification and chronology (for early attempts at classification see Ballout 1955; Frobenius 1937; Vauffrey 1969).

Rock-art is notoriously difficult to date accurately (Bednarik 1996; Jelínek 1993). By definition, it is on natural, context-less rock surfaces which present no opportunities for dating. Rock paintings can sometimes provide material for a range of scientific

dating techniques including radiocarbon dating (Muzzolini 1991; 1993a), although many of these methods still require validation in their application to rock-art. A series of radiocarbon dates were obtained on images from sites in the Akākūs when the technique was still in its infancy (Mori 1968, 1969). While these are often quoted as unequivocal, both the technique for obtaining the dates themselves and the assumptions by which they are linked to the rock paintings remain questionable (Mori 1968; 1978; cf. Muzzolini 1991). For rock engravings there have been considerable attempts to date the patina common to them in arid areas (Cresmachi 1992; Lutz and Lutz 1995a, 39-44). Results have so far been highly controversial and widely unaccepted, and at present no viable technique exists for the precise ageing of petroglyphs.

Problems with a precise chronology for Saharan rock-art

One of the main challenges presented by Saharan rock-art, then, is identifying when it was created and, consequently, how it relates to archaeologically-determined human cultural developments. The few radiocarbon dates for Saharan rock paintings in the literature relate to material in archaeological deposits found at the foot of decorated walls, and so, at best, provide only approximate dates for those particular images (Mori 1968, 1998, Muzzolini 1991; 1992; 2001a, 625-30). They cannot be relied on to form the basis of a precise chronological framework. There can be no agreement on a precise chronology for the art until secure dates have been obtained on a wide variety of images from different locations, and the relationship between the archaeological data and the rock-art has been confirmed.

While there are significant local variations in the style of rock-art, certain stylistic groups are common to the majority of regions, with parallel stylistic progressions. Although a precise chronology of Saharan rock-art remains elusive, the stylistic succession of imagery can be temporally orientated by correlation with a scientifically dated palaeoclimatic and palaeoenvironmental framework to form a relative chronology. For example, during the past 12,000 years of the Holocene, the Sahara experienced several dramatic climatic reversals that may have had profound implications for human occupation and economies. The start of the Holocene was marked by a wet phase, which persisted until the early 8th millennium BP. This was followed by an abrupt, intense period of aridity lasting for almost 1,000 years until the start of the 7th millennium BP, after which the climate returned to a pronounced humid phase, often referred to as the 'Neolithic wet phase'. Desertification commenced once again from the mid-5th millennium BP and, with the exception of a brief humid interlude lasting several centuries during the 3rd millennium BP, has remained hyper-arid thereafter. The two humid stages c.12000-8000 and 7000-5000 BP are thought to equate to the main periods of prehistoric human occupation of the Sahara, and to relate to the major phases of rock-art production, with a further phase after the final climatic deterioration and continuing up to more recent times.

However, a coherent relative chronology for Saharan rock-art remains controversial (Muzzolini 1991, Lutz 1993, Mori 1998). This derives in part from the extrapolation of independent, localised chronologies to a pan-Saharan framework, and in part from inflexibilities in 'older' chronological frameworks to accommodate new data and new arguments. While the dating of the more recent images can generally be equated to well-documented processes (such as the introduction of horses and camels, the development of wheeled transport and metal weapons of diagnostic types), dating the more remote periods is more controversial. The relative chronology developed by Muzzolini (1991; 1992) successfully integrates all major rock-art areas of the Sahara, and aligns these with contemporary archaeological, palaeozoological, palaeobotanical, palaeoenvironmental, historical and linguistic data. Although, as Muzzolini himself admits, this scheme is contentious and imperfect, it perhaps represents the 'best fit'

model for the available data. However, Muzzolini's chronology, and to a certain extent, his terminology, varies from that of previous chronological frameworks established by, for example Mori (1968, 1998) and Lhote (1959) for the paintings of the Akākūs and Tāssīli respectively (see Table 8.1). The main area of dispute centres on the possibility of pre-Pastoral phases of rock-art production, with some researchers such as Mori arguing for origins as early as 12000 BP, in contrast with Muzzolini's suggestion of 6000 BP. Muzzolini's chronology and terminology for Fazzān are adapted here and outlined below with reference to alternative schemes where necessary. Although we have reservations about Muzzolini's extremely compressed chronology for Saharan rock-art as a whole, the Wādī al-Ajāl appears to lack rock-art of the earliest phases and the later phases proposed by Muzzolini map quite well with our material. The evidence from the Massāk and the Akākūs almost certainly extends further back in time than Muzzolini has conceded, though probably not as early as Mori has argued (Lutz and Lutz 1995a, 30-33).

	Mori 1998 (Akakus)	Muzzolini 1993 (Pan-Saharan)	Lutz and Lutz 1995a (Massāk)
Bubalus period	10000-8000 BP		10000-8000 BP
Round Head (1 st painted)	9000-7000 BP	6000-4000 BP	9000-8000 BP
Pastoral period	7000 – 5000 BP	6000-3000 BP	7000-4500 BP
Tazina style		5000-2800 BP	
Horse Period	3500 BP +	3000 BP +	3500 BP +
Camel Period	2000 BP +	2000 BP +	2000 BP +

Table 8.1. Comparative dating schemes for Saharan rock-art.

Naturalistic Bubaline (c.7000?-4500 BP)

This earliest rock-art phase is common to most areas of the Sahara, including the Atlas, Fazzān, the Tāssīli and the Akākūs. The phase is often termed the *Bubalus antiquus* or Great Wild Animal phase, following Mori's system of classification, as it is characterised by naturalistic depictions of the African buffalo, *Bubalus antiquus*. The buffalo became extinct in north Africa around 5,000 years ago, at the end of the Neolithic Wet Phase, providing a *terminus ante quem* for this style. Images in this style are typically large, naturalistic depictions of animals engraved with deeply incised and polished lines, and the engravings often include detail of animals' hides or markings, and sensory organs. In addition to buffalo, a rich menagerie of 'Ethiopian' fauna are depicted, including elephant, giraffe, hippopotamus, crocodile, aurochs and antelope (Fig. 8.4a).

Traditionally, this phase was thought to precede the appearance of domestic stock (which were believed to be represented subsequently in the 'Bovidean' stylistic category) and to date to the early Holocene or possibly even the late Palaeolithic (Mori 1974). However, Muzzolini (1990, 1991) argues that domestic stock are also typical to this stylistic group, and that there is no real distinction between an early pre-pastoral and a later pastoral style of art. According to this model, the naturalistic bubaline phase is in part chronologically constrained by the widespread appearance of domestic stock which, until reports of early cattle domestication in the Eastern Sahara can be confirmed as a Saharan-wide phenomenon (Wendorf *et al.* 1984, Gautier 1987), is generally accepted as being during the 6th millennium BP during the Neolithic Wet Phase.

Tazina Phase (c.5000-2800 BP)

Early regional stylistic variants are found in certain regions of the Sahara, notably the Tāssīli and the Akākūs, where a rich rock-painting tradition, known as the 'Round

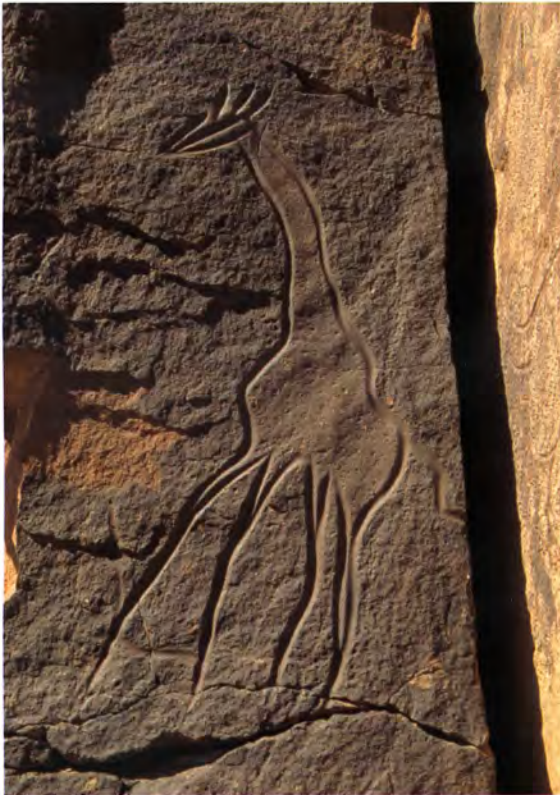


Fig. 8.4. Wādī Matkbandūsh: a) Example of *Bubalus* phase image; b) example of Tazina phase image.

Head' style (on account of its distinctive round-headed human figures) exists contemporaneously with a further sub-group – the Sefar Ozaneare ('early Bovidian') – and the naturalistic bubaline. Rock-art traditions in many regions of the Sahara ceased with the prevailing hyper-arid conditions experienced during the mid-Holocene, but certain areas, such as the Atlas mountains, the Rio de Oro and Fazzān, were less severely affected, and an original, unique style of engraving developed in these regions. This Tazina style dates to roughly the 5th and 4th millennia BP in the Atlas and possibly slightly later (around the late 5th–4th millennia BP) in Fazzān (Lhote 1970, Muzzolini 1991).

The Tazina style is characterised by engravings of wild and domesticated animals with a deeply incised, polished outline whose schematic style is typified by the animals' front or back limbs depicted as a single unit tapering to a point, sometimes bisected by a vertical line, to represent the separate limbs. Alternatively, the animals' limbs are massively elongated, or the lengths of

the horns are exaggerated. Animals such as the antelope, oryx and caprine are common, with many species depicted in the earlier phase now absent, suggesting a shift to a more arid environment (Fig. 8.4b). Abstract and non-figurative images are also common to this phase – ovoids and 'spears' in particular (Lutz and Lutz 1995b).



Fig. 8.5. a) Example of caballine phase image (FJJ 28); b) example of cameline phase image (TAG 23).

Horse or Caballine phase (3rd–2nd millennium BP)
The first appearance of horses, often with riders, characterises this phase in many regions of the Sahara, including Fazzān (Muzzolini 1996). Images (both paintings and engravings) are depicted in a schematic, geometric style, with human figures sometimes drawn as double triangles (Fig. 8.10*b*) with a line or circle for the head. Carts and two or four-wheel chariots are also shown for the first time and are traditionally attributed to the Garamantes (Camps and Gast 1982; Camps 1987). Characteristically the chariots are shown with their teams of horses at full gallop, seemingly ‘flying’. Figures are often depicted brandishing weapons and other implements that may relate to status or social affiliation. Domestic stock animals and wild animals are also drawn, although the latter are generally confined to representations of ostrich and giraffe. Horses are known in North Africa from at least the mid 4th millennium BP and the Sahara from the early 3rd millennium BP (Smith 1992), and this phase dates from *c.*2800 BP to *c.*1500 BP. It overlaps with the Garamantian period and the development of wider and more structured links with regions beyond the Sahara, and in Fazzān it is thought to be associated with the Garamantian culture (Fig. 8.5*a*).

Camel or Cameline phase (end of 3rd millennium BP to the recent past)

Following on from (and partially overlapping with) the horse phase, the camel phase is characterised by images of camels, many with riders or with packs, which are depicted in schematic, pecked engravings and crude paintings (Fig. 8.5*b*). These are shown alongside representations of domesticated animals (especially caprines) and occasional wild animals that generally form part of a hunting scene. Domesticated camels are believed to have been present in the Nile Valley from the mid-3rd millennium BP (Rowley-Conwy 1988), and may have been in more general use in the Sahara by the late 3rd millennium BP (Muzzolini 1995). This phase is believed to date from *c.*2000 BP until relatively recently in some areas. The

camel style is often associated with the Tuareg people, whose writing, Tifinagh, is a prolific component of this phase of drawings. The quantity of images of this period varies across the Sahara, and although less widely publicised than the earlier images, they are prolific in the Massāk Ṣaṭṭafat, the Akākūs and also in the Algerian Sahara (for

example, Soleihavoup 1988, 58-62; 1990, 76-82). Sometimes dismissed as ‘modern’ and thus of less interest, they nonetheless represent the activity of people in some of the most extreme landscapes of the Sahara at a point in time long after the climatic shift towards hyper-aridity. They merit more detailed recording.

OBJECTIVES AND METHODOLOGY OF THE FIELD SURVEY IN THE WĀDĪ AL-AJĀL

A few rock-art sites had been noted by CMD and were included in his archive, but only on a limited scale. The main objective of the FP rock-art survey was to establish a broad understanding of the range and extent of rock images in the Wādī al-Ajāl. More specifically, the survey aimed to:

- i. identify new rock-art sites and revisit previously documented locations in order to construct a record of the sample area;
- ii. identify different styles, superimposition, technique, content and patination, from which a preliminary grouping and, ideally, phasing of the images could be developed;
- iii. record the landscape context of rock-art sites in order to identify possible patterning in their distribution;
- iv. relate context and phasing of the images to the archaeological data, and, ultimately to integrate them within a broad interpretative framework;
- v. assess points of similarity and divergence with the rock-art assemblage of the Massāk.

Structure of survey and recording methods

A total of six separate areas were surveyed during the 2000 season (Fig. 8.6), with some follow up work in 2002 (reported on by Barnett 2002, but not fully integrated in this Chapter). Areas were chosen with the intention of sampling a range of different

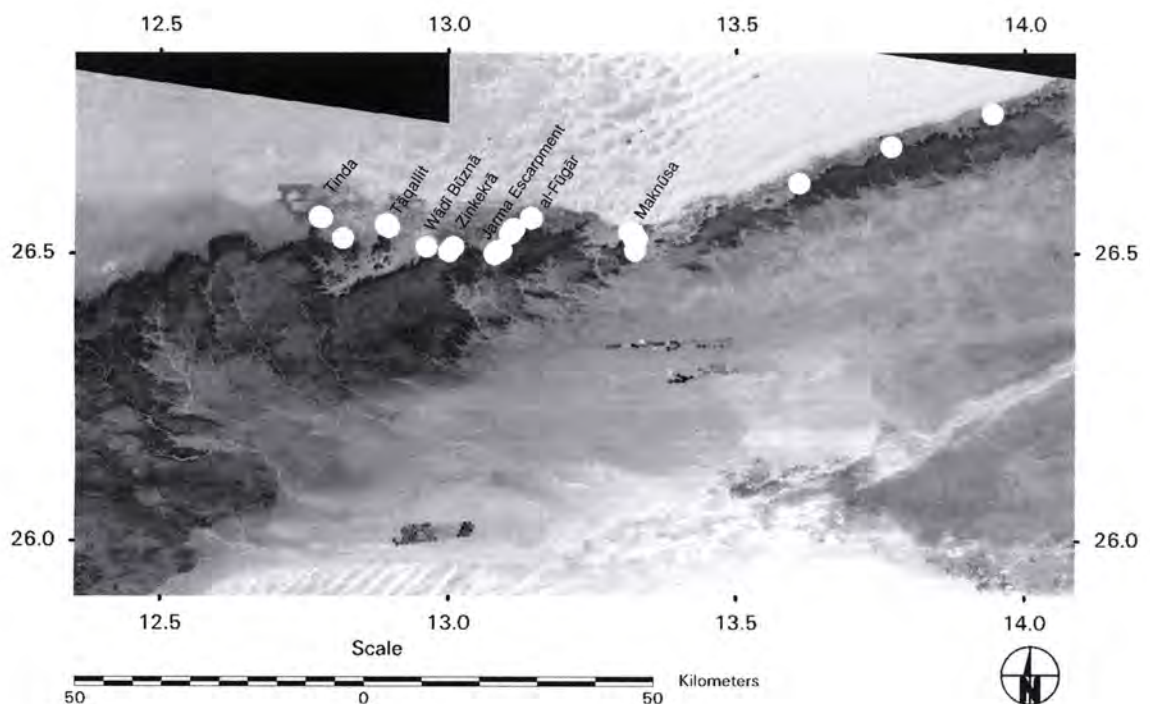


Fig. 8.6. Distribution of rock-art in Wādī al-Ajāl.

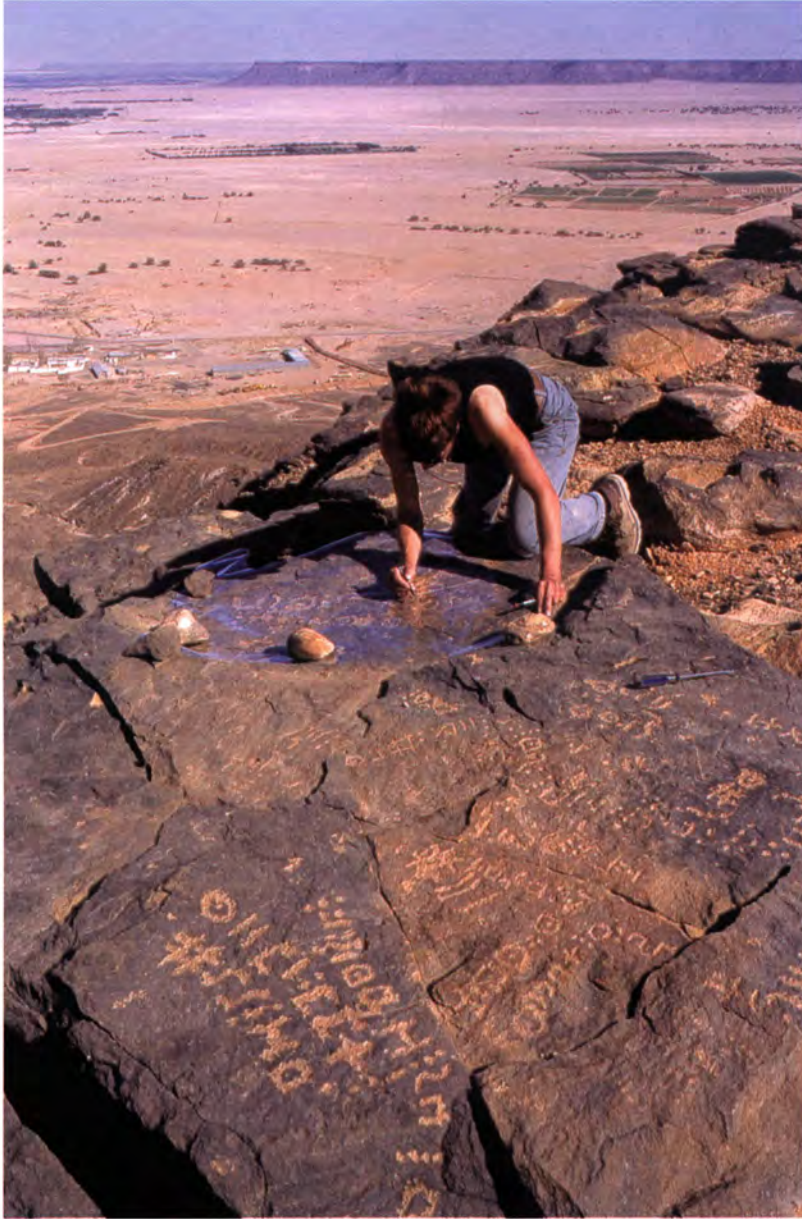


Fig. 8.7. Making a tracing of engravings above Tinda.

topographic locations, and also to focus on landscape ‘types’ that offered the best opportunities for maximising recording in the time available. Consequently, some of these areas were chosen because rock images were already known to exist there; other sample areas were identified on the basis of their particular topographic or archaeological interest.

Each location was investigated thoroughly on foot, and visual and documentary records were compiled for all images or panels of images within each location. The visual record comprised photographs (black and white, colour and slide film) and tracings made with fine-nibbed permanent markers on 75mm thick transparent acetate or 1mm clear polythene (Fig. 8.7). These tracings have subsequently been converted to digital format to provide a more flexible archive and working record (Fig. 8.8).

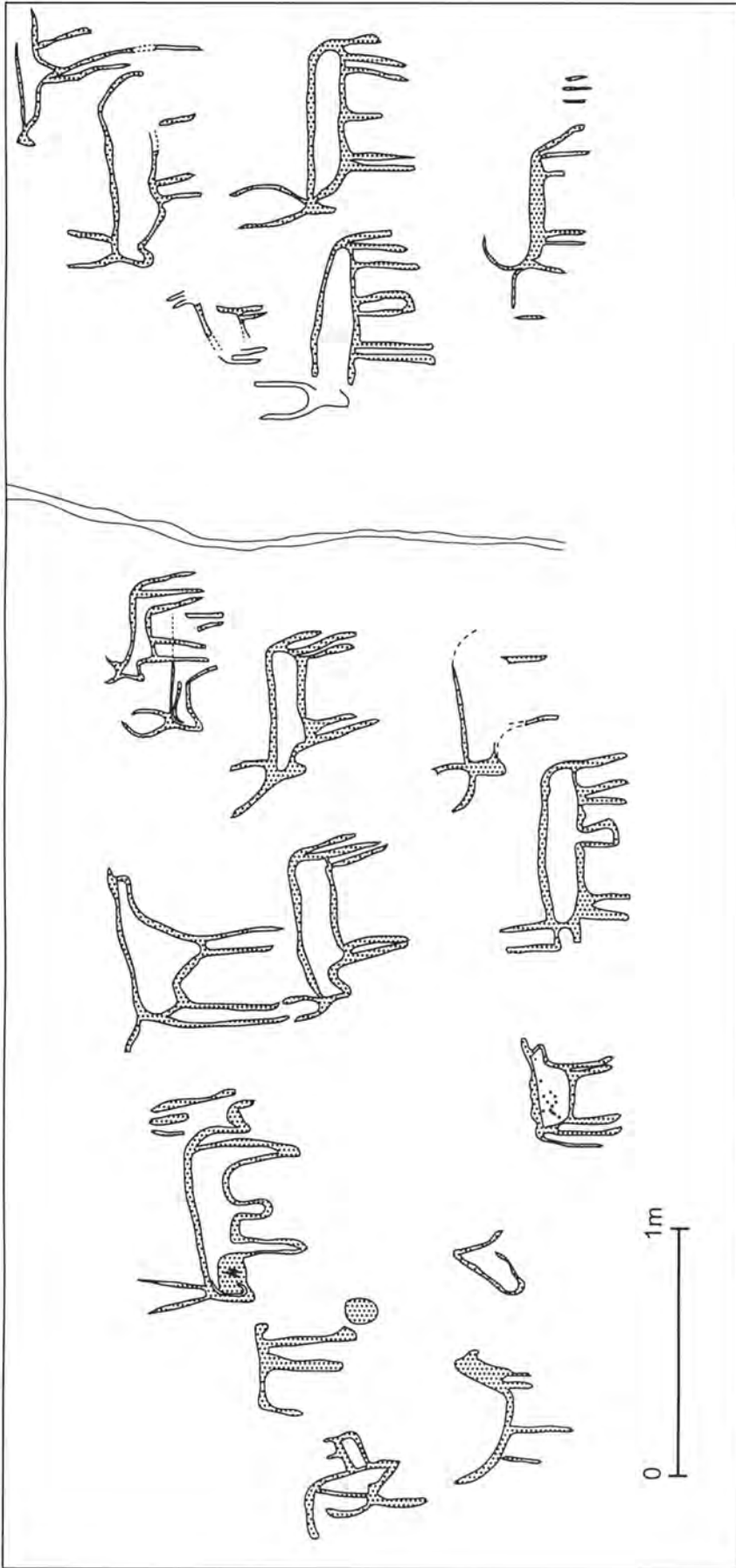


Fig. 8.8. Example of field drawing, showing a large group of bovines (ZIN 902.23-35).



Fig. 8.9. *Content: sandals and inscriptions (TIN 27).*

DETAILS OF THE ROCK ENGRAVINGS OF THE WĀDĪ AL-AJĀL

Content

In common with engravings found across the Sahara, the rock-art of Wādī al-Ajāl comprises images of wild animals (especially giraffe, also elephant, rhinoceros, antelope/gazelle and ostrich), domesticated animals (especially long-horned and short-horned humpless cattle, also sheep/goat, horse and camels), human figures, abstract symbols and inscriptions (Fig. 8.9). These latter are predominately in the Libyan script, some of considerable antiquity, others in the Tuareg version called Tifinagh, although Arabic, European and Asian scripts are also represented. As detailed in the gazetteer, human figures were often associated with or carrying implements of some description. These included metal weapons such as swords and spears, or decorated 'sticks'. In one panel, three two-wheeled chariots or carts were depicted. A summary of the content of rock-art at individual sites is given in Table 8.2.

Technique

All the images in the Wādī al-Ajāl are engraved. Two main techniques were employed: incision and pecking. One group of images are all incised, with a broad, deep, polished outline defining the image, produced by grinding U- or V-shaped lines into the rock, possibly with bone or wood implements and water. Where incisions are used to create

Site	giraffe	elephant	ostrich	other wild	bovid	ovicaprid	horse/ camel	human figure	chariot/ cart	abstract other	Tiffinagh	other inscript.
TIN 27							Camel			sandals, hands	✓	arabic, chinese, european
TIN 20					✓					parachute swastika	✓	
TAG 9	✓		✓				Camel horse	✓			✓	
TAG 22	✓									sandals	✓	
TAG 23				✓		✓	Camel	✓			✓	
TAG 24	✓				✓					✓		
TAG 25										sandals spears? lines	✓	
TAG 28					✓					✓	✓	
TAG 40							Camel	✓				
TAG 41					✓					✓		
TAG 42					✓						✓	
ELH 18	✓	✓	✓	✓	✓	✓		✓		✓		
LGR 26					✓						✓	
LGR 28					✓							
ZIN 279								✓				
ZIN 902.1A	✓					✓						
ZIN 902.1												
ZIN 902.3					✓							
ZIN 902.5, 6, 7											✓	
ZIN 902.9, 10, 11					✓							
ZIN 902.12						✓						
ZIN 902.13, 14								✓				
ZIN 902.16					✓							
ZIN 902.20			✓					✓				
ZIN 902.21, 22					✓					lines		
ZIN 902.23-35					✓							
ZIN 902.36	✓				✓							
ZIN 902.41	✓				✓							
ZIN 902.55-58											✓	arabic

Site	giraffe	elephant	ostrich	other wild	bovid	ovicaprid	horse/ camel	human figure	chariot/ cart	abstract other	Tiffinagh	other inscript.
ZIN 902.55-58											✓	arabic
ZIN 902.59											✓	
ZIN 902.63					✓							
ZIN 902.64	✓											
ZIN 902.65						✓						
ZIN 902.66										sandals	✓	arabic
ZIN 902.67								✓		✓		
ZIN 902.68										sandals		arabic
GSC 41					✓		Horses	✓	✓			
GSC 43								✓			✓	
GSC 45							Horse	✓	✓ ?		✓	
GSC 47					✓			✓ ?				
GSC 49					✓ ?					sandals	✓	arabic
GSC 50											✓	
GSC 51			✓		✓							
TWE 24		✓		rhino	✓		Horse				✓	arabic
TWE 33												arabic
TWE 34					✓							
TWE 41	✓	✓								✓	✓	
FUG 18, 19	✓				✓					lines, heraldic symbol	✓	
FUG 20				antelope / gazelle	✓ ?							
FUG 21					✓						✓	
FJJ 12	✓	✓				✓ ?	Camel	✓				
FJJ 22	✓				✓							
FJJ 23				rhino				✓				
FJJ 24	✓							✓				
FJJ 25	✓											
FJJ 26					✓	✓				abstract		
FJJ 27						✓	Horse	✓			✓	
FJJ 28	✓			feline?	✓	✓	Horse	✓		lines	✓	
FJJ 29			✓		✓	✓				ovoids, spears?		
GHL 1										sandals	✓	Arabic
BNH 19	✓				✓			✓		spears, sandals	✓	

Table 8.2. Summary of rock-art content at all recorded sites (for detail, see the Gazetteer entries in Archaeology of Fazzān 2).



a)



b)



c)

Fig. 8.10. Technique: a) deep and broad engravings (FJJ 27); b) narrow incised lines (BNH 5); c) pecked lines (TAG 9).

later images, the lines are narrower and shallower, and generally V-shaped in cross-section. Other images are just scratched onto the rock surface, possibly using a harder implement such as a metal tool (Fig. 8.10a/b).

The second main technique used is pecking; pounding the rock surface with a stone implement to achieve the desired outline and detail (Figs 8.10c; 8.11). Images produced by the pecking technique tend to be shallower with less precise and often broken outlines. This method was also employed in some of the naturalistic engravings with incised outlines, for example to depict the markings on a giraffe's hide, but is generally associated with more schematic images. In the drawings accompanying this Chapter, stippled lines are pecked work, solid black lines are engraved, and open black linework indicates an underlying image.



Fig. 8.11. Technique: pecked giraffe ZIN 902.8.

Style

'Style' describes a combination of aesthetic principles and method of execution (for example, Sackett 1977). Style can vary according to cultural derivation, technical competence and the purpose of the image. Although there is no direct relationship between stylistic change and cultural change, different styles can often broadly reflect different cultures in space or time. In the Wādī al-Ajāl, different styles can be corroborated with other variables, including extent of erosion, patination and superimposition, to suggest that there was stylistic change over time. To what extent stylistic change can be attributed to cultural discontinuity in the wadi is unclear at present.

Several distinct styles can be identified in the al-Ajāl. These can be grouped into five main categories. They include a vivid, semi-naturalistic style depicting predominately wild animals, especially elephant and giraffe, which are shown in profile with clear distinction between the near-side and far-side limbs. The lines are flowing and continuous, and are

invariably wide, deeply incised and polished. Sensory organs are shown in detail, as are markings on the hide of the animal (for example, reticulated giraffe). The lower limbs and feet of the animals are shown clearly, but are often more stylised. These images are generally large and well proportioned, with some of the largest images at FJJ 12 or ELH 18 measuring 2 m or more in height. It is not uncommon to find many images in this style crowded on a single panel. These images cannot be classed as typical 'naturalistic bubaline', but they do bear certain similarities to engravings of that 'school'. Other attributes, such as superimposition and patination, imply that these are the earliest group of images in the Wādī, although the small sample size precludes any definitive classification of them at present (Figs 8.12-13).

The second stylistic group of engravings demonstrates a more schematic style. Wild and domesticated animals, particularly giraffe, cattle and caprines, and abstract symbols – spears and ovoids especially – are depicted in this style of engraving. Although well proportioned, the animal depictions are smaller and lack the anatomical detail of the earliest group of engravings. Heads and often eyes are represented by a simple triangle, and horns are often greatly exaggerated in length. Lower limbs and feet are generally portrayed by long, tapering lines, often with the two front limbs and two back limbs combined to produce elongated triangles that end in a point, or are depicted only by a single line. The belly of the animal is often depicted as a U-shape (this feature becomes increasingly pronounced in subsequent images). Outlines of these animals are either incised or pecked, and hide markings are also shown by pecking. Sensory organs are rarely depicted in detail (Fig. 8.14).



Fig. 8.12. Style 1, FJJ 12: the treatment of the bodies of the giraffes at the left side is characteristic of Style 1.



Fig. 8.13. Style 1, FJJ 12, detail.

The third stylistic group includes schematic pecked and incised images. This style is associated with the appearance of images of horses and of human figures, many of which are shown riding. Human figures generally comprise a triangle for the torso and stick arms and legs, or a second, inverted triangle depicting a 'skirt'. The head is either stick-like or a simple circle resting on the shoulders (with the striking exception of the so-called 'portrait of the Garamantian' in bas-relief at ZIN 902.18, which is stylistically unique), and hands can be shown in detail, but not in proportion. For the most part the images are rather static and formalised, even when representing 'scenes' of motion (for example, riders on horseback; hunting) (Fig. 8.15). Other domesticated animals and wild animals are shown, generally with a simple, schematic outline and stick-like legs, tail and horns. Heads are shown as simple lines or ovals. There is also greater diversity in the subject matter. Objects



Fig. 8.14. Style 2, FJJ 27 is characteristic of the Tazina style.



Fig. 8.15. Style 3, ZIN 902.22, horseman is representative of the caballine style.



Fig. 8.16. Style 4, TAG 23 is typical of the cameline style.

become important features of the art, particularly in relation to humans, although all are depicted rather crudely, often with a broadly pecked outline that makes any accurate identification difficult for us. Wild and domesticated animals are still depicted, with the emphasis on cattle and giraffe.

The fourth recognisable 'style' is highly schematic, although also lively and almost comic. Pictorial images include camels, humans and domesticated sheep or goats, which may form part of a hunting scene (Fig. 8.16). Cattle and wild animals are rarely depicted (with the exception of gazelle and ostriches). These images are invariably pecked with a crude, broad outline depicting shape without detail. Either two or four legs are shown for the animals. In addition there are a large number of Libyan inscriptions, both associated with figurative images or on their own, at all angles to the horizontal. Outlines of sandals or feet in this style are also prolific, often close to Tifinagh inscriptions or with inscriptions inside them. The content of these engravings is indicative of a more persistently arid environment in the Wādī.

The final style is mostly limited to Arabic and European graffiti, with an occasional, highly schematic image. These engravings are generally shallow and fairly crude – the main exception being the magnificent, deeply incised emblem at al-Fūgār illustrated in Fig. 8.26a. The interpretation and dating of the latter is uncertain, and it is possible that a later inscription has been added to an earlier carving (see below).

It must be emphasised that these stylistic distinctions are tentative as they are based on a restricted sample. There are, in addition, a number of images that lie outside the categories outlined above, such as the naturalistic bovine on the underside of a broken and displaced rock (at TAG 45), and the eroded rhinoceros at TAG 42, about which little can be said at present.

Style cannot be used in isolation as a diagnostic tool. Other attributes of the rock-art also need to be analysed in order to understand the stylistic succession and to construct a relative chronological relationship between the different stylistic groups.



Fig. 8.17. *Superimposition: FJJ 12 - there is a clear case of superimposition involving two giraffes to right of the elephant (cf. Fig. 8.12).*

Superimposition

Superimposition of engravings is not commonplace in the Wādī, with different stylistic groups respecting each other's space. However there are several instances of superimposition, which are critical to our understanding of the localised succession of style. For example, at FJJ 12, semi-schematic giraffe are superimposed over a semi-naturalistic giraffe engraving (Fig. 8.17); at TAG 22, 24 and 42, 'sandals' and inscriptions are superimposed over semi-schematic giraffe. Certain instances of superimposition suggest deliberate and meaningful action (for instance, the interesting example at ZIN 902.41 where a giraffe is directly superimposed over a bovid, reusing the same lines). Occasionally later additions have been made to alter an existing image, for example at FJJ 12 and ZIN 902.41, where crude images of human 'hunters' have been added to an image of a wild animal – a phenomenon common in other areas of the Sahara, such as the Massāk Ṣaṭṭafat.

Patina

Patina is a dark, shiny coating found on rock surfaces across the Sahara, and commonly called 'desert varnish'. It is believed to be formed under humid conditions from metal oxides, especially manganese and iron oxides, which are deposited on the rock surfaces by the wind where they become enriched by bacterial action to form a homogenous microscopic layer. Cutting through the patina exposes the natural oranges and yellows of the sandstone in dramatic contrast to the black patina and it has been suggested (Lutz and Lutz 1995a, 39-40) that this striking effect would have characterised all rock-art when first produced, making it a dramatic feature of the landscape. Over time, depending on prevailing climatic conditions and relative exposure, the exposed areas will gradually darken and change colour as a patina reforms. Although it is not possible to calibrate the rate of patination of the image, that is, the variation in colour of the images relative to time, it is generally accepted that the darker the patina, the older



Fig. 8.18. Patina: this example from TIN 20 shows at least four phases of engravings, differentiated both by technique and degree of patination.

the image (Cremaschi 1992; 1994; although see Lutz and Lutz 1995a, 39). A second, reddish patina has also been identified (Cremaschi 1992), believed to be produced from iron oxide-enriched bacterial growth during more arid conditions. Engravings with a redder patina, such as the highly schematic images of camels, are therefore believed to have been engraved during recent periods of increased aridity over the past 2,000-2,500 years. Variations in patina may thus be used to work out the relative age of an engraving (Fig. 8.18).

CLASSIFICATION AND SEQUENCING OF ENGRAVINGS IN WĀDĪ AL-AJĀL RELATIVE TO THE MASSĀK

Collating the various diagnostic features of the images from the Wādī allows us to identify a succession for their production that corresponds to the five broad stylistic categories for Wādī al-Ajāl. Five consecutive categories of images were identified. These are described below and summarised in Tables 8.3-8.4. They have been classed here as different 'phases', although they should not necessarily be considered as separate, autonomous groups, and there may be considerable overlap between them. Full details of all sites are published in the *Gazetteer* volume.

Working within the constraints of the small sample size from the Wādī al-Ajāl and the limitations of a relative chronology, the various styles of the rock engravings from the Wādī can be broadly correlated with the styles of painted rock-art in the Tāssīli and the Tadrart Akākūs, despite the fundamental differences in artistic technique between the two media (see Mori 1998, 93-114, for his most recent exposition on painted art). This relationship is illustrated in Table 8.1 above. It should be stressed that these categories and the proposed relative chronology for the engravings of the Wādī remain tentative. The main purpose of this exercise is to demonstrate that there are a

series of different, successive stylistic groups here, which span several thousand years, enduring from a prehistoric pastoral phase to the present day.

Naturalistic Bubaline (c.7000–4500 BP)

Typical naturalistic bubaline style engravings appear to be absent from the Wādī al-Ajāl despite the relative proximity of the extensive naturalistic bubaline engravings of the Massāk Ṣaṭṭafat and Mallat. There is, however, a group of semi-naturalistic engravings in the Wādī that share distinct stylistic features with the naturalistic bubaline, including depictions of markings and sensory organs, realistic proportions, size and movement, and these appear to be the earliest style of engravings in the Wādī. These images have been termed ‘Phase I’ for the purpose of this study. They can provisionally be dated to the period preceding the post-Neolithic arid phase, that is, sometime before c. 4500 BP. The small sample size precludes any further categorisation of this group of images at present.

Tazina (c.5000–2800 BP)

The presence of Tazina style engravings in the Wādī (especially FJJ 20-29, in the Maknūsa Pass) is highly significant as it represents the most easterly occurrence of this style currently reported in the Sahara (Muzzolini, pers. comm.), and it raises questions concerning the relationship between Wādī al-Ajāl and the surrounding regions. These images have been termed ‘Phase II’ here.

Horse or Caballine phase (3rd–2nd millennium BP)

The horse phase is well represented in the Wādī al-Ajāl, including the representation of three two-wheeled chariots or carts at the GSC 41 site. There are also a number of typical ‘caballine’-style human figures in the sample. These are all termed ‘Phase III’ for this study.

Camel phase (end 3rd millennium BP to the recent past)

Engravings belonging to this stylistic category, especially sandals or feet outlines (Fig. 8.19) and Tifinagh inscriptions, are prolific in Wādī al-Ajāl. These form the largest stylistic category and are collectively termed ‘Phase IV’.

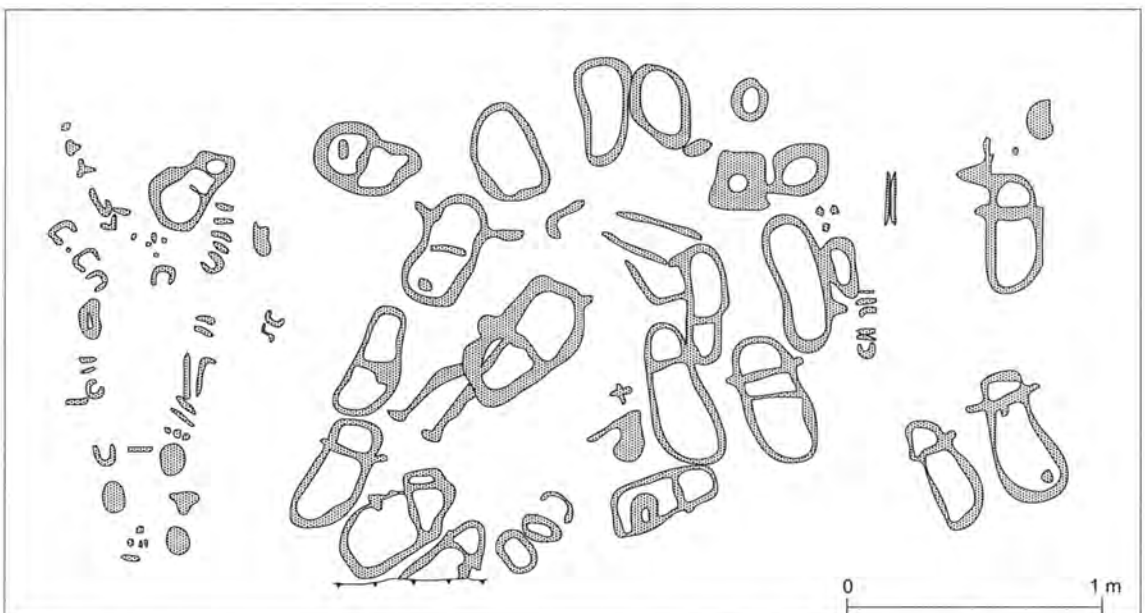


Fig. 8.19. Sandals or feet are a very common theme at certain locations (TAG 22).

Classification of attributes	Phase
Semi-naturalistic images of wild and domesticated animals (predominately giraffe and long-horned or short-horned humpless cattle with upward pointing horns). Deeply incised, wide, flowing and often polished outlines, u-shaped in cross-section. Images are generally large (up to 2 m high), showing detail of hides and sensory organs, although feet are more schematically represented. Images often crowd a rock surface, although with negligible superimposition. Dark grey patina.	I
Semi-schematic pecked and incised images of wild animals and domesticated humpless bovids, sheep and goats. More shallow engravings, variety of techniques and narrower outlines, often polished. Fewer large images, although still some detail of hide markings. Limbs and feet often represented as elongated triangles ending in a point, or as elongated lines. The underside of the animal often represented as an inverted u-shape. Heads are often depicted in profile as a simple triangle, often with a defined eye, and horns are exaggerated in length. Abstract symbols, including ovoids and possible spears. Lighter grey patina.	II
Schematic and increasingly geometric pecked and incised images. Narrow outlines with incisions and broad outlines with pecking. Greater variety of subjects including wild animals (predominately giraffe), domesticated cattle, sheep and goat, horses and human figures, often on horseback. Giraffe can be depicted with trapping stones. Human torsos generally represented by triangles, heads and limbs by lines or circles. Representation of material objects and symbols including weapons, decorated sticks (?), discs and decoration associated with cattle, also carts or 2-wheeled chariots. Overt male symbolism displayed in cattle gender and male 'warriors'. Attention to symbols rather than anatomical detail. Grey/white patina.	III
Schematic and often crude images with broad, rough-pecked outlines. Images are dynamic despite schematisation. Camels depicted, often with riders. Domesticated sheep and goat also shown, but cattle are rare if non-existent. Few wild animals, although 'hunting' scenes may be depicting wild sheep. Human figures shown crudely, often on camel-back and carrying weapons of some description. Prolific Tifinagh inscriptions – various sizes and often associated with or inside engraved outlines of feet or sandals. Occasional abstract symbols. Light grey or orange/red patina.	IV
Pecked and incised graffiti in Arabic or European script. No patina.	V

Table 8.3. Stylistic succession of rock images in the Wādī al-Ajāl.

Inscriptions (last 2000 years)

There are numerous inscriptions in a variety of scripts in the Wādī, including Arabic and European, which date to the more recent past. Occasionally these are accompanied by iconic images which still have a resonance for the present inhabitants of the Wādī. These are termed 'Phase V'.

Wādī al-Ajāl and the rock-art of the Massāk

Although an attempt is made here to equate the al-Ajāl art to a broader temporal and stylistic framework, there are elements that suggest that it should be treated as a semi-autonomous phenomenon rather than an outlier to a better known and more prolific body of art, such as that of the Massāk. There are certainly elements of the rock-art repertoire recorded on the Massāk that are absent or under-represented in the Wādī al-Ajāl, such as theranthropic scenes (mainly human figures with animal heads: see Camps 1997a; Lutz and Lutz 1995a, 145-64; van Albada and van Albada 2000 for details of theophoric images in the Massāk) or imagery of an explicit sexual nature (ithyphallic figures, the so-called 'femmes ouvertes' or scenes of coitus: Beltran 1993; Lutz and Lutz 1995a, 169-75; *Encyclopédie Berbère*, s.v. Fazzan, 2793-95).

Phase	Approximate date (BP)	Corresponding phase for Fazzān
I	pre-4500 (perhaps starting as early as 7000)	Current survey data lacks exact correlates. Certain similarities with naturalistic bubaline, but may form a localised group.
II	5000-2800	'Tazina' phase.
III	2700/2500-2000	Horse or caballine phase.
IV	2000-recent	Camel phase.
V	Recent-present	

Table 8.4. Classification of image attributes in the Wādī al-Ajāl relative to the chronological classification for Fazzān. (Note: 'Phase' numbers are those used to refer to the Wādī al-Ajāl material, and Phase I may begin earlier elsewhere in Fazzān. Approximate dates are adapted from Muzzolini 1991, 1992).

Whilst it is possible that one of the factors here may be sample size and preservation (sexual imagery is less likely to survive intact close to modern habitation), there do seem to be significant differences in emphasis in the themes of the two areas, coupled with clear distinctions in the locations in which the art is found. On the Massāk, the art is primarily found in the series of wādīs cut down through the plateau and running north-west to south-east (Fig. 8.20). Scenes were often cut on vertical rock surfaces, though also on fallen blocks and boulders alongside the wādīs. Some engravings are associated with rock shelters in the cliffs alongside wādīs. There is also a noted concentration of major complexes of engravings of all types and dates close to seasonal water holes (*gueltas*), rocky basins in the wādī floors where standing water can be found after rains (van Albada and van Albada 2000). In the absence of springs on the Massāk, such seasonal water sources have been of prime importance ever since the wādīs ceased to be permanent streams and rivers in the late Pleistocene.

The repertoire of scenes includes:

1. Wild animals of the Bubalus phase, many depicting the later extinct bovine with its massive horns (Lutz and Lutz 1995a, 102-07);
2. Many wild animals depicted in the later styles, sometimes clearly being hunted by human figures (in decreasing order of numerical importance, the most common are ostriches, giraffes, elephants, rhinoceros, buffalo, aurochs). Some scenes show the use of snares attached to heavy rocks (so-called trapping stones) to impede the movement of the prey (Lutz and Lutz 1995a, 66-90 [wild animals in general]; 52, 61, 91-96, 130-31 [general hunting]; 97-101 [trapping stones]; van Albada *et al.* 1994, 48-55; van Albada and van Albada 2000, 32, 71);
3. Domesticated cattle (by far the most commonly represented of all animals), donkeys, sheep and goats – animals are shown with various harnesses and horn adornments, cows being milked, etc. (Lutz and Lutz 1995a, 114-28);
4. 'Fertility' imagery, encompassing both sexual scenes and animals giving birth or associated with depictions of the placenta (Lutz and Lutz 1995a, 169-75);
5. Human figures, both male and female, often depicted in considerable detail of costumes, hairstyles and engaged in a wide range of activities (Lutz and Lutz 1995a, 129-44). Some scenes involve music or dancing (cf. Viallet 1995);
6. Scenes depicting the human hand or showing humans with hands raised (the orant pose) or touching animals (Le Quellec 1992);

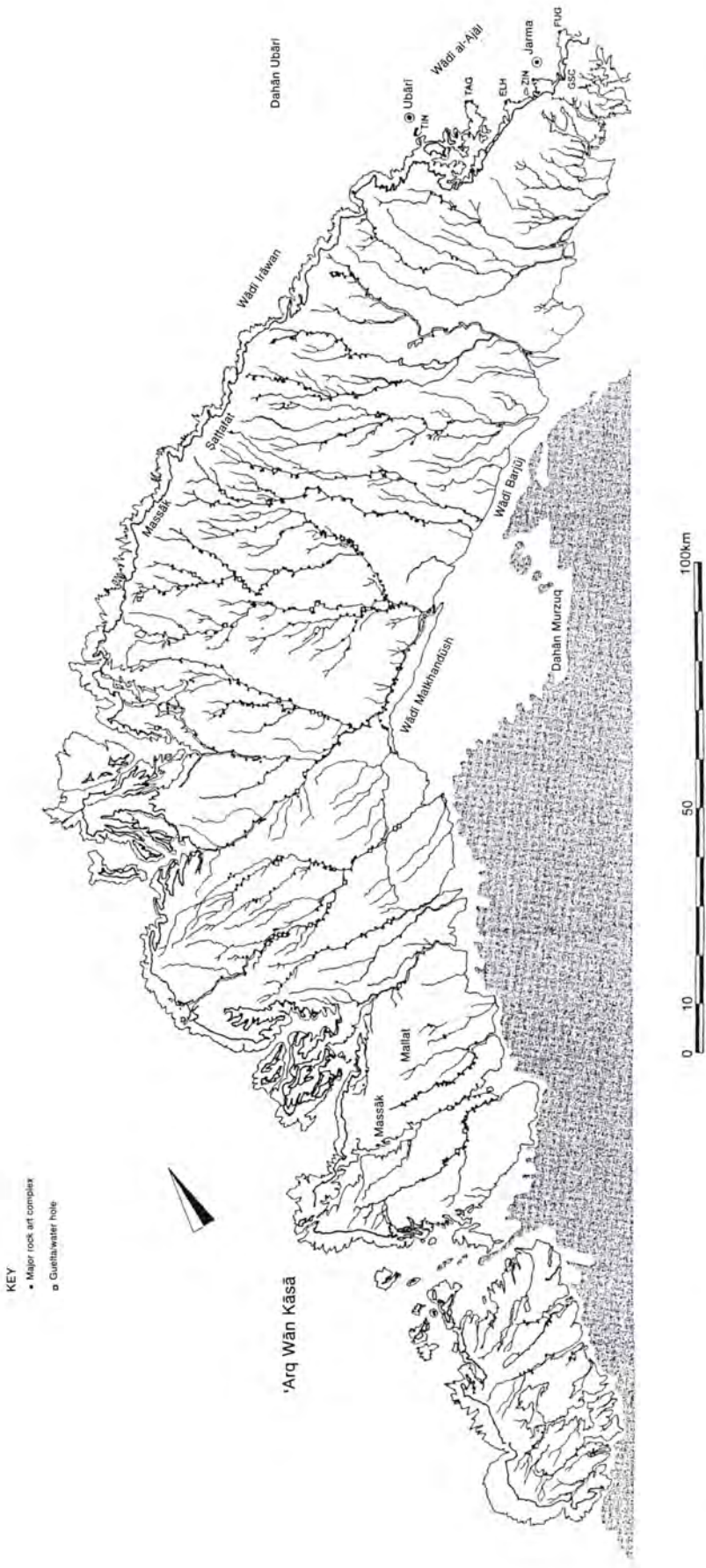


Fig. 8.20. Distribution map of rock-art in the Massāk Šaiṭfaṭ/Mallat and its relationship to the Wādī al-Ajal (adapted in modified form from van Albada and van Albada 2000).

7. Theophoric representations of animal-headed people or gods. Some scenes may depict ritual dances of masked humans, but others appear to be based on imagination or spiritualism (dog-headed figures – lycaon) are sometimes shown demonstrating superhuman strength to bring down a variety of big-game animals (see Camps 1997; Lutz and Lutz 1995a, 145-64; van Albada and van Albada 2000);
8. Horse and chariot scenes are generally rare in the Massāk (though c.10 locations are listed by Gauthier and Gauthier 1994b; cf. Lutz and Lutz 1995a, 63);
9. Some scenes may include representations of date palms, though the interpretation is not certain and the scenes are rare (the painted art of the Akākūs contains a number of unequivocal representations of palms of the caballine Phase: Mori 1969, 28);
10. Numerous examples of the cameline style, featuring camels, people, flocks of goats, hunting of ostriches and gazelle, etc. (Lutz and Lutz 1995a, 64).

Of these image types, all are present in the Wādī al-Ajāl, though (4) is represented by a single example of an ithyphallic ‘Bes’ figure from Maknūsa (Pauphillet 1953, pl.VI.1), and (6) by a human with bovine head at GSC 41. However, the relative proportions of all the different image groups differ, with groups (4)-(6) much less common than on the Massāk, and proportionally there is a higher occurrence of art of the caballine phase in the Wādī. Hunting scenes using trapping stones are rare in the Wādī al-Ajāl (ZIN 902.64), and the actual trapping stones have not been found here, though they are common on the Massāk plateau and further west in the Wādī Irawān (on the use of trapping stones in hunting, see Chapter 9 below, also Le Quellec 1990b; Lutz and Lutz 1995a, 97-101; van Albada *et al.* 1994, 48-55; van Albada and van Albada 1993, 552-53; 2000, 32 and 71). These differences between the two areas may support the view that there was specificity between representation and topographic location, with, to some extent, different cultural agendas being followed on the Massāk and on its northern flank along the edge of the Wādī.

We now have an appreciation of the possible temporal patterns formed by the rock-art of the Wādī al-Ajāl, and how these may relate to a wider Saharan context. This framework provides us with a foundation for more detailed discussion of the rock-art of the Wādī al-Ajāl and of its relationship to the landscape.

LANDSCAPE, TOPOGRAPHY AND LOCATION OF IMAGES

Power of place

Beyond description and classification of rock-art, we are concerned with its meaning. Rock-art is part of an eloquent system of communication and expression belonging to past cultures. Understanding what the rock-art means provides us with a deeper insight into these cultures, what they valued and believed and how these values and beliefs were perpetuated. This can help to guide and enrich archaeological enquiry. However studying rock-art in isolation only produces circular debate – some ‘handle’ on the past is essential, either from ethnography, ethnohistory, archaeology or some related topic that can provide an informed context through which to study and interpret the art. Given these requisites, rock-art and archaeology are summative and symbiotic.

The FP provides such a context through excavation and detailed archaeological and geomorphological survey. Building on this ‘handle’ to the past, we can assess the contribution the rock-art makes in providing an additional dimension of information about the people who inhabited or used the Wādī in the past. This information could help to guide future archaeological research in the Wādī and elsewhere in Fazzān.

As described above, a considerable quantity and range of images were identified and recorded during this project. Beyond a purely descriptive appreciation of the ‘artistic’ achievements of those who made the engravings, what can these images actually tell us? How can they contribute to our understanding of the perceptions, beliefs and practices of the people that created them?

The rock-art survey concentrated on recording the content of the images in addition to their context with respect to the landscape and to local topographic features. This approach provided some fascinating and intriguing preliminary results, discussed below.

Landscape and Topography

The contemporary landscape of the Wādī al-Ajāl is polarised between the vegetated and irrigated wādī, running east to west, and the arid, barren landscapes of the Ubārī sand sea to the north and the Massāk Ṣaṭṭafat to the south. These arid landscapes are uncompromising environments where, away from the few water sources, human life is non-viable unless highly mobile. As indicated in Chapters 2 and 7, perennial or seasonal desert water sources appear to have been more abundant or more reliable in the past, even in the period after the onset of the fully arid phase *c.* 5000 BP, but would not have sustained fully sedentary existence even during hyper-humid phases. Because of the need for mobility, the lifestyle of people exploiting these landscapes is in direct contrast to the settled agricultural existence pursued in the Wādī.

The rocky plateau (or ḥamāda) of the Massāk terminates abruptly in a steep, rocky escarpment dropping 100 m or so to the floor of the Wādī. Along much of the escarpment, sheer sandstone cliffs make the upper limits impassable for humans or animals. However, the escarpment is punctuated by occasional steep gullies cutting down from the hamada to the Wādī, some of which allow somewhat difficult ascent. The best natural route up onto the central Massāk from the north is via the Wādī Būznā, in the area south of al-Ḥaṭīya and al-Ghrayf. Two important rock-art sites have been noted along this corridor, the most impressive (ELH 018) on a rocky pinnacle where it debouches into the main plain of the Wādī al-Ajāl (Jelínek 1994; Pesce 1968), and a second *c.* 11 km to the south-west (Le Quellec 1985a). Other clusters of rock-art have been recorded in minor water courses cut into the front of the escarpment south of Jarma (GSC 41, 43, 45, 47, 49-51). Access to the eastern end of the Massāk and through it to the Wādī Barjūj to the south is most feasible at the single major natural pass, the Bāb al-Maknūsa (Pesce 1968, 109). A number of images have been recorded previously in the Maknūsa pass by Zoli (1926; 1927) and Pauphillet (1953); these correspond with FP sites FJJ 12 and 22-29 (see now, Barnett 2002). The western edge of the Maknūsa pass defined the easternmost extent of our detailed survey, though a few images were also recorded in reconnaissance work in the eastern sector of the Wādī (for example, BNH 19).

In a number of places the escarpment juts out into the Wādī in a series of promontories that terminate abruptly in steep, narrow projections. These form pronounced topographical features, which naturally enclose embayments and dominate the landscape of the Wādī. In some cases they create narrow *passages obligés* between escarpment and oasis cultivation, as at Tinda, Tāqallit, Zinkekrā and al-Fūgār, and, as discussed below, these locations often contain complexes of rock engravings (TIN 20, 27, TAG 22-25, 28, 40-42; ZIN 902, FUG 18-21) (Fig. 8.21).

Location of images

The sites recorded by this survey demonstrated a discrete, patterned distribution in this landscape that appears to correlate with natural, topographic features. This patterned distribution can be summarised as follows:

- i. All sites were located along the escarpment; that is, at the interface between the different environments of the Wādī and the ḥamāda;
- ii. Engravings from all stylistic groups discussed above recurred at the same locations;



Fig. 8.21. The Tāqallit complex. Rock-art concentrates in a series of points at the base of the escarpment (e.g. TAG 22-25) and at the summit far above (TAG 9).

- iii. Sites were distributed along the escarpment edge of Bāb al-Maknūsa, which provides the main route of access between the Wādī and the Wādī Barjūj;
- iv. Many sites were concentrated at the ends of the promontories;
- v. At the ends of the promontories, sites displayed a bimodal distribution. The main group lay around the base of the promontory (at the interface between the Wādī and the escarpment), with a further, smaller collection of sites positioned at the uppermost tip of the promontory, at the very edge of the hamada;
- vi. Finally, some groups of images cluster adjacent to channels that cut down through the escarpment.

The location of all sites are detailed in Table 8.5 and illustrated in Fig. 8.6. Further details are published separately in the Gazetteer (*Archaeology of Fazzān 2*). The nature of the apparently discrete clustering of the images is discussed below.

Site	Location relative to topography
TIN 27	Base of escarpment, promontory
TIN 20	Top of escarpment, promontory
TAG 9	Top of escarpment, promontory
TAG 22	Base of escarpment, promontory
TAG 23	Base of escarpment, promontory
TAG 24	Base of escarpment, promontory
TAG 25	Base of escarpment, promontory
TAG 28	Base of escarpment, promontory
TAG 40, 41, 42	Base of escarpment, promontory
ELH 18	Below top of escarpment, promontory
LGR 26	Base of escarpment, promontory
LGR 28	Base of escarpment, promontory
ZIN 902.1A	Below top of escarpment, promontory
ZIN 902.1	Below top of escarpment, promontory
ZIN 902.3	Below top of escarpment, promontory
ZIN 902.5, 6, 7	Below top of escarpment, promontory
ZIN 902.9, 10, 11	Below top of escarpment, promontory
ZIN 902.12	Below top of escarpment, promontory
ZIN 902.13, 14	Below top of escarpment, promontory
ZIN 902.16	Below top of escarpment, promontory
ZIN 902.20	Below top of escarpment, promontory
ZIN 902.21, 22	Below top of escarpment, promontory
ZIN 902.23-35	Below top of escarpment, promontory
ZIN 902.36	End of escarpment, promontory
ZIN 902.41	Below top of escarpment, promontory
ZIN 902.55-58	On masonry wall on top of escarpment
ZIN 902.59	On masonry wall on top of escarpment
ZIN 902.63	Below top of escarpment, promontory
ZIN 902.64	Below top of escarpment, promontory
ZIN 902.65	Below top of escarpment, promontory
ZIN 902.66	Below top of escarpment, promontory
ZIN 902.67	Below top of escarpment, promontory
ZIN 902.68	Below top of escarpment, promontory
GSC 41	Palaeostream channel, edge of escarpment
GSC 43	Palaeostream channel, edge of escarpment
GSC 45	Palaeostream channel, edge of escarpment
GSC 47	Palaeostream channel, edge of escarpment
GSC 49	Palaeostream channel, edge of escarpment
GSC 50	Palaeostream channel, edge of escarpment
GSC 51	Palaeostream channel, edge of escarpment
TWE 24	Base of escarpment
TWE 33	Base of escarpment
TWE 34	Below top of escarpment, promontory
TWE 41	Base of escarpment
FUG 18, 19	Base and middle of escarpment, promontory
FUG 20	Base of escarpment, promontory
FUG 21	Base of escarpment, promontory
FJJ 12	Mid-top of escarpment, promontory
FJJ 22	Base of escarpment, Bāb al-Maknūsa
FJJ 23	Base of escarpment, Bāb al-Maknūsa
FJJ 24	Base of escarpment, Bāb al-Maknūsa
FJJ 25	Base of escarpment, Bāb al-Maknūsa
FJJ 26	Base of escarpment, Bāb al-Maknūsa
FJJ 27	Base of escarpment, Bāb al-Maknūsa
FJJ 28	Base of escarpment, Bāb al-Maknūsa
FJJ 29	Base of escarpment, Bāb al-Maknūsa
GEL 1	On prominent detached hill (The Pyramid)
BNH 19	On prominent detached hill

Table 8.5. Summary of site location relative to topography.

DISCUSSION AND PRELIMINARY INTERPRETATION

The above discussion has established a broad temporal and spatial framework for the rock-art, and this framework furnishes us with the basis for greater understanding of the meaning of the engravings and their possible role for the cultures that occupied the Wādī al-Ajāl. Recording the rock-art in relation to the natural topography produced a number of interesting observations which may in turn provide a key to the social and ideological landscapes of the past. Three of these observations are explored in more detail below, using one specific site to illustrate a particular interpretative perspective.

Rock-art and place. Case Study 1: Tāqallit

Rock drawings are deliberately located in specific places in the landscape and can be a powerful feature of it. The drawings are immovable and they are constantly visible – their relationship with the landscape cannot be ignored (Bradley 1997). There is often a powerful relationship between rock-art and natural topography, yet this is a relationship that is rarely considered in rock-art studies. As Bradley (2000) points out, rock-art is either considered on a very local scale (such as the micro-topography of a French cave in relation to Palaeolithic images), or on a very broad level (for example, the relationship between Scandinavian rock carvings and changing sea levels), not at an intermediary level that encompasses a tangible scale of landscape.

In the Wādī al-Ajāl, the escarpment was a focus for certain specific human activities in the past, as detailed elsewhere in this volume. In particular, it was the focus for the numerous cairn cemeteries of the Garamantian period – a place for the dead – and the foggaras, which channelled water to the fields and settlements of the Wādī – a source of life. Many of the cemeteries and foggaras were concentrated preferentially around promontories, some of which were also developed in the early 1st millennium BC as settlements (for example, Zinkekrā).

All rock-art sites identified by this survey and by previous reports are located along the escarpment edge. While there is an obvious functional explanation for the absence of engravings in the Wādī and the sand sea, where no suitable rock surfaces exist, the rock-art sites also demonstrate an apparently discrete patterning along the escarpment, with concentrations of sites associated with specific topographic features. The following relationships were noted:

- The majority of sites were clustered around promontories;
- The majority of images at the promontories were in easily accessible locations around the base of the escarpment, at the interface between the different landscapes of the Wādī and the escarpment;
- Where examined, all promontories with images around their bases also had a small cluster of images at the uppermost tip, where the hamada ended. These sites were all difficult to reach and had extensive views over the Wādī;
- There were few petroglyphs on the intermediary slopes. Where they were found, they were invariably closely associated with ancient springlines (for example, Tinda, al-Fūgār);
- Although there is a low occurrence of isolated images all along the escarpment, few concentrated sites were found away from the promontories. The main exceptions were the images lining the western edge of the Maknūsa pass, connecting Wādī al-Ajāl and the Murzuq ḥamāda, and the images along the Wādī Buznān and the palaeochannel cutting through the escarpment south of Jarma (described in case study 3 below) – all of which are lines of passage from the Wādī al-Ajāl onto or through the Massāk.

The relationship between rock-art and escarpment topography is most pronounced at the site of Tāqallit. Tāqallit is a dramatic promontory, jutting out into the Wādī with a characteristic profile – sheer sandstone cliffs for the upper 10-20 m with steep, boulder-strewn slopes below for a further 100-200 m (Fig. 8.21). Away from the promontory terminus, the slopes are bisected by a series of old stream beds cutting from the top of the escarpment down to the Wādī. The ḥamāda is accessed today only by scaling the cliff face at the top of the escarpment or by scrambling up the line of an old stream bed. The base of the escarpment is peppered with burial cairns, and long lines of foggaras extend from the promontory deep into the Wādī.

Prolific engravings are concentrated around the base of the Tāqallit promontory on large, isolated boulders and areas of exposed bedrock. A range of different techniques, styles and subjects were depicted, from all the five Phases identified above, all within a relatively confined area. Although some surfaces were crowded with images, in general there was little superimposition, with each new image allocated its own space and the space of existing images respected (Figs 8.22-8.24).

Several of the images at Tāqallit displayed possible ‘symbolic devices’ – for example one bovid had a decorative



(a)



(b)



(d)



(c)

Fig. 8.22. TAG 22-25, selected images: a) TAG 24 bovines (one with solar disc); b) TAG 22 sandals and inscriptions; c) TAG 23 ‘spears’; d) TAG 23, man hunting Barbary sheep (?) with spear

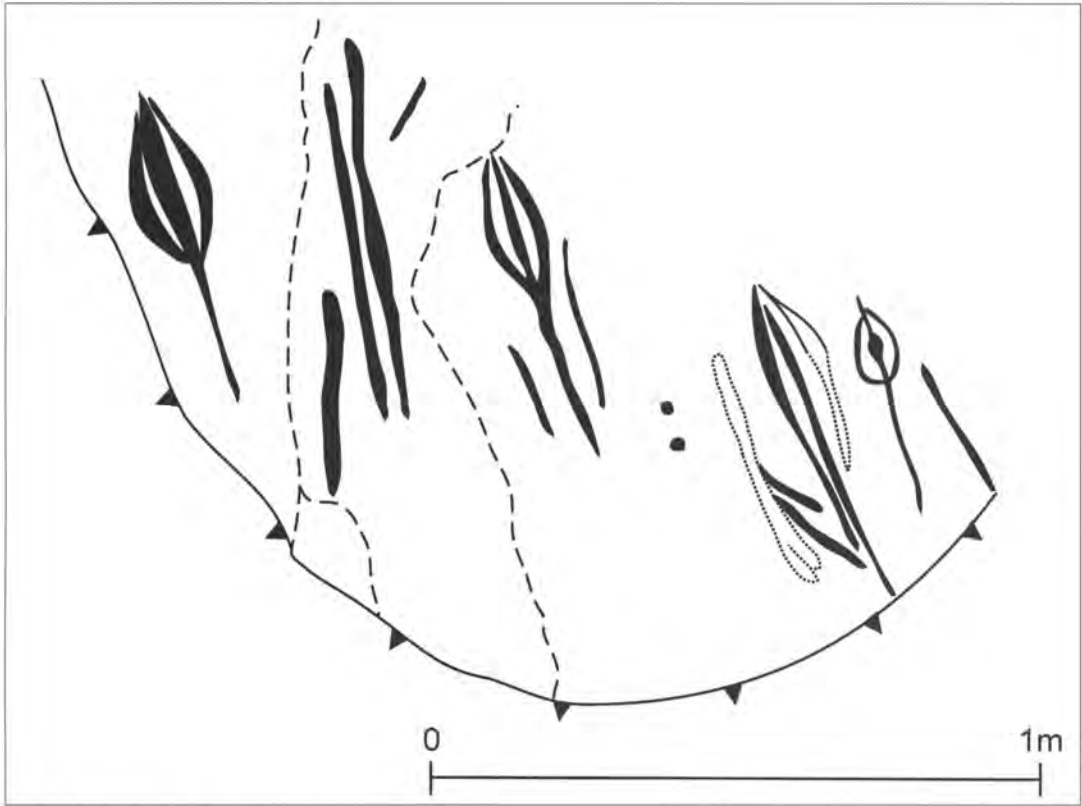


Fig. 8.23. TAG 23, spears.

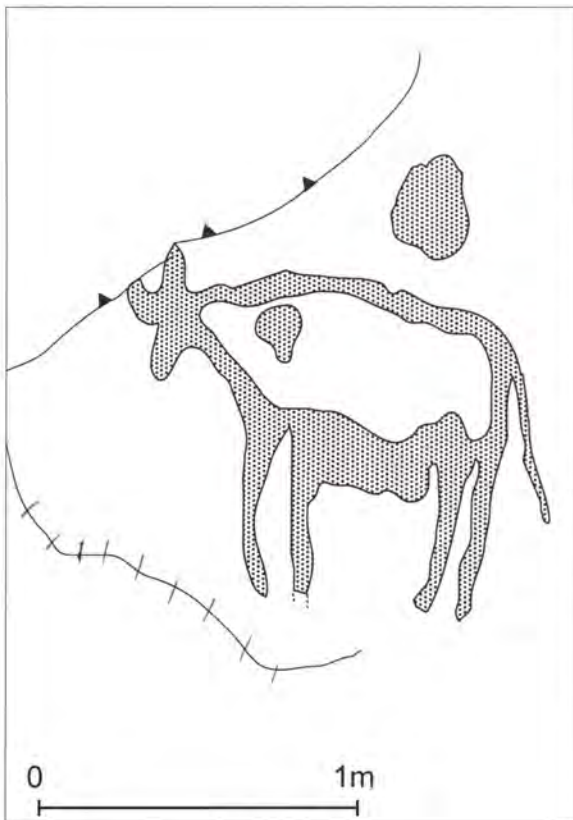


Fig. 8.24. TAG 25, bovine.

'saddle' on its back, another was associated with a disc close to its head and one appeared to have a disc between its horns. Other bovids had 'decorated' horns ('decorated' domestic animals are a well-known feature of naturalistic bubaline and Tazina images, for example the 'adorned rams' of the Atlas mountains: Lhote 1970). These features are commonly associated with a system of belief and ritual, possibly centring on domesticated cattle or stock (Lutz and Lutz 1995a, 114-28; van Albada *et al.* 1994, 36-38; van Albada and van Albada 2000, 47, 49, 74-75). A number of decorated surfaces also had what could be termed 'axe' sharpening or polishing marks – a phenomenon observed elsewhere in this region (for example, al-Fjayj), and possibly having ritual connotations.

The concentration of rock-art is very confined around the promontory base. Moving away from the promontory terminus, the frequency of rock-art decreases rapidly. A second, smaller

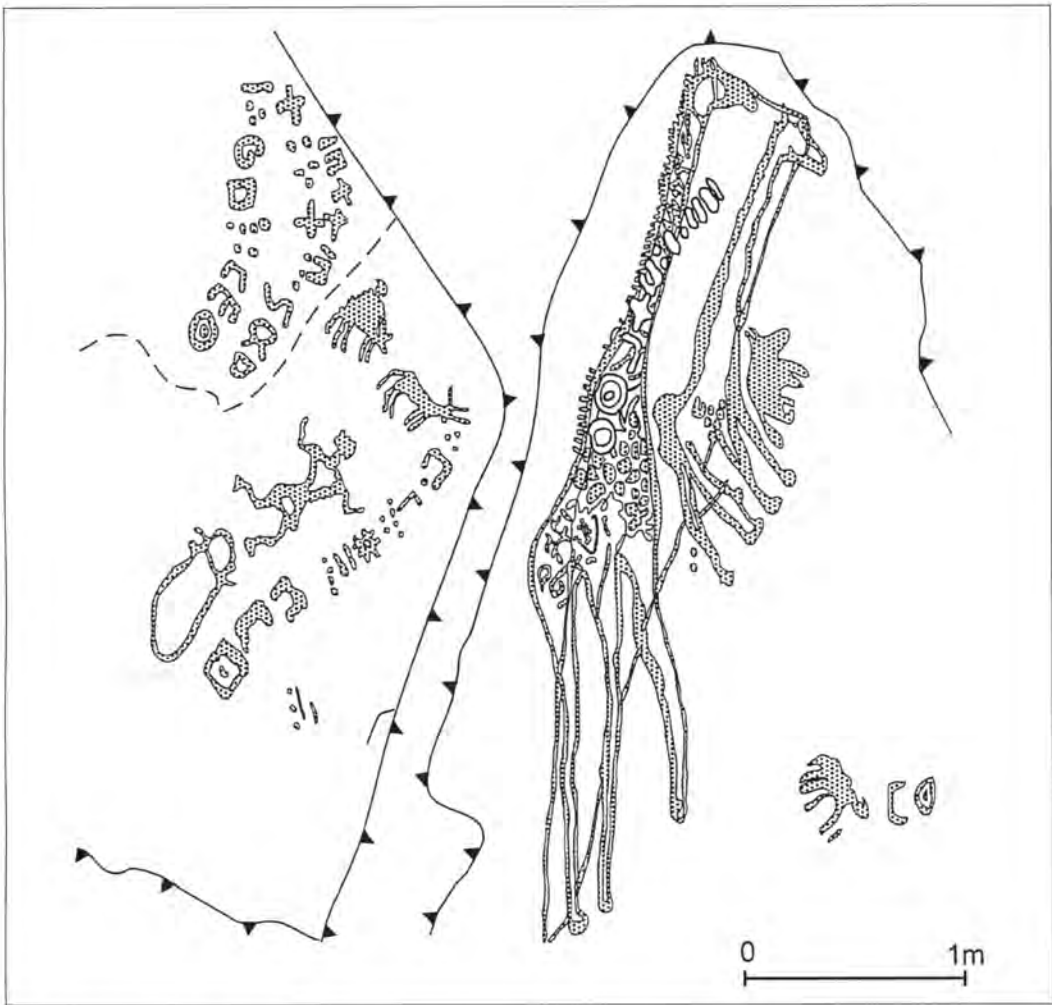


Fig. 8.25. TAG 9, promontory top. Images of all four styles.

concentration of images is located on the hamada at the tip of the promontory terminus, directly above the images on the lower slopes, to which access was difficult. These engravings are pecked (though the 4 m-high giraffe has a quite deep outline) and included images from several separate phases (Fig. 8.25, cf. 8.30).

In summary, the rock-art of Tāqallit displays a rich aggregation of symbolism, which possibly extends over a considerable period of time. The patterned distribution relative to the escarpment features and, in particular, the termini of the promontories, suggests that these held special cultural significance and meaning.

In addition there are two distinct groupings of engravings, one around the base of the escarpment and the second at the top of the escarpment. This suggests a deliberate partition of images between two contrasting topographical locations or 'types' of landscape, one of which is open, visible and easily accessible, the other hidden and difficult to reach. Dichotomy in accessibility of images at many sites (very easily accessible versus very inaccessible) suggests that there may have been exclusive access to certain images and the knowledge or information that they represented (Bradley, forthcoming). Research on this phenomenon elsewhere in the world suggests that access may have depended on the identity and cultural background of the individual 'reading' the art. Certain levels of access, and therefore knowledge, may have been excluded from different sectors of society. Differential access to knowledge may have provided a mechanism for intellectual control and may have been an important source

of power. For example, Bradley (2000), writing on European rock-art, suggests that the least accessible images are also the hardest to 'read', that is, the most abstract, and therefore understanding them would have been intellectually as well as physically exclusive. Ethnographic interrogation of rock-art producing cultures indicates that images often have several 'levels' of meaning and can be 'read' differently depending on access to specific information (Morphy 1991).

Continuity of significance. Case Study 2: al-Fūgār

Several hundred separate images were identified by this survey, thought to be the cumulative creations over several millennia of human activity. However, these images are all confined to a limited number of discrete locations where engravings spanning several thousand years crowd together. With few exceptions, we noted that each consecutive image respected the space of its predecessor.



(a)



(b)

This observation is best illustrated by a description of the site of al-Fūgār. Al-Fūgār is the promontory closing the eastern end of the Jarma embayment, by a major Garamantian cemetery and the site of the marabout cemetery of Sīdī 'Alī (Graziozi 1942). The base of the promontory terminus was prolifically decorated with rock engravings from different Phases, including frequent Tifinagh inscriptions and engraved sandal/feet outlines. In addition, there were numerous prayers and requests written in Arabic on pieces of paper, placed under stones or in crevices in the rock. Numerous tracks led a short distance up the lower slopes of the promontory to a small Garamantian cairn field and a 'marabout' tomb. Slightly further up the slope, by the mouth of a dry

spring, was a striking collection of engravings. These included some very fine Phase II giraffe, Phase III cattle and an enigmatic and deeply incised emblem cut on an elongated slab that may have served as a stele (Fig. 8.26a-b). The design looks like an abstract bird, such as an eagle. There is what looks like an Arabic inscription cut below the image, though it is conceivable that this is a

Fig. 8.26. FUG 19 (Sīdī 'Alī): a) engraved slab (stele?); b) giraffes.

later addition to an earlier engraving. There are parallels for the use of a bird of prey as an emblem in the Tripolitanian pre-desert to the north of Fazzān during the Roman period (Barker *et al.* 1996b, 185, 203, 205, 241). Alternatively, the carving has some affinities with funerary stele of suspected Pastoral date (van Albada *et al.* 1994, 32-33; Wagneur and Le Quellec 1995).

This site demonstrates use from prehistoric times until recently, and continues to be used today as a focus for pilgrimage and prayer. It is tempting to propose a continuity in perception of the site as a sacred and meaningful place. The relationship between rock images and the springs at al-Fūgār (and elsewhere) suggests that water sources may have been considered significant and sacred. Some of the engravings may relate to a relatively arid phase in the Sahara 5000-4000 years ago – a time when water may have been considerably constrained and reliable water sources vital for human survival – or to a period of climatic instability when water supplies were unpredictable. A relationship between water sources and rock-art is perhaps more clearly defined in the Massāk Ṣaṭṭafat and Mallat where engravings are primarily found concentrated round gueltas (natural rock pools and watering places) in the series of wādīs cut down through the plateau and running north-west to south-east (Fig. 8.20).

In the Wādī al-Ajāl, the same locations have therefore been deliberately and repetitively chosen over a period of several thousand years. Continuation in the tradition of making engravings in identical locations through time suggests that the significance of these places was recognised, respected and perpetuated by successive rock-art producing groups, and that the relationship between the landscape and its occupants was powerful and deeply embedded, even though the meaning associated with them may have altered over time. The dense clustering of rock-art images of many different periods around the water pools on the Massāk is another example, though there the marking of the landscape may have had a strongly pragmatic element.

The distribution of rock images relative to the natural topography, and the relationship between the content and the context of the engravings over time suggest that the images were created in ‘meaningful’ places in the landscape, and the power with which these places were imbued persisted through time even though their specific meanings may have shifted and changed. The rock-art may have embellished the significance of these places and reinforced their importance as part of a conceptual landscape, possibly communicating more information to a wider audience. In this way the rock-art may have reinforced established cultural beliefs and traditions, and expressed the predominant ideological themes of a community.

Iconography of power. Case Study 3: Jarma Escarpment

The content of images from the Wādī al-Ajāl varies proportionately between different phases. General trends could be identified and are illustrated broadly in Table 8.3 above. For example, Phase I is characterised by representations of giraffe and elephant, while an increasingly diverse range of wild and domestic animals is depicted in Phase II, and an increase in material imagery in Phase III. Wild animals are rarely engraved in Phases IV and V, with the emphasis on inscriptions and, in Phase IV, on standardised depictions of feet or sandals. Not only were different aspects of the environment imbued with varying degrees of prominence through time, but their symbolic relevance and meaning may also have varied.

For example in Phase III, the phase associated with the Garamantes, there is a distinct shift in the content of the rock-art in comparison to the preceding Phases – this is best exemplified by the Jarma escarpment site (Figs 8.27-8.29). The images here are mainly located along an ancient river course where it widens before opening out into the Wādī. The area shows considerable Garamantian activity in the form of quarries and burial cairns (GSC 34-35, 41-51). The two main groups of images are



(a)



(b)

Fig. 8.27. Jarma escarpment group: a) chariot group (GSC 41); b) bovines (GSC 47).

sited on opposite sides of the river bed, each adjacent to a small collection of large cairns. The eastern group includes a large, flat boulder with engravings of a male figure, three horses and three two-wheeled chariots (for chariot engravings in Fazzān, see Gauthier *et al.* 1991; Gauthier and Gauthier 1999; Soleihavoup *et al.* 2000, 74-80). Engravings on boulders nearby depict bovids, a rider on horseback, a human figure with a cow's head and a full frontal male figure with outstretched arms. This figure and the rider both hold some form of decorated stick or weapon. With the exception of the bovids and the theophoric image, the subjects depicted here have few precedents

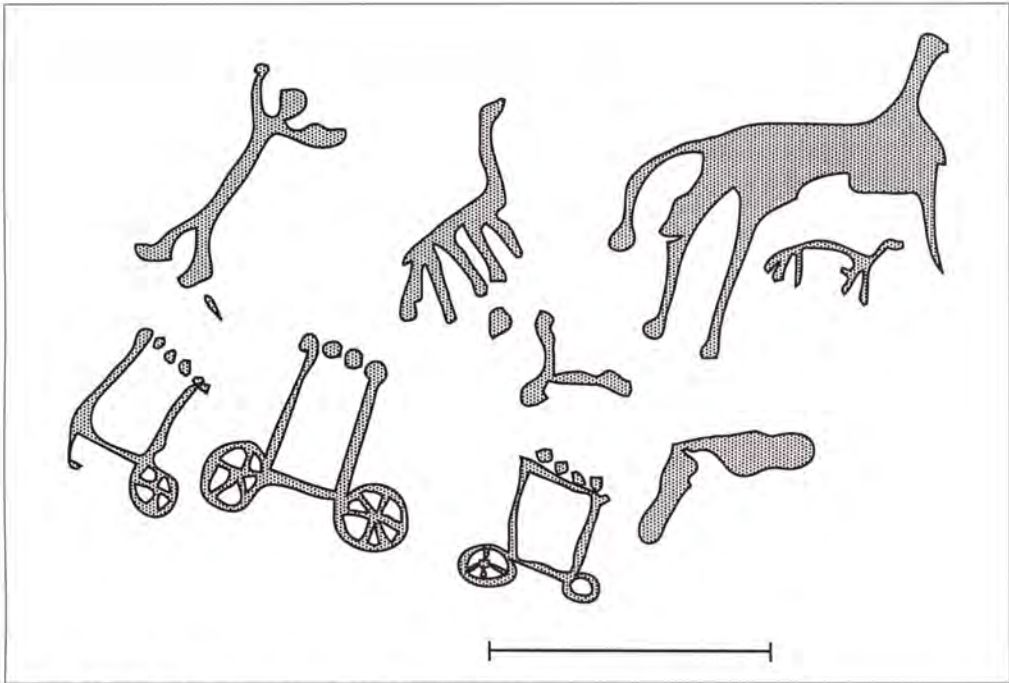


Fig. 8.28. GSC 41, proud owner shows off three chariots and horses?

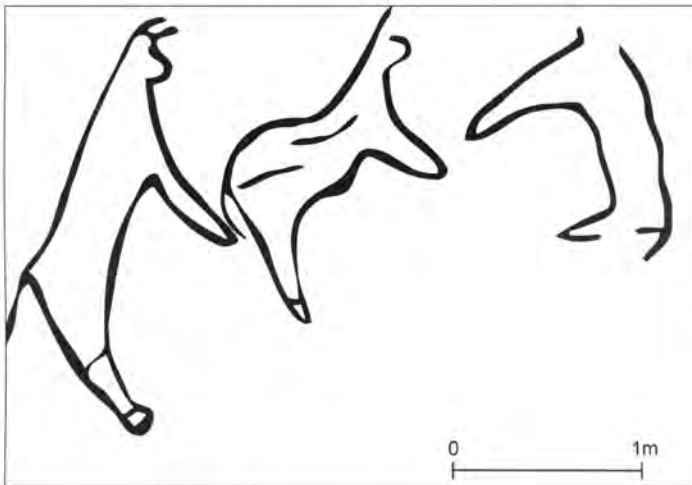


Fig. 8.29. GSC 47, bovine group.

in the art of the earlier phases in the Wādī. They illustrate a new range of material items with perceived significance and possible implications of status. The objects and the activities they represent are masculine and it is tempting to relate the symbolism of the engravings to the status of the burials with which they are spatially, and possibly temporally, associated. Throughout the Wādī, there is an efflorescence of male-dominated symbolism with Phase III images. Animals are now depicted as overtly male

and human males are shown in a range of male-orientated activities and poses – riding, hunting, brandishing weapons.

On the opposite, western side of the channel, the second group of images is located on a single, vertical panel. Here there is a sequence of three large, humpless cows raised on their hind legs (Fig. 8.29). Uniquely, none of these animals has horns and there is no gender distinction. Again, it is tempting to relate these images to the smaller burial cairns with which they are associated. It is possible that some early Garamantian burials distinguished males and females through tomb size, with the males furnished with larger, more impressive tombs. If this is the case, we can suggest that the symbolism of the western engravings may be female-specific in contrast to the male-dominated symbolism of the eastern group.

The internal relationship between different social groups suggested by the rock-art, and the emergence of a male-dominated symbolism throughout the Wādī in the Garamantian period, provides a perspective to be pursued further through rock-art and archaeological investigations.

LIBYAN INSCRIPTIONS

The widespread occurrence in the Sahara of inscriptions in the Libyco-Berber alphabet has often been remarked on, but the date, content and significance of the material remain ambiguous in the majority of cases (Aghali-Zahara 2001; Bates 1914). Although the ultimate origins remain uncertain (Muzzolini 2001b), the antiquity of some Libyan inscriptions is certain, with many believed to date to the latter centuries BC (the earliest securely dated examples being the bilingual text from Dougga in northern Tunisia: Chabot 1941; Galand 1989a; Horn and Ruger 1979 89-97). Brogan (1984; cf. Reynolds *et al.* 1958) and Rebuffat (1975a) have reported on significant groups of Roman date Libyan texts from Tripolitania to north of Fazzān. Similarly, an important study by Daniels (1975) established the certainty of a Garamantian date for some texts from the al-Ajāl. Muzzolini (2001b) has argued against the adoption of a written script before the cameline phase rock-art, that is, from around the end of the 1st millennium BC and there is nothing from the Wādī al-Ajāl to contradict this, though a date in the latter few centuries BC is possible for the earliest inscriptions there. However, a complicating factor in Fazzān and in the swathe of territory extending west into the Algerian Sahara is the long-term continued use of the Libyan text by the Tuareg nomads (*Encyclopédie Berbère*, s.v. écriture, 2564-80; *Encyclopaedia of Islam* s.v. Libiya, 754-57). The written form of their language (Tamehu/Tamahaq) is known as Tifinagh and in consequence rock engravings of Libyan characters are often referred to as 'Tifinagh inscriptions'. Whilst many may be of comparatively recent origin, this is far from certain in some cases (Camps, in *Encyclopaedia of Islam*, 756, notes that many of the 'modern' symbols had already made their appearance by the 5th century AD, being carved on blocks built into the monument of Tīn Hinan). Thus, in the work of the FP all texts have been designated 'Libyan inscriptions' to avoid the assumption that they are necessarily of recent date. At this stage, the texts collected by the survey in photographic or traced form remain unstudied, but it is hoped to have them systematically interpreted by a specialist in due course, at which point it may be easier to discriminate between ancient and recent texts. Depth and technique of cutting, letter forms, superimposition, degree of patination and weathering all suggest that some are certainly very old (cf. Fig. 8.18).

Among the many problems relating to the study of these texts (Chaker 1984; Galand 1979; 1991) are the lack of firm rules governing the direction of the text (vertical or horizontal, left to right, up or down), the lack of clear divisions between words, the relative brevity of most texts, the phonetic value of specific letter forms (and changes over time), and the meaning of words (and the potential problems relating to lost dialects).

For inscriptions of more recent date (say within the last 500 years), modern study of Tuareg vocabulary and dialects can be helpful for their elucidation (see for example, Motylinski 1904; Nehlil 1909, on Berber dialects at Ghadāmis and Ghāt). The true Tifinagh inscriptions contain symbols that are modified from the ancient Libyan forms (Galand 1989a; 1998), though as noted already the modifications probably began in late antiquity. Although many texts can be transcribed, the meaning is often unclear. Galand's work on the meaning of a range of these texts is important because it highlights the fact that they can be very formulaic (1989a/b; 1991, with references to key earlier works). His main group of texts was originally collected by Th. Monod in northern Tuareg territory in Algeria and Galand has been able to

suggest several repeated patterns within the data. One common formula for short inscriptions simply contain the sentiment “It’s me, X”, others seem at first sight to reflect a worldwide pattern of graffiti “I, X, love Y”. More interesting perhaps are another group that start “It’s me, X, who says ...”. The content of the second part of the message is harder to determine, but in several cases again turns out to be amatory in nature (Galand 1991, 56-58). An important ongoing project involving Galand’s research team is trying to make a systematic collection of additional texts from the Sahara and Maghrib (they edit *La lettre du répertoire des inscriptions libyco-Berbères*).

Inscriptions carved on rock walls in remote areas by love-sick Tuareg could easily be dismissed as simple graffiti, but we may reflect on why the inscriptions have been cut to a far greater extent at some locations than at others. In parts of the Massāk one can see rock faces covered with such texts, whilst equally good surfaces nearby are untouched (Liverani 2000d, 40; Soleihavoup *et al.* 2000, pl. F). We should not underestimate the power of the written word in a semi-literate society and in its mediation of desires with a spirit world that may be seen to be embedded in the landscape. These may not be declarations, then, but supplications to powerful forces, the committal to stone of the wish being an essential part of the negotiation. This strongly suggests either continuity of traditions of landscape nodes, or a reattachment of significance in more recent times to locations that were demonstrably important to earlier people, as indicated by the rock-art complexes. In many parts of the Sahara, the assumption that Libyan inscriptions are ‘modern’ Tifinagh is too readily made. It is clear that there is a long Saharan tradition of cutting short inscriptions and in a few cases the chronological depth can be demonstrated.

Libyan texts occur in a wide range of contexts in Fazzān:



Fig. 8.30. Rock-art and inscriptions (TAG 9)

- as graffiti on personal items, both ancient (for example, amphorae and table ware in Garamantian graves: Corrain *et al.* 1967; Daniels 1975) and of more recent date (some Tuareg silversmiths still punch their names into their handiwork);
- on Garamantian funerary stele and offering-tables (Daniels 1975, probably ancient, though the possibility of secondary embellishment of an older monument cannot be excluded);
- on other portable slabs, perhaps used as grave markers;
- on rock walls or isolated large blocks, often, but by no means universally, accompanied by rock-art images of the cameline phase (van Albada and van Albada 2000, 19). There may be indications of greater or lesser antiquity here if weapons are indicated in the hands of camel riders – firearms are rare (cf. Soleihavoup 1993a, 499-502);
- on the walls of standing structures or buildings, whether as graffiti or because of reuse.

The FP survey work in the Wādī al-Ajāl has recorded *c.*40 locations with Libyan inscriptions all along the valley (the concentration towards the western part simply reflects the intensity of work there). A more targeted search would undoubtedly reveal far more. The contexts of the inscriptions can be divided as follows:

Inscriptions in association with other rock engravings and markings: TIN 20, 25, 27, TAG 9, 22-25, 28, 40-42, LGR 26, ZIN 902.5-7, 902.55-58, 902.66, 903, GSC 43, 45, 49-50, TWE 24, 33, 41, FUG 18, 21, FJJ 27-28, GEL 1, BNH 19 (Fig. 8.30).

By caves and rock shelters: EDS 26, TWE 022 (Fig. 8.31).



Fig. 8.31. Inscriptions by rock-shelter or cave: a) TIN 27; b) EDS 26.

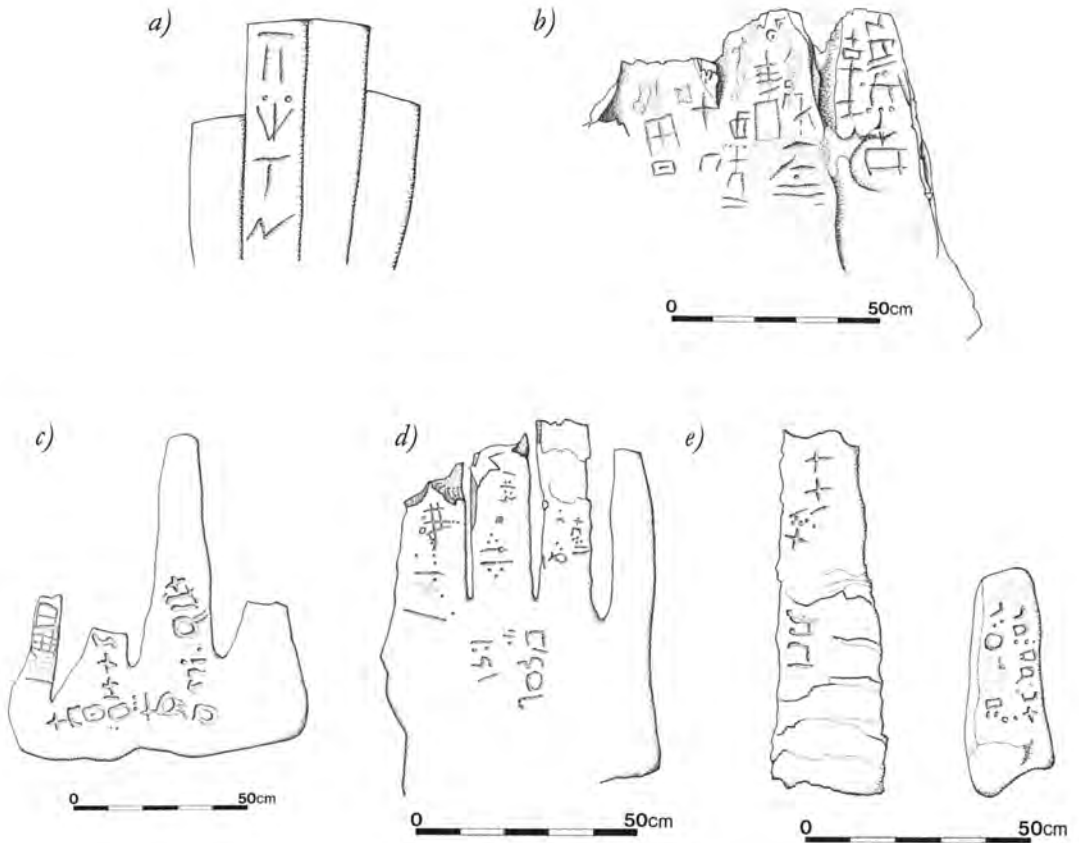


Fig. 8.32. Inscriptions on Garamantian funerary stele: a) LEK 10; b)-e) TAG 1.

Inscriptions on Garamantian funerary stele and offering tables: TAG 1, GSC 30; CHA 1/2, LEK 10, ZOU 2 (Figs 8.32-8.33).

Graffiti on portable items: GER 1, from the Garamantian levels of the FP excavations we have a short Libyan text engraved in the handle of a local pot prior to firing (to be published in *Archaeology of Fazzān* 4).

Other portable inscriptions (for example on rough stele where funerary context is not certain): ITF 4, TAG 1 (Figs 8.34-35, a rough inscribed stele appears to have been incorporated into the side of a later Garamantian tomb, where it would have been obscured by mud-plaster), UAT 13, 22, GSC 22.

On rocks adjacent to foggara shafts: TAG 8 (three examples) (Fig. 8.36).

Within Garamantian sites: ITF 1, GER 1 (Fig. 8.37).

As graffiti on Garamantian structures: UAT 1, TWE 1 (mausolea) (Fig. 8.38).

Built into walls of post-Garamantian structures: BNH 5 (Fig. 8.39).

As with the rock engravings a number of different styles of cutting the letters was employed, from deep grooves, to thin incised lines, to pecked lines. (Examples of painted inscriptions are also known from the Akākūs and in southern Algeria). A case can be made for quite a few of the inscriptions recorded by the FP being of Garamantian or early post-Garamantian date, both in terms of symbol forms, degree



Fig. 8.33. Inscription on funerary stele (CHA 1).



Fig. 8.34. Inscription on slab built into Garamantian tomb (TAG 1) - the slab would have been covered in mud plaster and not visible during the life of the tomb.

of patination and context, though some of the texts associated with cameline rock-art are certainly of post-Garamantian/Islamic date. The exact dates of the Garamantian period inscriptions are uncertain. Several of the cemeteries yielding inscribed offering-tables and stele date to the classic Garamantian period (1st-4th centuries AD) and were certainly still in use at the upper end of that period. On the other hand, some inscribed personal artefacts from Sāniat bin Huwaydī come from tombs dating to the 2nd century AD (Daniels 1975, 251-4 and 261); and the inscriptions from the shaft heads of a series of foggaras near Tāqallit, if they relate to initial construction rather than

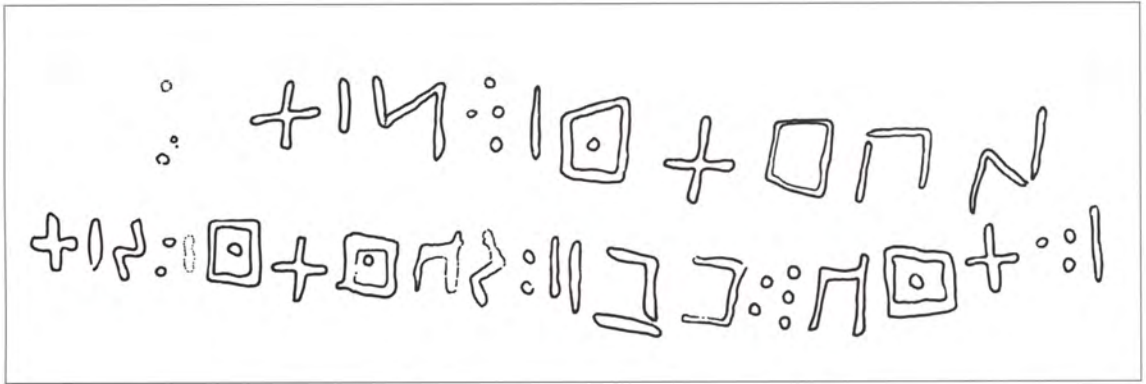


Fig. 8.35. Transcription of TAG 1 inscription.

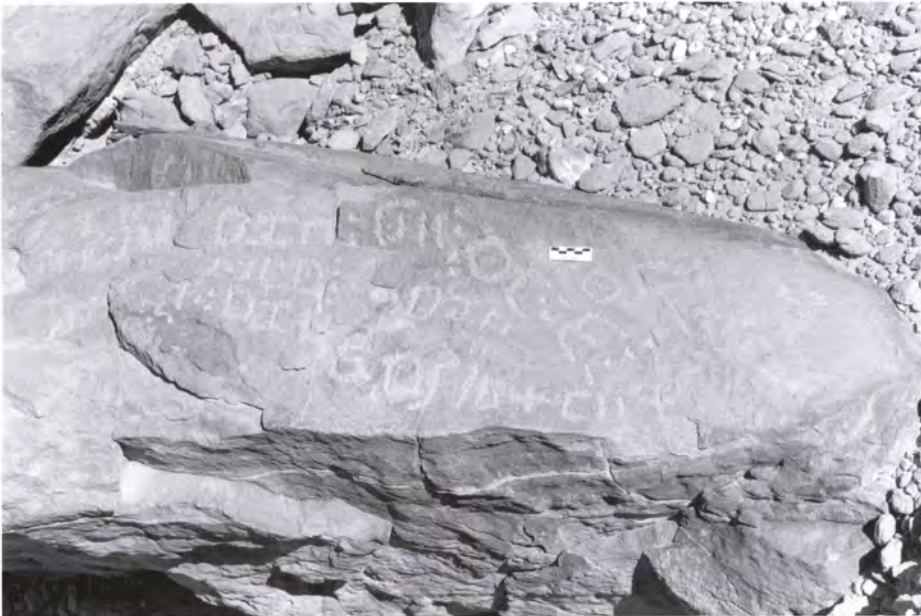


Fig. 8.36. Inscriptions by foggara shafts (TAG 8): a) - F200; b) F202b.



Fig. 8.37. Inscription within Garamantian site (ITF 1).



Fig. 8.38. Graffiti on Garamantian structure (UAT 1).



Fig. 8.39. Inscribed blocks built into post-Garamantian building (BNH 5).

later maintenance, should belong to the last centuries BC. The most that can be said on present evidence is that the alphabet may have been in use as early as the latter centuries BC (in line with its apparent introduction to the Maghrib) and it may have become more commonly employed over time in funerary contexts (though it is clear that the majority of offering-tables and stele was uninscribed).

Distinctions can perhaps be drawn between the use of Libyan texts in connection with rock-art, those on funerary structures and those found on portable artefacts.

Each category appears to be serving a rather different function potentially: in the former case a spiritual negotiation, in the second instance most likely as a form of personal commemoration, and in the last example as a way of denoting ownership. Whilst much will remain uncertain until further detailed study is devoted to a large dossier of such inscriptions in Fazzān, it is clear that the material has deliberately been placed in the landscape and that, as with the rock-art, the context of such inscriptions is a key element in their interpretation.

Other inscriptions from Fazzān are quickly summarised. There is the famous Greek inscription from the top of Zinkekrā hill to a certain Aurelius (Fig. 8.40), who may conceivably have been a Roman soldier (Daniels 1975, 256-57). But there are no verified Latin texts (despite a mischievous claim by Petragarni 1928, 307-08 and 389-90). Recent reports that a Latin text has been discovered at Tim Missaou in southern Algeria (Anon 1991; Pichler 1997) are still much debated (for the location, see Fig. 3.1). The text was executed in red ochre and from the published photographs and drawings seems to have more in common with the so-called Latino-Punic inscriptions of Tripolitania (Mattingly 1995, 161-67), rather than being an official Roman military text. It would seem to confirm the presence of non-Saharans along the trade routes running west of Ghāt.

There are a number of other inscriptions in undeciphered scripts that appear to be non-Arabic and non-Berber, but their interpretation remains uncertain (Monod 1993).

CONCLUSION

Well over one hundred previously unrecorded images and about the same number of inscribed texts were identified by the FP survey. The spatial distribution of the engraved images was mapped in relation to natural topographic features along with previously documented sites within the survey area. The distribution of the images displays discrete groupings that correlate with specific and generally prominent topographic features.

The deliberate association between rock images and specific topographic features suggests that certain aspects of the landscape were perceived as significant. The reasons for this are opaque at present, although certain proposals can be made – for example water, the source of life and fertility, emanated from the promontories, where



Fig. 8.40. Aurelius inscription and adjacent engravings on the top of Zinkekrā hill (ZIN 900.68).

foggaras and cemeteries were also concentrated; the escarpment is transitional between two contrasting environments – one arid and sparsely inhabited, the other fertile and relatively densely populated, with the escarpment a liminal zone between the two. Again the concentration of cemeteries along this transitional zone is pertinent here. Some images were clearly placed at the foot of the escarpment where they would be observed by people passing along the edge of the valley. Yet close inspection of these locations reveals additional images inscribed on less visible surfaces, behind or in narrow fissures, where they must be deliberately sought out. Similarly, the dichotomous distribution of sites between highly accessible locations and obscure locations suggests deliberate manipulation of visual space to ensure differential access to symbolism and knowledge. Such exclusivity may have provided the basis for differential power over certain sectors of society.

Although the rock-art of the Wādī al-Ajāl has its own local identity and characteristics, it can also be placed within a broader context. Analysis of the relative chronological relationship of the images in the Wādī as well as tentative correlation with a wider Saharan chronology indicates that they could span (albeit sporadically) the last 7000 years. As rock-art is the product of a specific cultural context at a particular point in time, this suggests that the engravings relate to cultural events and developments in the Wādī and surrounding area, roughly from the appearance of domesticated stock until the present. It must be stressed that the date range of rock-art elsewhere in Fazzān may well have extended back further in time to the pre-domestication phase.

The Wādī al-Ajāl was marginal to the main zone of engraved rock-art on the Massāk and was also a very different landscape to the latter. Understanding of the rock-art is dependent on understanding the human interactions of the people or peoples who exploited each of these discreet landscape zones. The numerous palaeolakes of the sand seas to north and south of the Massāk are also part of the picture and to some extent it is clear that the natural connections of the Massāk was with the Wādī Barjūj and the Murzuq sand sea to the south, following the flow pattern of its wādīs. However, the recent FP work has now also revealed abundant ancient lakes in the Dahān Ubārī, evidently capable of supporting substantial Holocene groups. The potentially complex interplay between the three zones (Massāk, sand sea and Wādī) are explored further in the next chapter.

The imagery of horses, chariots and martial prowess that typifies some of the images of the caballine phase can be seen as symbolic of the emergence of a new society in the Wādī, whose concerns for the material and natural resources of the Wādī now surpassed its interest in the plateau. The horse-drawn chariots, cavalry and biconical human forms betoken the emergence of the oasis-dwelling Garamantes.

Rock-art is as significant a part of the landscape as any archaeological feature – a cemetery or monument, for example. While rock drawings may appear to form an autonomous body of information on the past that can be studied in isolation, they can only impart meaning now when studied in parallel with the archaeological features and monuments with which they formed the cultural and conceptual landscape of the past. One of the problems with much current work that focuses exclusively on the rock-art is that it divorces the images from their broader context. Coupled with a tendency for recording to focus on what are perceived to be the best artistic productions, with a general neglect of images of the caballine or cameline phases and Libyan inscriptions, such study can only produce very subjective results. In order to understand and interpret the function and meaning of the images, we must study them in an archaeological or ethnographic context and a diachronic approach is important. Under these circumstances, rock-art provides an extra dimension on the beliefs, rituals and concerns of the past. Rock-art provides a perspective on how the landscape may have been used and perceived, and the role it may have played in social and cultural

development. These suggestions provide a way forward for exploring such intangible aspects of the past.

By adopting an integrated approach, the Fazzān Project has provided a viable archaeological framework for investigating the rock-art and engraved inscriptions, while this study has provided a deeper insight into the possible relationship between the inhabitants of the Wādī al-Ajāl and their landscape over time.

CHAPTER 9

SYNTHESIS OF HUMAN ACTIVITIES IN FAZZĀN

By David Mattingly,
with Tim Reynolds and John Dore

ENVIRONMENT VERSUS PEOPLE?

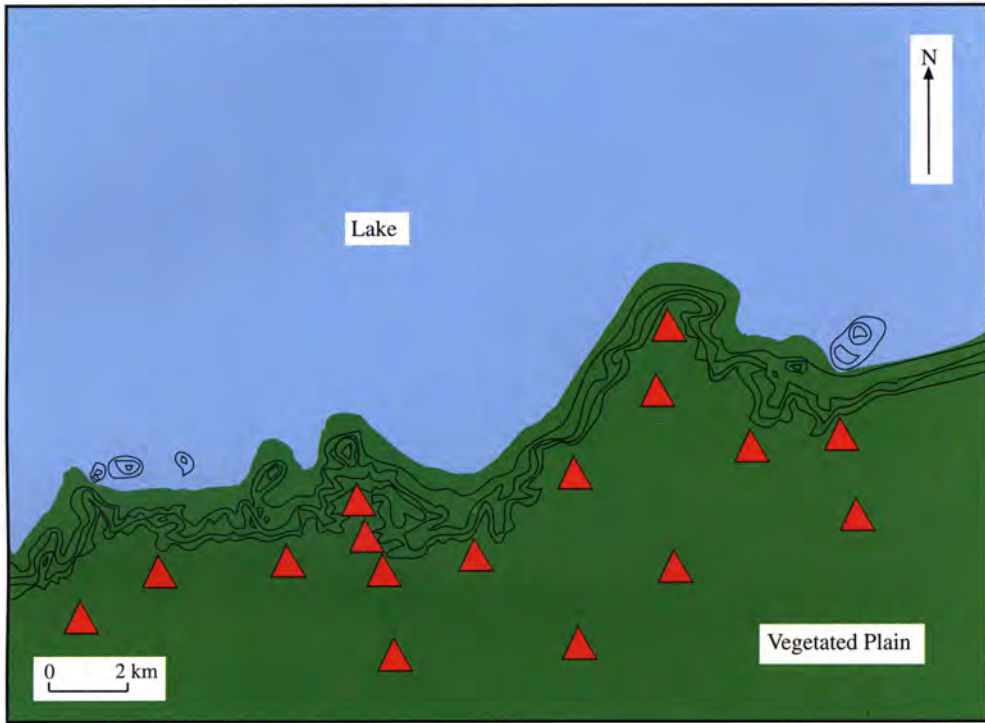
The history of human activity in Fazzān is fundamentally an inter-linked account of people and environment. Equally, it is clear that there have been dramatic changes in environment, climate and human activity over time (Shaw 1976; Petit-Maire 1988; 1993; Stiles 1988). What follows is a very simplified and provisional analysis, which will no doubt require revisions as more evidence accrues. The reconstruction proposed at this stage is thus essentially a series of models, designed for further testing and elaboration (Mattingly 2000g, for a concise initial summary). A clear trend running through, though, is one of overall decreased water availability over time. Climatic change and the onset of desertification have reduced rainfall to negligible levels and caused old surface water sources, such as lakes and springs, largely to dry up (Cremaschi 1998a/b; 2001; Cremaschi and Di Lernia 1996b). The timescale of the declining hydrology of the region spans the last 10 millennia, with an acceleration in the last 5000 years. The processes of environmental degradation and diminishing hydraulic resources are still continuing at the present time (Swearingen and Bencherifa 1996). Human activity shows consistent attempts by people to adapt to changing conditions and to seek out new sources of water or novel ways of tapping into diminishing aquifers (Barich 1998; Barich and Gatto 1997; on general themes in the archaeology of drylands, see Barker and Gilbertson 2000a). The trends observed in Fazzān are similar to those in the eastern Sahara and Upper Nile Valley, though with some important differences (Barich and Hassan 1990; Blench 1991; Sadr 1997; Vercoutter 1988; Wendorf and Schild 1980; Williams 1991). Desert landscapes do not merely present human societies with a set of adaptive challenges, they also influence their sociological and cultural outlook. People have had a complex relationship with their environment and it is increasingly recognised that human perceptions of landscape play an important part in the manner in which resources are exploited (Tuan 1974; 1984). Marginal landscapes are particularly significant in this regard (Barker and Gilbertson 2000b; Shields 1991; Young and Simmonds 1999).

THE PALAEOOLITHIC AGE

Knowledge of Saharan prehistory has made dramatic progress in recent decades (cf. Camps 1974; Forde Johnson 1959; Humbert 1989; Ki-Zerbo 1981; Milburn 1984; Vauffrey 1969). During the palaeolithic period the region is known to have been very different to the desert environment it has since become. For instance, the ḥamāda plateau of the Massāk Ṣaṭṭafat south of the Wādī al-Ajāl is assumed to have been well-vegetated savannah, with abundant rainfall, running streams and rivers, supporting a large range of animals and hunter-gatherer human groups – whose tool assemblages occur in abundance across its surface. It has been known for some time that a large area of central Fazzān was covered in an extensive lake system and our work has shed additional light on this question, allowing us to choose between two alternative models. Low-lying areas of central Fazzān, below the 500 m asl contour are likely to have formed part of a large lake (or lakes) around 80000 BP. This includes the Wādī al-Ajāl, the Wādī Barjūj and the Murzuq basins, as well as much of the Murzuq sand sea, and some scholars have also claimed that the Ubārī sand sea was part of the lake

85000 - 70000 BP MODEL 1

INLAND SEA



▲ Lithic scatter

Fig. 9.1. Model of huge Pleistocene inland sea, covering not only the Wādī al-Ajāl, but also the Dabān Ubārī. This model is now disproved by the work of the FP.

bed of a continuous stretch of water connecting the ash-Shaṭī and al-Ajāl depressions (Klitzsch and Ziegert 2000, 40). However, it is now clear that many of the dune formations of the Ubārī Sand Sea were already in existence, but probably mantled in vegetation in this phase, and human activity extended into the interdune corridors on the northern side of the Wādī al-Ajāl (Figs 9.1-9.2). The Wādī ash-Shaṭī also appears to have been water-filled, though neither the height of the lake edge deposits, nor their date, match the evidence from the Wādī al-Ajāl. The most recent research on climatic change (summarised in Chapter 2 above), suggests that there was a prolonged phase (or sequence of phases) of higher aridity after 70000 BP, which drastically reduced human activity in this phase.

Despite the large distances involved, understanding of the Libyan Palaeolithic has generally been extrapolated from work in the coastal area with its associated highlands, set within a broader framework provided by recent research in the Maghrib and Nile Valley/Eastern Sahara (Barker 1996; Clark 1992; Close 1986; 1990; 1992; Garcea 1993; Hugot 1981; McBurney 1967; McBurney and Hey 1955; Smith 1993; Vermeersch 1992; Wendorf and Schild 1980; 1992). Research on the Fazzān region has been limited (Klitzsch and Pesce 1966; Ziegert 1967; 1978; 1995; 2000) and it is mainly the Italian Missions in the Tadrart Akākūs that can provide a local source of comparison for the present study (Barich 1987; Barich and Gruner 1997; Cremaschi and Di Lernia 1996a; 1998a; Di Lernia and Cremaschi 1996a and b).

The Fazzān Project has identified a number of 'sites', localities at which specific, identifiable actions took place, as well as documenting the wider distributions of Pleistocene materials across the landscape. Although sample sizes are small, it is possible to go beyond purely a chronological record of human presence in the area.

85000 - 70000 BP MODEL 2

SHALLOW LAKE AND SMALL SAND SEA LAKES

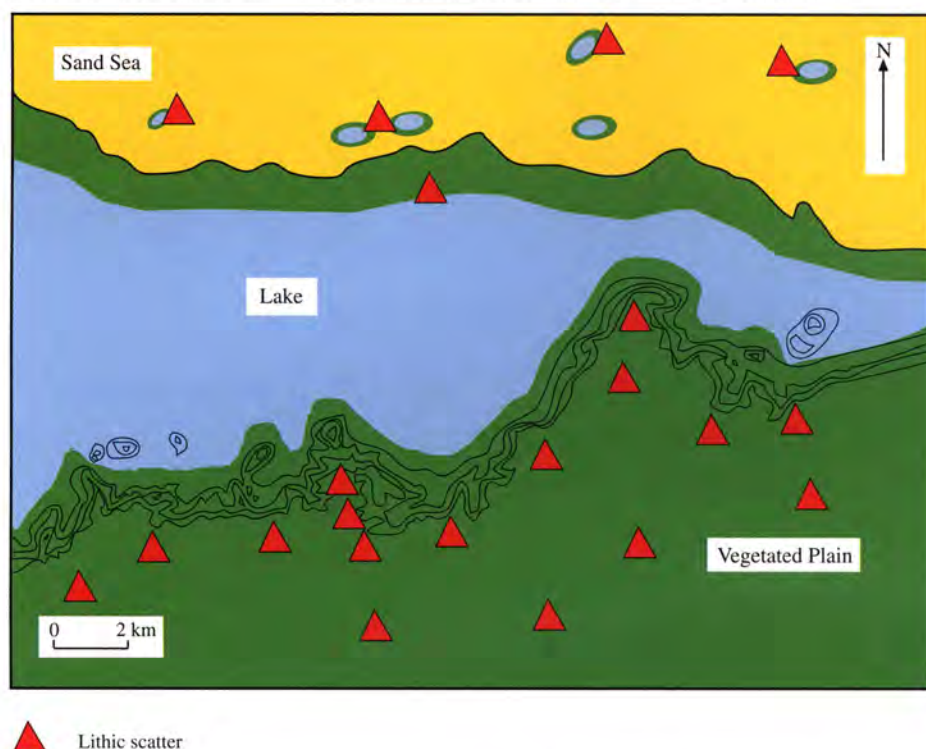


Fig. 9.2. Alternative model of a large shallow Pleistocene lake in the Wādī al-Ajāl with a shoreline at c. 500 m asl, demarcated by the escarpment and the Dabān Ubārī.

The project set out to identify the history of human activity within the Wādī al-Ajāl area, concentrating principally upon the Holocene phases, but has successfully provided a deep-time background that begins in the Middle Pleistocene. The multi-disciplinary approach has permitted environmental reconstructions through geomorphology, which is an important element in understanding the earliest human exploitation of the landscape. In the absence of evidence for an early chopper-chopping tool-based industry for the area, there is evidence for four main technological/chronological phases within the Pleistocene. This division places any Epipalaeolithic materials into the Holocene and does not discuss them in this section, as it is believed unlikely that significant re-occupation of the landscape took place prior to 10000 BP, despite the decreasing aridity taking place from c. 14000 BP. The phases identified are: 1) the Acheulean; 2) the Mousterian; 3) the Aterian; 4) a blade industry.

Pleistocene chronology

It may be seen from the brief accounts above (Chapter 4) that the survey has recovered materials which probably span the period c. 400000–70000 BP within the Pleistocene. There may be considerable overlap between the entities that have been described: the typological and technological differences between Late Acheulean, Mousterian and Aterian industries are few, and often it is the presence or absence of type fossils that allows separation. Grab sampling from land surfaces that have materials of different periods can produce varying results subject to its sensitivity and the presence and possible contemporaneity of these industries should be allowed for. It is reassuring, however, that the results of this survey match those of a similar study



Fig. 9.3. Group of Acheulean bifaces found near southern edge of the *Dahān Ubārī* (EDU 5).

from the Tadrart Akākūs and so perhaps meaningful patterns can be detected. The Acheulean is characterised by the use of bifaces as a device to allow mobility for small groups of hunter-gatherers, living in a range of environments across the landscape and also concentrating on exploiting the quartzites of the ḥamāda when they were available (Fig. 9.3). The Mousterian sees a continuation of this pattern. A typical example of small-scale, specialised extractive sites on the ḥamāda is GSC 53, where two individuals sat adjacent to work the quartzite. One roughed out blocks to produce cores and the other then used the crude cores to make Levallois blanks. There is insufficient data to establish a pattern of Aterian use of the landscape except to note the comparative lack of material on the ḥamāda and that Aterian pieces are generally more heavily weathered (Cremaschi *et al.* 1998; Debénath 1994). Chronologically, it is often assumed that there is a succession of one of these industries into the next, though recent work on the Wān Afūda cave in the Akākūs (Di Lernia 1999a) suggests a date of 90-69000 BP for the Aterian phase there. It is clear from recent work that ‘Mousterian’ industries now predate OIS 5 and are well dated in Egypt where five successive lake stands have been dated between 175000–70000 BP. The earliest are associated with Mousterian and the later with Aterian. In the Central Sahara, Clark (1993) notes that Aterian is stratified above the Mousterian. In Algeria, Aterian materials were recovered from a beach deposit at Karouba which has been dated by Th/U (Uranium/Thorium) to 140000 ± 10000 BP, while in Morocco Th/U dates for the Aterian at Ouljian are also 140000 ± 10000 BP (Wendorf and Schild 1992). The coastal sequences suggest that Mousterian tends to predate the Aterian. At the Haua Fteah, beds XXXII–XXXIII have Levallois-Mousterian industries resembling elements found in the Fazzān. Elsewhere such industries have been dated to OIS 5 by Th/U, ESR and TL methods (Bar-Yosef 1998). If such comparison is permissible, these

industries would be younger than the Aterian of the Mahgreb. The dating and inter-relationships between the Middle Palaeolithic industries of northern Africa are clearly complex and currently in need of further revision. It is clear from environmental data that hominids could have only been present in the Fazzān when conditions were relatively wet. In the time of the Middle Palaeolithic conditions were fluctuating and a number of arid/wet successions have been recorded on the basis of pollen evidence, marine cores and dust flux (Hassan 1996; Schild *et al.* 1992). There was a marked increase in rainfall at 135000, 125000 BP (OIS 5c), at 103000 BP (OIS 5a), at 80000 BP and at *c.*47000 BP (Schild *et al.* 1992). There were arid phases at 130000 BP (OIS 5e/d), 120000 BP (OIS 5d), 105000 BP (OIS 5b) and 94000 BP. Arid phases also occurred in late OIS 4 at 60000 BP, at 32000 BP in late OIS 3 and in OIS 2 at 25000 and 17000 BP. A record that should be matched to this sequence is a succession of five lake events in the western desert of Egypt which span the period 175000-70000 BP. Wooded savannah fauna is associated with these lakes and both Mousterian and Aterian industries have been found (Wendorf and Schild 1992). It is likely that the Middle Palaeolithic materials recovered by the survey also fall into these patterns of environmental succession, but geomorphological data cannot at present determine how they would fit. The Aterian pieces stratified in cave deposits in the Tadrart Akākūs at Wān Afūda and Wān Aṭabū, which are now firmly dated to the Pleistocene, indicate a clear and prolonged break in human activity in the central Sahara before recolonisation in the early Holocene (Cremaschi and Di Lernia 1995; Di Lernia and Cremaschi 1996b; Di Lernia 1999a).

No Upper Palaeolithic is known from the area and this may be expected as a response to the increasingly arid conditions that began from 70000 BP. Although there was a brief damper phase *c.* 40000 BP it appears to have been too short to allow repopulation on a scale adequate to be reflected in the archaeological record.

Pleistocene behaviour

The evidence from the survey indicates the presence of small bands of hunter-gatherers foraging across the landscape, which, when occupied, was wooded savannah. A large mammal fauna was available but no traces of this have been recovered during the survey. The hominids would have been in competition with large predators such as lion and hyaena. It is clear from the Middle Palaeolithic site (GSC 53), that at least two people were present and probably working together to exploit an outcrop of good-quality quartzite on the ḥamāda surface. The distribution of materials almost suggests a 'production-line' approach to reduction that is significant in terms of understanding hominid behaviour and time scheduling. Although no hominid remains have been recovered, the type responsible for most of the material recovered would most likely have been a form of archaic *Homo sapiens*.

One of the most interesting developments of the FP work to date has been the additional light shed on the extent of the large palaeolake with a shoreline at *c.*500 m amsl. This builds on the earlier work of Ziegert (1995; 2000), but with important refinements. Pleistocene lithics are found in abundance both on the plateau of the Messak and on the pediment at the foot of its escarpment, close to the postulated southern edge of the lake. Human groups were thus living both on the Massāk and along the narrow strip between the escarpment and the lake. DGPS and Remote Sensing data indicate that the western edge of the lake lay in the Wādī Irāwan, *c.* 100 km west of Ubārī, but with a land bridge into the southern fringes of the Dahān Ubārī, which also lay mostly above the lake level. The presence of numerous palaeolithic scatters on the northern side of the Wādī al-Ajāl and in the interdune corridors indicate human colonisation of this area also, with lithics derived from the Massāk outcrops (Figs 2.16; 9.2).

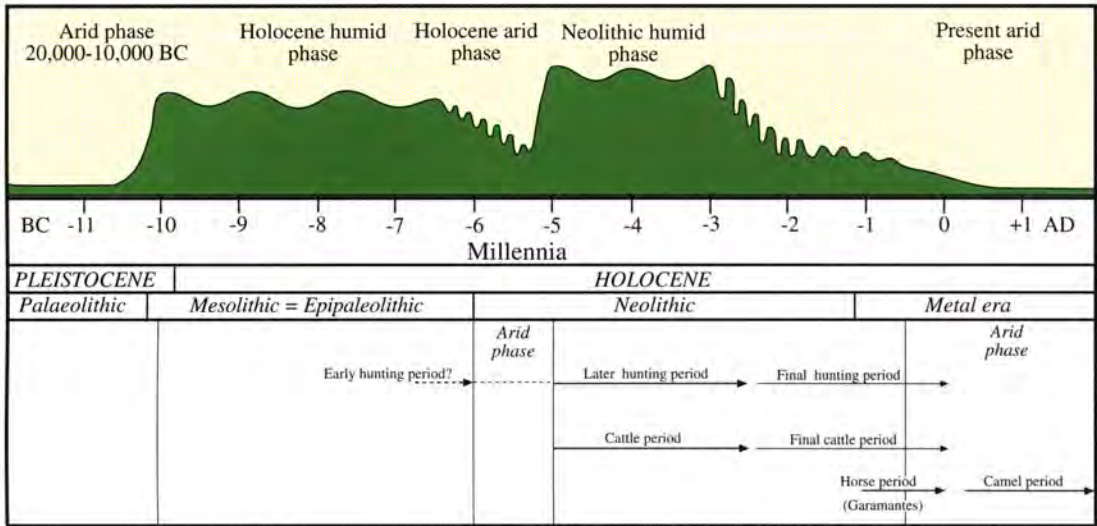


Fig. 9.4. Holocene climatic change in Fazzān.

THE PASTORAL PHASES (MESOLITHIC AND NEOLITHIC AGES)

The reappearance of substantial human populations in the Mesolithic and Neolithic periods, generally referred to as the Pre-Pastoral and Pastoral phases in the Sahara (Di Lernia and Garcea 1997), can be related to a new period of increased rainfall (Fig. 9.4). The landscape was still fairly well vegetated in this phase, supporting a wide range of wild animals, which were initially exploited through hunting, especially on the plateau and wādīs of the ḥamāda. However, in successive phases of further climatic change – whether major oscillations as indicated on Figure 9.4, or a more step-like progression towards acute aridification – human settlement became increasingly focused on locations where water was to be found at shallow depth. Thus many sites, presumably camps, have been located in the al-Ajāl depression and around small lakes in the edges of the sand seas (the Dahān Ubārī, Murzuq and the ‘Arq Wān Kāsā).

A detailed picture has been built up by the Italian team for a well-dated sequence of sites and deposits in the Tadrart Akākūs and Wādī Tanzzūft area (Cremaschi 1998a/b; 2001), but it remains to be seen how far this correlates with the new evidence for the al-Ajāl emerging from the FP. Local differences in hydrology and micro-climate could have been of considerable importance in this phase of climatic fluctuations and, ultimately, climate degradation. The Tadrart Akākūs and Wādī Tanzzūft area is to some extent physically linked more with the Tāssīlī Azjar massif to its west than with Fazzān to the east. The pre-Pastoral phase comprising the Mesolithic and early Neolithic and the Pastoral phases (corresponding to the Neolithic) were thus far from a uniform period and further analysis of tool types, rock-art phasing, and the evolution of pottery use, will help us elucidate discrete phases of activity (Cremaschi and Di Lernia 1998a marks an important step in this direction).

The late Pleistocene arid phase first eased at c.14000 BP. It is debatable whether this change was of sufficient duration and intensity to recreate the extensive palaeolakes along the edge of the sand sea and in the interdune areas prior to the end of the Pleistocene. The absence of humans during this time has been noted both in the Tadrart Akākūs and elsewhere in northern Africa (Cremaschi and Di Lernia 1999). Soils were forming in the highlands and amelioration may have been more advanced there due to topographical effects (Cremaschi and Di Lernia 1996a). At 10000 BP there was a rise in aridity and then conditions again became wetter by 8600 BP; there is

evidence for the sand sea lakes rising. Lakes reached their maximum height between 7400–6500 BP in the ‘Arq Wān Kāsā/Dahān Murzuq area, followed by a slight drop and then a further high stand between 6600–6000 BP. The period between the 8th and 6th millennia was the last effective wet period. After this time there was a rapid rise in aridity and it would appear that most of the lakes had dried out by 4900 BP. The formation of duricrusts over the last lacustrine deposits continued for some time – two dates have been obtained from the ‘Arq Tanzzūft indicating duricrust formation between 4000 and 3500 BP (Cremaschi 2001). However, fluvial systems draining the highlands were still active at 3800 BP. This is one of the special features that makes the Wādī Tanzzūft so important for late Pastoral activity, at a time of increasing desiccation elsewhere (Cremaschi 2001).

The broader North African picture shows wet phases at 14000 BP, 10550–9200 BP and 7000 BP. There is a documented drop in lake levels at 10,800 BP. The Egyptian Sahara shows arid phases at 9700–9350 BP, 8700–8600 BP, 7900–7700 BP and 7100–6900 BP (Hassan 1996). After 4500 BP severe droughts would have been common. The scheduling of environmental changes between the Fazzān and the eastern Sahara appears slightly different (compare Close 1990 with the above), but the general pattern is clear. Human exploitation of the area took place against a background of environmental changes that would have had a determining effect on ecological options. Populations would have been more likely to have initially re-entered the area from the west and south due to the more extreme aridity and the lag in environmental amelioration (this correlates with the rock-art, which initially shows negroid or dark-skinned communities). A number of industries span these changes, beginning with the Epipalaeolithic and then passing on to pastoralist/Neolithic traditions. The dating of the various phases is as follows: Epipalaeolithic/Mesolithic, 10th and part of 9th millennium BP; Early Pastoral, late 8th and 7th millennium BP; Middle Pastoral, end of 7th to end of 6th millennium BP; Late Pastoral, end of 6th millennium onwards (Cremaschi and Di Lernia 1998b, 248–50). The economy of these populations varied, from hunting, gathering and fishing to cattle pastoralism and sheep/goat nomadism (Barich 1984, 1992; Cremaschi and Di Lernia 1996a; Cremaschi *et al.* 1996). It is unlikely that any plant domesticates were being grown before a late phase of the Late Pastoral, although stands of wild plants were exploited (Wasylikowa 1993).

The geographical context of Pastoral sites

The FP survey work revealed three broad areas in which Pastoral sites were located: on the Massāk, in the al-Ajāl depression and in association with palaeolakes within the edge of the sand sea (Fig. 9.5). The Holocene lithic sites collected along the edges of palaeolakes and the less systematically sampled material from the ḥamāda and the main Wādī all indicate human presence during the period between the 7th and the 4th millennia BP, that is primarily of the Mid-Late Pastoral phases. There is also evidence for a smaller human presence in the earlier Holocene. Most of the lithic sites identified by the FP are small, discrete and have a clear pattern of the material discarded. The material remaining shows an amount of re-tooling, the reduction of a small number of cores and an association with Middle Palaeolithic material, which we believe to relate to raw material exploitation – the Pleistocene sites being used as raw material sources, matching the behaviour observed by the Italo-Libyan project in the Tadrart Akākūs, where at the same time systematic quarrying of raw material was undertaken (Di Lernia and Cremaschi 1997; Di Lernia *et al.* 1997). The organisation of the use of raw materials was clearly a significant factor at this time when mobility was an essential part of adaptation. The pattern observed matches that described by Close (1990; 1992) for the Eastern Sahara.

PASTORAL (NEOLITHIC)

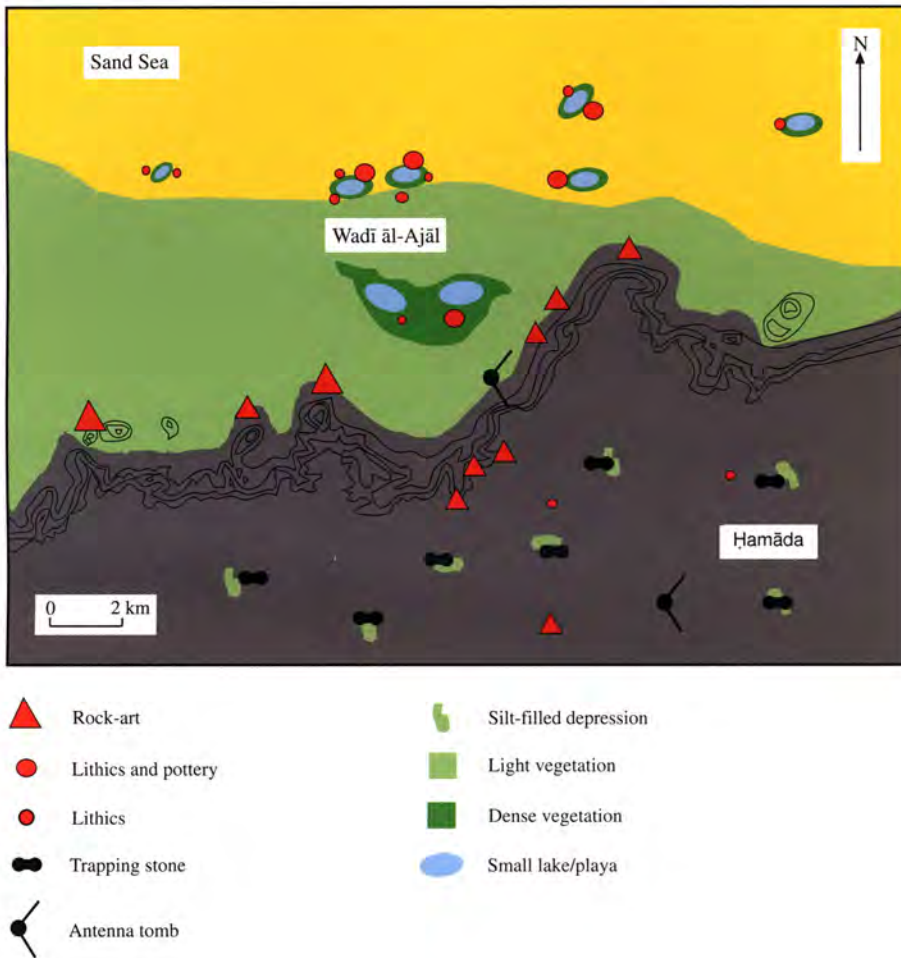


Fig. 9.5. Model of Pastoral activity in the Wādī al-Ajāl.

The sites from the edges of the palaeolakes were probably the short-term stops of mobile groups exploiting the seasonal growth of vegetation in the area during the summer (Fig. 9.6). The lakes would have provided a predictable background to this mobile lifestyle; pastoralists could focus on them while sending other parties further along the interdune corridors to exploit the seasonal stands of vegetation there. Thus the palaeolakes were a relatively predictable landscape element where water was readily available, where some fishing might have been possible (although no evidence for it has been recovered by the FP survey), where stands of vegetation existed and where raw materials in the form of earlier sites could be exploited. They would then have enabled grazing parties to move out into the interdune areas seasonally. However, the majority of these lakes will have been fed by rainfall or rapid percolation of rain through the dunes and most of them will not long have survived the climatic change of 5000 BP (though to this day a small number of spring-fed lakes do exist). Duricrusts formed over the dried up lake deposits (in one case with an antenna tomb of Late Pastoral date being built over the top of it). People thus continued to visit the sand sea, perhaps mainly to hunt and to travel through it, but it looks as though the scale of activity was greatly diminished after 5000 BP.

The volume of engraved rock-art now known in the Massāk (see above Chapter 8), coupled with lithic extraction sites, encampments, rock shelters, cairns and other



Fig. 9.6. Palaeolake in the Dabān Ubārī, with relic traces of three terraces of duricrusts, representing three different lake levels (EDU 5).

burial monuments, combine to point up the significance of this upland area in the Pastoral phases. Although limited survey was undertaken on the Massāk by CMD or the FP, unpublished work as part of a survey for an oil company has confirmed this. It may be that the survey has been monitoring the summer elements of a single mobile adaptive strategy that was focussed in the uplands of the Massāk, where the rock-art is so concentrated. A more detailed examination of the ḥamāda area is now needed to provide an understanding of the Holocene elements that have been recorded there (rock-art sites, rock shelters, camp sites, lithics scatters, trapping stones, cairns and burials).

As a source of raw materials for lithic tool production, of wild game and of seasonal grazing for flocks, the Massāk was an important resource for communities who may also have ranged the valleys and sand seas to north and south (Di Lernia *et al.* 1997; Garcea 1996). Because of its elevation, the Massāk still receives a higher level of rainfall than the surrounding lowlands and this tends to collect in natural rock pools (*gueltas*) within the wādīs, providing prolonged water sources even in the summer months for those who know where to look for it (Fig. 8.20). However, there is no evidence at present to suggest that the Massāk was occupied on a year-round basis by the groups responsible for the rock-art (though the higher quality of many of the earliest engravings may be indicative of a more extended stay and more leisured lifestyle). There is a comparative shortage of larger ‘camp’ sites on the Massāk and of the full range of Holocene tools and material culture exhibited by the sand sea sites. Seasonal use by hunting and pastoral groups seems the most likely interpretation of the physical traces of rock shelters, campsites with hearths, sporadic burial cairns, ritual monuments, trapping stones and lithic reduction sites.

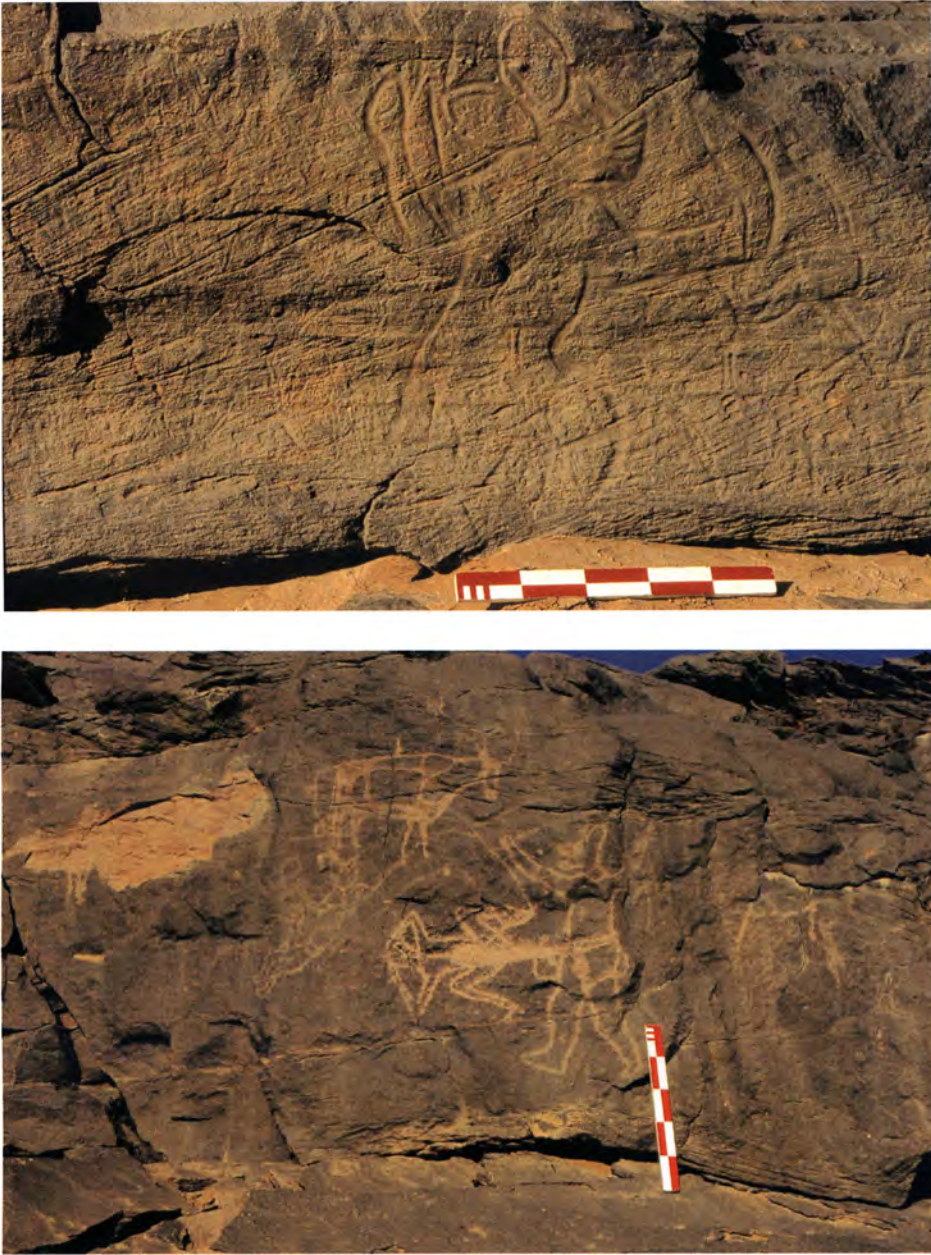


Fig. 9.7. a) *Theophoric figure, Massāk Saṭṭāfat*; b) *fertility imagery, Massāk Saṭṭāfat*.

It is uncertain when theophoric figures, fertility imagery and the more varied human depictions appeared in the rock-art alongside more frequent elements, but it is a reasonable hypothesis that the dramatic increase in importance of this imagery may have correlated with climatic deterioration, when concerns over human and animal fertility might have become acute (Fig. 9.7a/b). The impact of climate change on the use of the Massāk will have been critical, reducing the amount of grazing vegetation for both wild animals and for domesticated stock, and making water sources fewer and less reliable. Human activity was not cut off at a stroke, however, but may have become more focused on specific locations, with the rock-art representing a more sophisticated dialogue between people and a powerful spirit world, bordering on formalised religion. The relative absence of theophoric and fertility imagery from the Wādī al-Ajāl suggests that either there was less activity there than on the Massāk during the major climatic shift around 5000 BP or, more likely, that the Massāk was

preferentially the zone where such imagery was executed (perhaps because it was more obviously affected by the effects of drought and reduced reproduction amongst stock). The Wādī al-Ajāl at this date still possessed active springlines and small lakes, and will increasingly have been a stronger focus for human activity, culminating with the transition to agriculture.

The rock-art of the caballine and cameline phases is now known to have been extensively spread on the Massāk, indicating continued exploitation of the area in later times, though there was an overall decline in the volume in comparison with earlier phases and an increasing focus on the immediate environs of the major water holes (*gueltas*) of the plateau.

At present we lack close dating of Pastoral phase sites in the depression of the al-Ajāl (and disappointingly no stratified rock shelters have been located), but comparison with the pattern of activity in similar environments in the Akākūs area is again instructive. Clearly, the scale of subsequent oasis development in the al-Ajāl has obliterated much of the vestigial archaeology of Pastoral activity there, but the attested presence of a number of lakes or playas may have served to provide an increasingly important focus for population in the valley of the al-Ajāl. It is possible, though as yet unconfirmed by radiocarbon dating, that the lakes in the base of the valley may have survived longer than the majority of those in the sand sea. There are certainly hints of an extensive Holocene presence here in the survey results (see Chapter 4), but the overlying Garamantian and later agriculture have masked the detail. A key question concerns the transition to agriculture here and the relationship between the earliest cultivators and the late Pastoral herders. Some of the latest Pastoral lithics and pottery, related in style to the Pastoral forms recorded further south-west, come from the series of early Garamantian hillforts along the southern edge of the al-Ajāl valley. There thus appears to be some element of continuity between the late Pastoral population of the region and the Garamantes.

This model appears similar to that for the Akākūs where the human population appears to have initially centred on the upland areas and seasonally exploited the lowland, but was subsequently disrupted by the climatic changes, leading to a re-centering of human activity in the depressions with seasonal exploitation of the uplands (Cremaschi and Di Lernia 1998b, 243-96). The refocusing of human activity also encompasses the fundamental shift from hunting to herding to cultivation. The large number of radiocarbon dates obtained by the Italian team allows different (but overlapping) chronological patterns to be observed in each of the three main contexts. The rock shelters within the valleys of the Akākūs massif were primarily occupied between the 10th and 4th millennia BP, though after the onset of full aridity *c.* 5000 BP, activity seems to have been on a diminished scale and seasonal basis. It is worth noting that there is some disjunction here between the radiocarbon sequences from the rock shelters, which have yielded only five dates post-4000 BP, and the rock-art images of the caballine and cameline phases. These are quite widespread in the rock shelters and indicate continued human exploitation of the upland valleys, though presumably in a far less intensive way than earlier. The sites of the Dahān Murzuq and the ‘Arq Wān Kāsā can be typified as campsites and are clustered around palaeolakes within the interdune corridors (Cremaschi 2001). The lake beds show evidence of two main cycles between 8500 and 5000 BP and it seems likely that human activity matched this pattern, suggesting an earlier decline in extensive use of the sand sea than of the upland valleys. The third area is the valley of the Wādī Tanzzūft, which also contained some lacustrine features in the middle Holocene phase. However, there are dated deposits to show that the Wādī itself remained active for several millennia after the major climatic deterioration *c.* 5000 BP. The continued local availability of surface waters in this valley long after the surrounding landscape had turned to desert is

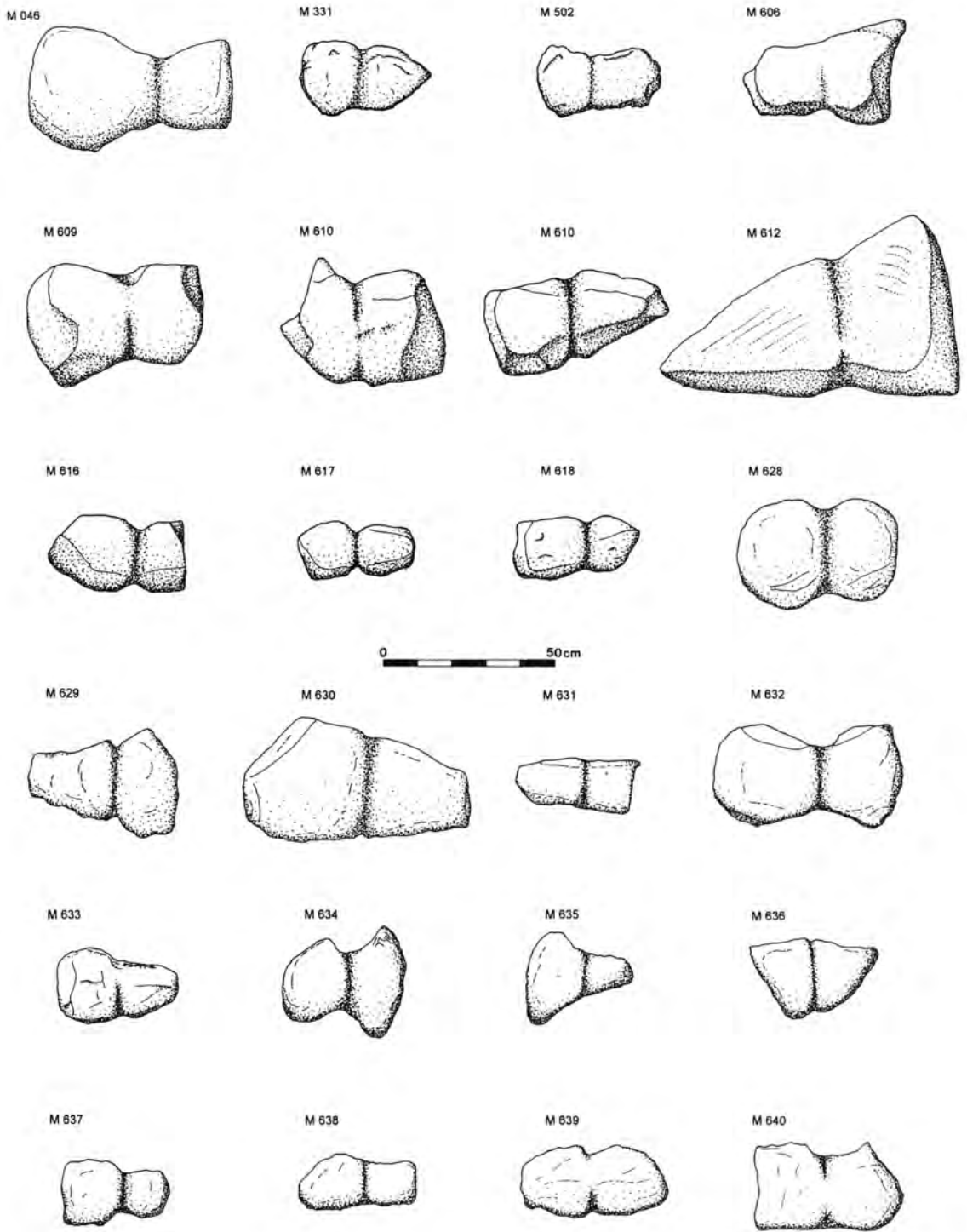


Fig. 9.8. Trapping stones from Massāk Saṭṭāfat.

reflected in the large number of late Pastoral camp sites discovered, some associated with lithic gouges and hoes that may indicate early cultivation practices. The radiocarbon dates here have a later peak, with over half the available samples dating after 5000 BP. Although only a small handful of sites in the Tazzūft developed into true oases in the Garamantian period, the presence of springs and groundwater reserves beneath the depression floor was ultimately the most critical factor in the development of the major settlements of the Akākūs region at Ghāt, al-Birkit and Sardalas (Cremaschi 2001).

Pastoral period economies and the transition to farming in the Sahara

Human strategies of exploitation of the Sahara are often presented as a series of evolutionary leaps forward, from hunting and gathering to pastoralism to agriculture. These are not mutually exclusive categories, of course, and the immediate predecessors of the Garamantes in the late 2nd millennium BC were probably practising all three strategies in combination. The hunting activities of Sahara communities were of long duration and widespread diffusion (Huard *et al.* 1980; Negri and Simonis 2001).

Hunting and gathering seem to have been the primary foci of early Holocene groups in the Akākūs, with data from the Wān Afūda and Wān Muhūjjāj caves indicating a concentration on the Barbary sheep (*Ammotragus lervia*) in the pre-Pastoral phases (Cremaschi and Di Lernia 1998a, 89-94; Di Lernia 1999a, 209-22; Di Lernia and Manzi 1998, 113-26). However, the extensive rock-art repertoire of hunting scenes and finds of the distinctive trapping stones (particularly common in the Wādī Tazzūft and on the Massāk plateau), illustrate that hunting expanded its range of quarry and continued to be a significant activity throughout the Pastoral Phases. The trapping stones (Fig. 9.8) are mostly large elongated stones, with a chipped line around the waist to produce an hour-glass shape (on trapping stones in general see, Lutz and Lutz 1993; Mori 1998, 178-79; Pachur 1991, who was aware of over one thousand examples from different parts of the Sahara). Ropes around these stones were attached to simple snares, laid in areas of animal tracks, presumably on known grazing paths (Fig. 9.9).

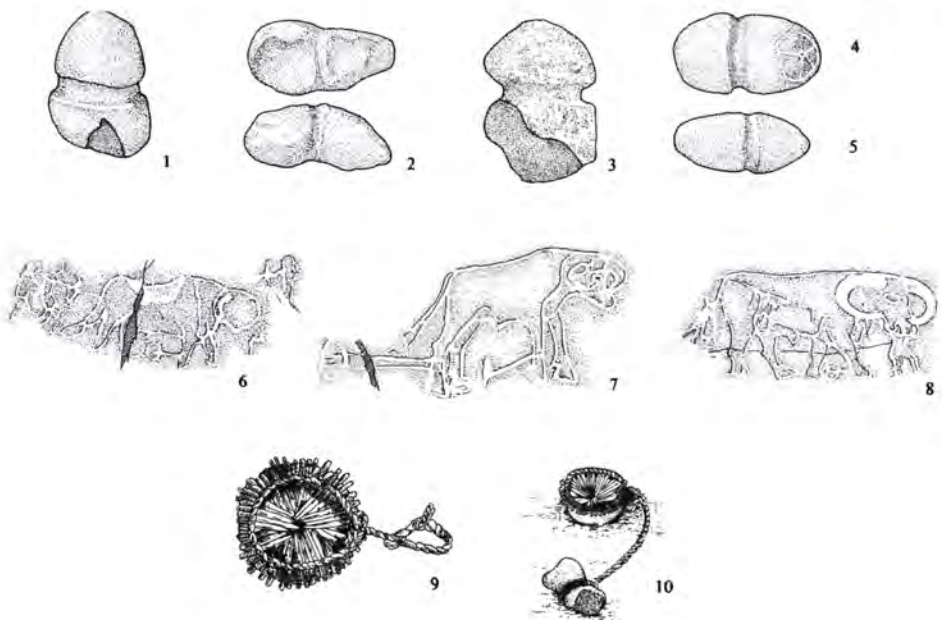


Fig. 9.9. Diagram showing: 1-5 examples of trapping stones; 6-8 rock-art representations of trapping stones in use; 9-10 reconstruction of functioning of trapping stone and snare (after Le Quellec 1990b).

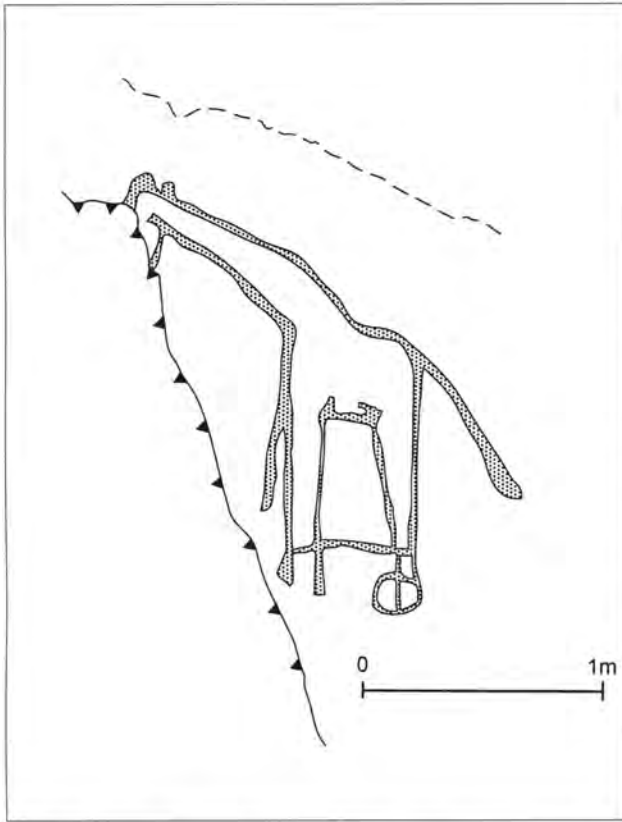


Fig. 9.10. ZIN 902.64 giraffe caught by a trapping stone.

animals inside them) could well represent the silt-filled features that were a key locale of hunting activity because that was where animals congregated to graze and many of the traps were laid (Lutz and Lutz 1993, mapped about 50 stones on the Massāk. More recent systematic work suggests there were many thousands). The possible dual use of the stones for hunting and for tethering domesticated stock has been discussed (Pachur 1991), but the overwhelming impression from the Fazzān evidence is that these were used for hunting in that region, often of large and dangerous animals (Lutz and Lutz 1995a, 97-101; van Albada *et al.* 1994, 48-55; van Albada and van Albada 2000, 32 and 71). Although no examples of trapping stones were located by the FP within the Wādī al-Ajal itself, examples were noted in the Wādī Irawān to the west of Ubārī in what has traditionally been an area of hunting and grazing, whilst the Wādī Tanzzūft contained a number of examples in areas of the valley that were remote from the main concentrations of camp sites (Cremaschi 2001; see also Poissonier and Bernard 1995). There are suggestions that hunting was of less importance in the final Pastoral phases, with some trapping stones being reused in late Pastoral ritual landscapes (observable around Matkhandūsh for instance). This may indicate that both game and the vegetation-rich areas of the landscape were diminishing.

The huge climatic fluctuations of this period form a backdrop to the transition to farming in Fazzān. Indeed, the domestication of cattle, ovicaprines and a range of other animals (donkeys, dogs) was a decisive development of the last Holocene pluvial phase in the Sahara, though many aspects of dating and succession are disputed (Forni 1993, for a wide-ranging summary). Domestication of animals can be traced both in the rock-art (which can only be dated in relative terms at present) and from some of the excavated rock shelters (Camps 1993; Cesarino 1989; Cremaschi and Di Lernia 1998b, 243-96; Di Lernia 1999a/b [Wān Muhūjjāj and Wān Afūda]; Druin 1989;

Once the trap was attached to an animal's leg, the weight of the stone would become an impediment to mobility and speed, allowing hunters with bows and spears to close in. The presence of the trapping stones on the silty depressions on the Massāk (*qaa* features), which are now virtually devoid of vegetation and often some distance from the water sources in the pools (*gueltas*) of the wādīs, indicates that the main hunting phase corresponds with the period before the onset of increased aridity from 5000 BP. The rock-art illustrates a variety of animals being hunted with the aid of trapping stones: wild bovines (aurochs), rhinoceros, giraffe (Fig. 9.10), donkey, ostrich, lion (perhaps accidentally snared!). Other elements in the rock-art iconography may also be connected to the use of traps on the Massāk: concentric ovals or circles connected by 'spokes', sometimes referred to as 'sun disks', probably represent the snare element of the trap (Mori 1998, 179 for an illustration), while plain oval shapes (sometimes with

Gauthier 1982; 1993; Marshall 1989; Muzzolini 1987; 1990b; 1993b/c). Whilst there was once a tendency to differentiate an early hunting phase from a later pastoral phase in the rock-art, it has recently been argued that this is largely a false dichotomy, with hunting scenes executed in virtually all styles/phases. As noted in the previous chapter, Muzzolini's (2001a) arguments for a compressed chronology for Saharan rock-art would place the earliest pastoral images only a little after the initial representations of wild animals. However, the evidence of the excavated rock shelters in the Akākūs shows clearly that the pastoral levels there were preceded by Epipaleolithic or Mesolithic phases in which subsistence was solely based around hunting, gathering and fishing, dating to *c.*10000 BP. The stratigraphic succession in rock shelters such as Torha East, Wān Afūda, Wān Aṭābū, Wān Muhūjjāj, Wān Talikī, etc. (Barich 1987; Cremaschi and Di Lernia 1998a; Di Lernia 1999a; Garcea and Sebastiani 1995) thus indicates that pastoralism was initially an addition to an existing pattern of subsistence, based in part on the hunting of the Barbary Sheep (Corridi 1998). Indeed, the initial evidence for the penning of Barbary sheep in the Wān Afūda cave appears to pre-date domestication and is interpreted by Di Lernia as a 'delayed use of resources' – keeping something in the 'larder' in anticipation of periodic lean times (1999a, 209-22). Palaeoenvironmental data suggests that the transition occurred in a sub-phase of increased aridity (Barker 1989, 34-37). Although the domesticated status of some of faunal remains is disputed, animals were increasingly represented in domestic levels from *c.* 8000 BP. By *c.* 6000 BP dense levels of dung indicate that intensive stock raising of cattle and ovicaprines was well established, with the latter growing in significance over time (Corridi 1998).

Study of the vegetation pattern from pollen in the Wān Muhūjjāj cave demonstrates progressive environmental degradation and 'regression of freshwater' between the 7th and 4th millennia BP, corresponding to the main period of intensification of pastoralism (Mercuri *et al.* 1998). There were three main zones in the Wān Muhūjjāj pollen diagram, corresponding to changing climatic and economic conditions, with the bottom of the sequence (*c.*7000 BP) indicative of a reasonably well-watered savannah landscape with few trees and some standing water sources (*Typha*, *Potamogeton*, *Phragmirtus*, *Scirpus*, *Gramineae*, *Cyperaceae*). The overlying second phase (*c.*6000 BP) represents a first response to a more arid environment (an increase in trees and shrubs, including *Acacia*, *Tamarix* and *Artemisia*, with plants indicative of standing water diminishing), but also with an increasing range and percentage of wild grasses present (including *Panicum*). In the third and latest phase (*c.*4000 BP) conditions had worsened further; this is indicated by the dominance of a wide range of desert trees (*Tamarix*, *Acacia*), shrubs (*Calligonum*, *Moltkiopsis* and *Cornulaca*) and herbs and reduction or disappearance in earlier savannah plants. Nevertheless, there was still a wider range of flora than is present in the modern environment (Mercuri *et al.* 1998, 112-19; cf. Mercuri 1999, for comparative data from the Wān Afūda cave). The range of wild grasses exploited in Phases 2 and 3 at Uan Muhaggiag, and the large quantities found within the shelter, indicate systematic collection for food, and the accumulated knowledge of such plants will have contributed to the eventual emergence of agriculture, as the desiccation of the desert became more acute and the natural extension of wild plants still more limited (van der Veen 1995). The picture from Fazzān correlates reasonably well with evidence from elsewhere in the Sahara (Bernus 1993; Gabriel 1976; Haaland 1995).

The exploitation of plant resources is also clearly signalled by the abundant grindstones at the Neolithic campsites by the lakes and water sources and by the appearance of images of the date palm, especially in the Horse phase (Forni 1993, 219, two palms being harvested for dates in the Tāssilī and Wādī Jarat area; Mori 1969, 28, for palms in the Akākūs). At present, we lack clear definition of the early phases of



Fig. 9.11. a)-b) Skulls from Zinkekrā 13 excavations (ZIN 13.170, 13.204).

the domestication of plants in the late Pastoral sites, though by the early 3rd millennium BP cultivation of bread wheat, barley, the grape vine and the date palm was well established in the Wādī al-Ajāl (van der Veen 1992). Part of the problem may lie in the fact that most research at present has been carried out in the upland areas of the central Sahara, where human activity survived the onset of high aridity \approx 5000 BP because of marginally higher rainfall than in other parts of the Sahara. The development of agriculture, however, is linked not to the communities who continued to utilise the limited rainfall of the uplands, but to those who now started to exploit the groundwater resources of the low-lying depressions. The subsequent evolution of oases there has obliterated much of the evidence of late Pastoral communities in these areas, though there are hints from the Wādī Tanzzūft, for instance, of an increasing congregation of people in the valley in comparison with the upland shelters and the sand sea encampments, which were progressively less frequented or abandoned after 5000 BP (Cremaschi 2001).

What is particularly interesting about this transition to farming in Libya is that it seems to arise as a response to adversity, not opportunity. People turned to stock-raising and cultivation here when dramatic change in the availability of water made a hunter-gatherer existence increasingly more precarious.

Late Pastoral human migrations?

A complication in the process of the transition from the late Pastoral herding communities to the agricultural Garamantes is the possible role played by palaeo-berbers, postulated migrations of Mediterranean (non-negroid) peoples into the Sahara in the last two millennia BC (Camps 1980; cf. Brett and Fentress 1996; Hamid

2000; Muzzolini 1984). Such a movement appears to be clear in the rock-art, where Berber types are certainly attested alongside the earlier dominant negro physiomy (Lutz and Lutz 1995a, 140-44; Smith 1993; van Albada and van Albada 1993a, 547-54). In addition, the evidence for the diffusion of the horse and the chariot also fits with such movements of people westwards from the Nile (Barker 1989, 38-39; Camps and Gast 1982; Lhote 1982), and there is some support in the skeletal evidence (Fig. 9.11; Chamla 1968, 187-201; *Encyclopédie Berbère* s.v. anthropologie, 717-42). But it seems unnecessary to postulate large-scale migrations. The tale of a group of five young men from the Nasamonnes, based on the oasis of Awjila (Herodotus 2.32-2.33), who journeyed across the Sahara to the Niger, may provide an echo of the impact of small bands of travellers, utilising horses to penetrate deep across the Sahara from the oasis of Awjila.

What do we know of the emerging communities of the 2nd-1st millennium BC? The combined evidence of funerary monuments and burial practices, rock-art, Egyptian representations of Libyans and limited information on their material culture suggests a society in transition. For one thing there was a fundamental change in armaments. The bowmen of the Pastoral period gave way to spearmen in the caballine phase (Fig. 9.12a/b), with metal-tipped weapons appearing in the later stages (*Encyclopédie Berbère* s.v. armes, 888-

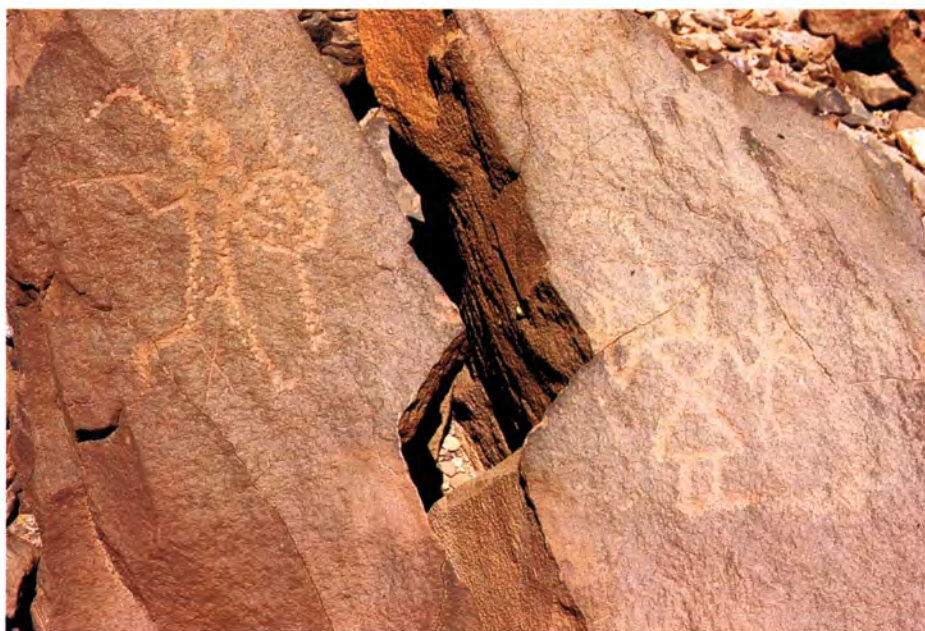


Fig. 9.12. a) archer from Matkbandūsh; b) spearmen from Wādī al-Ajāl (ZIN 279).



Fig. 9.13. Libyans on Egyptian relief (after Bates 1914).

904; Muzzolini 1992). There are close parallels with the Libyans depicted in Pharonic reliefs (Fig. 9.13), captives of war who originated from the tribes and oasis communities close to the Nile in the Western Desert (on the Eastern Libyans, see Bates 1914; White 1989; 1994). These characters in both Egyptian and Saharan reliefs feature ostrich-feather plumes, distinctive hairstyles, penis sheaves, tattooed bodies (though that is a feature of earlier periods also: Bates 1914, 137-40; Sansoni 1993), increasingly elaborate belted tunics (Bates 1970, 118-41; Ruprechtsberger 1998, 66-69). The rock-art of the late Pastoral phase shows an increasing fascination with fertility and with theophoric imagery (Beltran 1993; Choppy and Choppy 1996). Animal-headed figures feature prominently, some clearly masked humans perhaps involved in ritual dance or action, others apparently supernatural (Camps 1997a; Lutz and Lutz 1995a, 145-71; van Albada *et al.* 1994, 51-55 and 60-69). The parallels between this imagery and the religious panoply of ancient Egypt – the latter clearly influenced profoundly by the desert communities bordering the Nile valley – are surely significant. The significance of cattle and sheep in funerary rituals at Kerma on the Upper Nile in the 2nd millennium BC is another manifestation of the same tendency (Chaix 1988; 1993). Ritual and magic eventually transcended to religion. Burial monuments became increasingly more elaborate in the last millennia BC, with greater social differentiation apparent (Di Lernia *et al.* 2001). Although some of the keyhole monuments in southern Algeria and Niger may pre-date the climatic down-turn, the antenna tombs appear to belong to the period 5000-3000 BP (Milburn 1996). As we noted in Chapter 6, the antenna tombs were a significant development of the late Pastoral period, reflecting the emergence of elites within the desert societies.

The chariot is a major focus of discussion and contention in Saharan studies (Camps 1989; *Encyclopédie Berbère* s.v. chars, 1877-92; Muzzolini 1989; 1990a; 1994). Representations of wheeled vehicles, normally drawn by a pair of horses, are extremely common in the Sahara and they are generally admitted to provide the earliest evidence of the presence of both the horse and wheeled transport there, probably passed east to west along the chain of oases running west from the Nile (on the dispersal of the horse in North Africa, *Encyclopédie Berbère* s.v. barbe, equidiens, 1348-56, 2664-77; Muzzolini 1996). Many examples show chariots pulled by horses at full gallop, but there are a smaller number of examples of chariots at rest, being harnessed and even drawn by bovines. There is still debate about the earliest date for this importation, but the consensus is that horse and chariot alike are probably a feature of change in the early 1st millennium BC (Muzzolini argues not earlier than c.700 BC, though some have sought to push the date back to the mid-2nd millennium BC).

The interpretation of their role in society is far more controversial, with widely ranging views, though much of the debate has ignored a distinct peculiarity of the data. The people who we might expect to have been responsible for the diffusion of horse and chariot from oasis to oasis are palaeoberber oasis-dwellers, developing agriculture and trade routes with the help of the horse in particular. But the vast majority of images are found away from oases in the shelters of traditional pastoralists, and it is unclear if they are representing something that was central to their own small-scale communities or an aspect of the major changes that were affecting their neighbours. Camps (1987; 1989; 1995) has argued strongly that they represent the rise of an 'aristocracy' among the desert communities and the emergence of increased social hierarchy. Ceremonial use is certainly a possible explanation for some of the images. On the other hand, the reference in Herodotus to the Garamantes hunting Ethiopians in four-horse chariots has often been taken as evidence that these were also vehicles of war, and that their distribution to some extent reflects the range of Garamantian activity. Camps has objected that there are no scenes that unequivocally depict the chariots being used to attack people and that in any case the bulk of the rock-art images are of *bigae*, not *quadrigae* (Spruytte 1993, for a reconstruction of the typical two-horse chariot). Similarly, the idea of a Garamantian 'chariot route' has long since been discredited because of the existence of large tracts of unsuitable terrain between areas of chariot depictions, and because the majority of chariot representations lie outside their territory. Yet, one of the attractions of the chariot over a cart is that it can be disassembled and transported on horse- or camel-back across soft sand or stony ground and then reassembled. That could allow some use by raiding parties, but rules out any use in trade. The wide distribution of the images, and their division into three broad zones (central Sahara, western Sahara and Atlas: see Camps 1995, 153) suggests that we are witnessing a broader trend in Saharan society at this time, not something limited to the Garamantes and their immediate neighbours. An interesting aspect of the distribution is that many representations come from areas of the Central massifs of the Sahara (Tāssīlī and Tadrart in particular) that were unsuitable for chariots (Lhote 1982; Soleihavoup *et al.* 2000), whilst comparatively few representations have come from the Garamantian heartlands (the example from near Jarma is an important exception in this regard: Fig. 8.28 above). One possibility is that many of the images were created not by the owners of such vehicles, but by relict pastoral groups who were increasingly coming into contact with the oasis-based communities who had adopted them. This fits with the context of much of the rock-art, on the walls of rough rock shelters traditionally used by pastoral groups. The images may have had a practical value in transmitting knowledge about a potential peril or something foreign that had caught the imagination of the pastoral communities. But the standardisation of iconographic elements (especially the 'flying gallop') in many scenes

suggests that images may have had very specific symbolic significance to those who created them. Perhaps they were intended to have an apotropaic effect against the consequences of encountering horsemen and chariot parties when crossing regions where they could be deployed for raids. The lack of explicit images of battle could then simply reflect aversion on the part of these communities – were chariots not a matter of pride or ownership, but a symbol of their progressive subjugation? A further possibility suggested recently (Soleihavoup *et al.* 2000, 74-79) is that chariots were used as an aid in hunting wild animals, representing a new version of a traditional theme of rock-art. The truth may well combine elements of these various theories.

The Late Pastoral Phase was thus a period of accelerated social change due to climatic and environmental down-turn and marked by the arrival of new people and new technology, transforming the lifestyle of the existing inhabitants in the emerging oasis depressions. The Garamantian civilisation arose out of this new situation, marking a distinctive and significant phase in the cultural evolution of the Saharan region.

THE GARAMANTES

The Garamantes have for long suffered from neglect. By way of illustration, the *Oxford Classical Dictionary* (3rd edition) contains no proper reference to them, nor does the *Cultural Atlas of Africa* (Murray 1981, 48 mentions the ‘kingdom of Garama’ but omits it from the map showing significant African kingdoms). Similarly Wheeler’s verdict on them as ‘Fezzani nomads’ (1954, 130) has been consciously or subconsciously echoed in much subsequent scholarship on the Sahara, despite the evidence available to suggest a rather different interpretation. The period of the Garamantes (between 900 BC and AD 500) brought in or consolidated a series of dramatic changes:

- the rise of a major polity and civilisation in the Sahara (Daniels 1970a; Ruprechtsberger 1997);
- the development of urbanism (Daniels 1971a, 262-5);
- the evolution of a hierarchical and probably slave-using society (Daniels 1970a, 27-35; Liverani 2000b);
- the adoption of a written script for the Libyan language (Daniels 1975);
- the further development of agriculture to encompass a range of Mediterranean and desert crops that require intensive irrigation (cereals, grapes, olives, dates) (Daniels 1989, 56-58; van der Veen 1992);
- the introduction of the horse, the camel and wheeled transport to the Sahara (Camps, 1989; Lhote 1982; for the camel see *Encyclopédie Berbère* s.v. dromadaire; Monod 1989);
- the creation of trade and political relations that extended north to the Mediterranean, east to Egypt and south to sub-Saharan Africa (Bovill 1968, 1-44; Law 1967; Fontana 1995);
- a massive demographic expansion to a level that was probably not equalled again until the last 40 years (Daniels 1989, 49, estimated that there were at least 120,000 Garamantian burials in the al-Ajāl alone).

As we have seen, the Garamantes represent in part a continuation of the local Neolithic tradition, as is clear from lithic and ceramic finds at their early settlements (above 337). But they probably comprised a great confederation of tribes and there are



Fig. 9.14. 'Garamantian' portrait (ZIN 902.18).

indications that some elements may have migrated from oases further east, nearer Egypt, bringing with them (or obtaining by the same desert route) knowledge of improved technology for oasis cultivation (notably the *foggara*). Skeletal data supports the view that the Garamantes comprised a mixture of Berber and Negro types (Chamla 1968, 192-94; Sergi 1951). Several images from the Massāk appear to depict 'foreigners' of distinctive appearance, though it is impossible to judge how they interacted with the traditional pastoral groups. The Caballine-phase rock engravings from the Wādī al-Ajāl itself give us some impression of how the Garamantes saw themselves, albeit within the artistic conventions of the time that represented the body as a simple biconical form made up of two triangular shapes. There are several clusters of reliefs of mounted warriors brandishing weapons (TAG 9, FJJ 27-28), an extraordinary scene showing a Garamantian standing alongside three chariots and three untethered horses (GSC 41), and other scenes showing warriors on foot (ZIN 279, 902.20). The standard armament appears to have been spears and a small circular shield. The Garamantian 'portrait' from Zinkekrā (ZIN 902.18) is to date without parallel in the rock engravings of Fazzān, and if indeed cut by or for a Garamantian may reflect external influences (Fig. 9.14). The overriding impression from these images is that the Garamantes were a martial people, who celebrated elite status with images of chariots and horses.

Garamantian settlement and chronology

Most of the early Garamantian settlements currently known are situated along the edge of the escarpment, many in defensible positions, such as the classic hillfort site of Zinkekrā (Fig. 9.15). Botanical remains from the first half of the first millennium demonstrate that irrigated cultivation had begun early in that period (van der Veen 1992; Daniels 1989, 56-8; Mattingly *et al.* 2002). However, it is equally apparent that Garamantian society and culture did not suddenly appear fully-formed in the Central Sahara. Rather it was the result of a long process of evolution across *c.*1,500 years, which can be broken down into a series of four sub-phases.

GARAMANTIAN 900 BC - AD 500

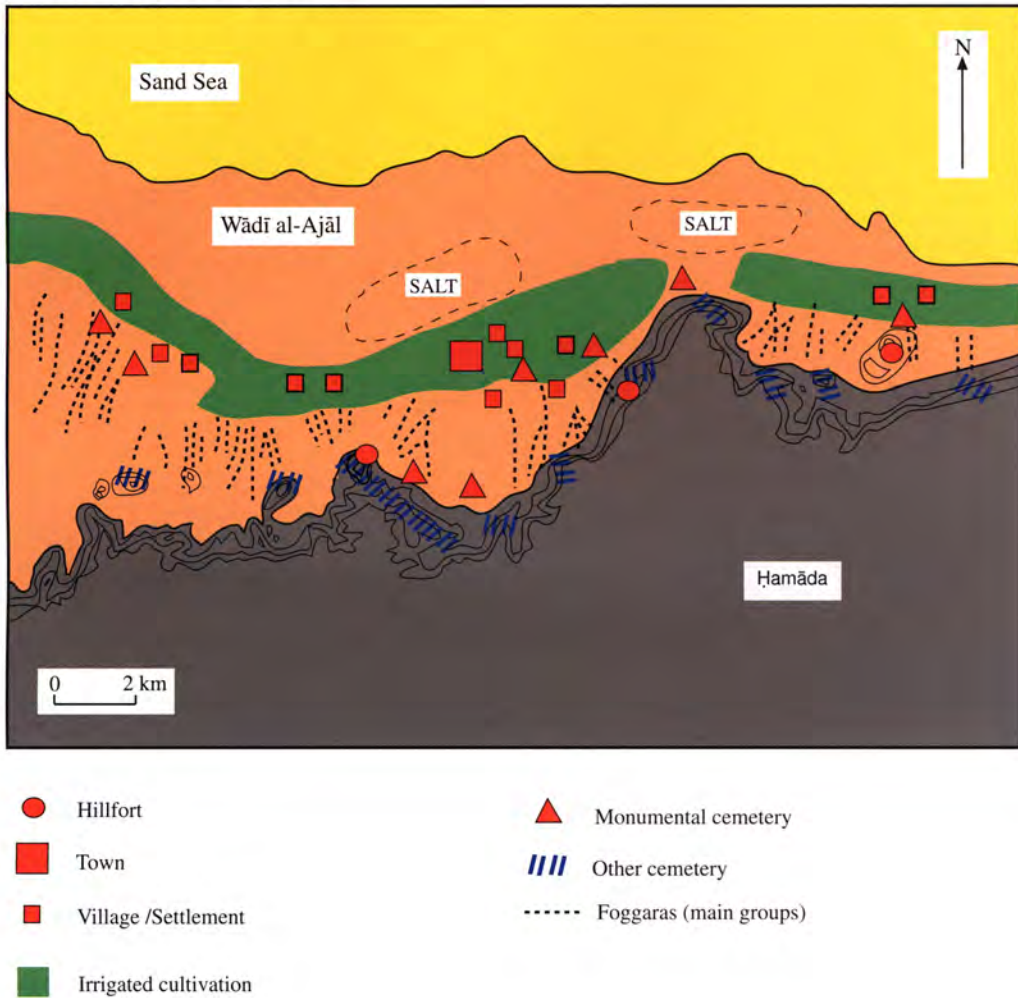


Fig. 9.15. Model of Garamantian phase activity in Wādī al-Ajāl.

The period from $c.$ 1000-500 BC is the **Early Garamantian phase**, with its cultural roots in part in the Late Pastoral traditions of the 3rd-2nd millennia BC. Settlements of this phase were sited on defensible bluffs of the escarpment edge of the Wādī al-Ajāl, with the type site represented by Zinkekrā. At least 13 examples of hillforts or escarpment-edge sites are now known in the Wādī al-Ajāl area (see *Archaeology of Fazzān 2, Gazetteer*) and the perched villages at Idri and Tmissa in the Wādī ash-Shaṭī appear to be the medieval successors of Garamantian settlements. It is likely that targeted research in the Wādī al-Ajāl and elsewhere in Fazzān would yield many further examples of such early Garamantian sites, though it seems clear that overall site numbers are lower in this and the subsequent proto-urban phase than in the Classic Garamantian phase (see below). The first phase of occupation at Zinkekrā ended around 500-400 BC (van der Veen 1992, 12-13), at which point it appears that an urban site originated in the valley centre at Jarma (ancient Garama), though occupation probably continued at Zinkekrā on a reduced scale until at least the 1st century BC. This period 500-1 BC may be characterised as the **Garamantian proto-urban phase**.

Over time, Garama emerged as the Garamantian capital and in the Roman period, what we refer to as the **Classic Garamantian phase** (AD 1-400), it was adorned with substantial public buildings and temples utilising stone on a scale and a quality of



Fig. 9.16. *Qaṣr bin Dughba wall circuit.*

dressing not previously witnessed. Since there is no evidence to suggest a Roman occupation of Fazzān, these must be the result of contact, diplomacy and trade between the Roman empire and the Garamantian kingdom. Garamantian culture, nowhere better illustrated than in its extraordinary funerary architecture, was extremely eclectic – though the variety of tomb-types in contemporary use may also reflect maintenance of discrete tribal identities within the structure of the polity (Ayoub 1967b; 1968; Daniels 1971a, 265-8; el-Rashedy 1988a/b; Ruprechtsberger 1997, 51-65). **The Late Garamantian Phase** (AD 400-700) is broadly speaking a continuation of the Classic Phase, but with an increasing emphasis on defensive structures – walls, *qṣur* and so on (Fig. 9.16). The quantity and quality of imported goods from the Mediterranean world also seem to have declined from a peak period in the 1st-2nd centuries AD. This suggests a society less closely connected with the Roman empire and perhaps with its trade links in general diminishing.

The evolved settlement pattern (Figure 9.15) reflects the increasing localisation of farming activity in the oases along the base of the depression. In addition to the large urban centre at Garama, there were clearly a number of major settlements whose size and internal organisation would suggest an interpretation as towns. *Qaṣr bin Dughba* (GBD 1) in the eastern *Wādī al-Ajāl* is one clear example (Fig. 5.7), as is *Qaṣr ash-Sharrāba* in the *Wādī ‘Utba* area (Fig. 5.13). But there must have been others, and the prime candidates include *Idrī* in the *Wādī ash-Shāṭī*, *Sabhā*, *Zuwīla* and *Aghram Nadarif* (near *Ghāt*). It is now clear that the characteristic Garamantian settlement was a nucleated community located in the centre of the depressions where agriculture was practised. In addition to urban settlements, there were densely packed villages and hamlets all along the valley of the *al-Ajāl*, to match the extensive evidence of cemeteries along the foot of the escarpment. The immediate hinterland of *Jarma* alone contains over 20 such sites, and the total for the *al-Ajāl* in Garamantian times will almost certainly have exceeded 50 (compare *c.* 30 villages and hamlets of early modern date listed by Despois 1946).

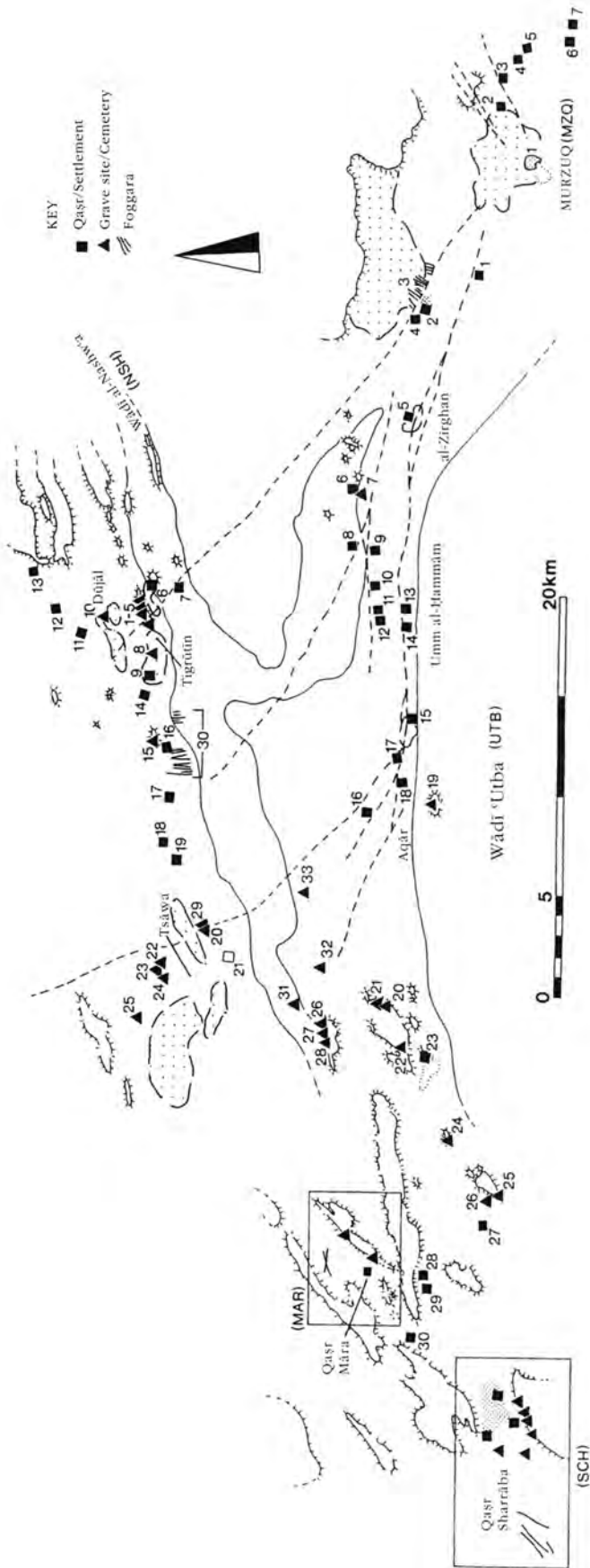


Fig. 9.17. Map of Garamantian sites in southern Fazzān ('Utba, Murzuq basin).

It is almost certain that a similar (though perhaps less dense) pattern of settlements of Garamantian date existed in the Wādī ash-Shāṭī (where the main iron ore resources lay), in the Sabhā oasis, in the Wādīs Barjūj and ʿUtba, and the Murzuq, al-Ḥufra and ash-Sharqiyat depressions (Fig. 9.17; on the southern areas, see Edwards 2001). The outlying districts of the Wādī Tanzzūft near Ghāt and in the Wādī Ḥikma were less well provided with subterranean water supplies, but there are indications that the main oases in these areas were also developed during the Garamantian period (Cremaschi 2001 indicates 11 sites of Garamantian date in the Tanzzūft). Where more detailed information is available, as in the Wādī Tanzzūft and the Wādī Barjūj, Wādī ʿUtba, Murzuq, al-Ḥufra and ash-Sharqiyāt depressions, it is apparent that Garamantian culture was not a straightforward replica of that encountered in the al-Ajāl. In particular, funerary monuments appear to have been more restricted in evolution and elaboration outside the heartlands of the Wādī al-Ajāl. With the sole exception of the oasis of Ghuddwa, the archetypal Classic Garamantian stele and offering-tables, in association with a dynamic range of tomb types, are limited to the al-Ajāl. Elsewhere, the prime elite burial type is the circular tomb, occasionally with simple funerary annexes for the placement of offerings (Figs 6.20-22, 6.30-34). Nonetheless, aspects of burial orientation, the use of red ochre, the presence of headrests and the range of imports from the Roman world suggest close cultural affinities with the Garamantes. Similarly, the indications of irrigated agriculture in these areas provide another link with the Garamantes and the historical sources imply a considerable extension of Garamantian power, at its height, in all directions. Despite these differences in material culture, then, there seems to be no good reason to disassociate the other main groups of oases in Fazzān from the Garamantian kingdom. Indeed, the evidence of iron smithing, but not smelting, and the primary processing of carnelian and amazonite in the Wādī al-Ajāl indicate control of distant resources. What we can recognise in these data, however, is the hegemonical nature of the Garamantian power, encompassing a range of desert oases, each with appreciably different traditions. The name of the Garamantian capital, Garama, indicates that the kingdom was built up initially from a base in the western Wādī al-Ajāl. It is no surprise to see the greatest levels of wealth being deployed in this area during the Classic Garamantian phase. Just as in the medieval period, when regional tendencies were also apparent, the unification of the whole of Fazzān will have depended on military power. When that power waned in late antiquity, the kingdom appears to have fragmented and the medieval sources mostly talk of the populations of individual oases.

Although much of Garamantian territory was waterless desert wastelands, the maximum geographical reach of the kingdom extended along chains of oases across an area of c.250,000 km². No reliable figures can be suggested for the number of villages and towns, though the total seems certain to have by far exceeded the approximately 100 villages and hamlets of early modern times. Similarly, it is not unreasonable to suggest that at its peak the population of Garamantian Fazzān greatly exceeded the 33,500 recorded in the Italian 1936 census (Sahara Italiano 1937: 403-15). A maximum figure in the range 50,000-100,000 is not implausible.

Garamantian farming

The irrigation systems, the foggaras, were a major landscape feature, with more than 600 constructed (involving the digging of more than 100,000 shafts up to 40 m deep and with the total combined length of the underground channels extending to several thousands of kilometres). Although such features are notoriously difficult to date, we are certain that they relate primarily to the Garamantian and early Islamic periods (see above Chapter 7). They clearly facilitated large-scale and extensive cultivation of the valley-floor oasis area (Fig. 9.15). The spatial relationships between them and the

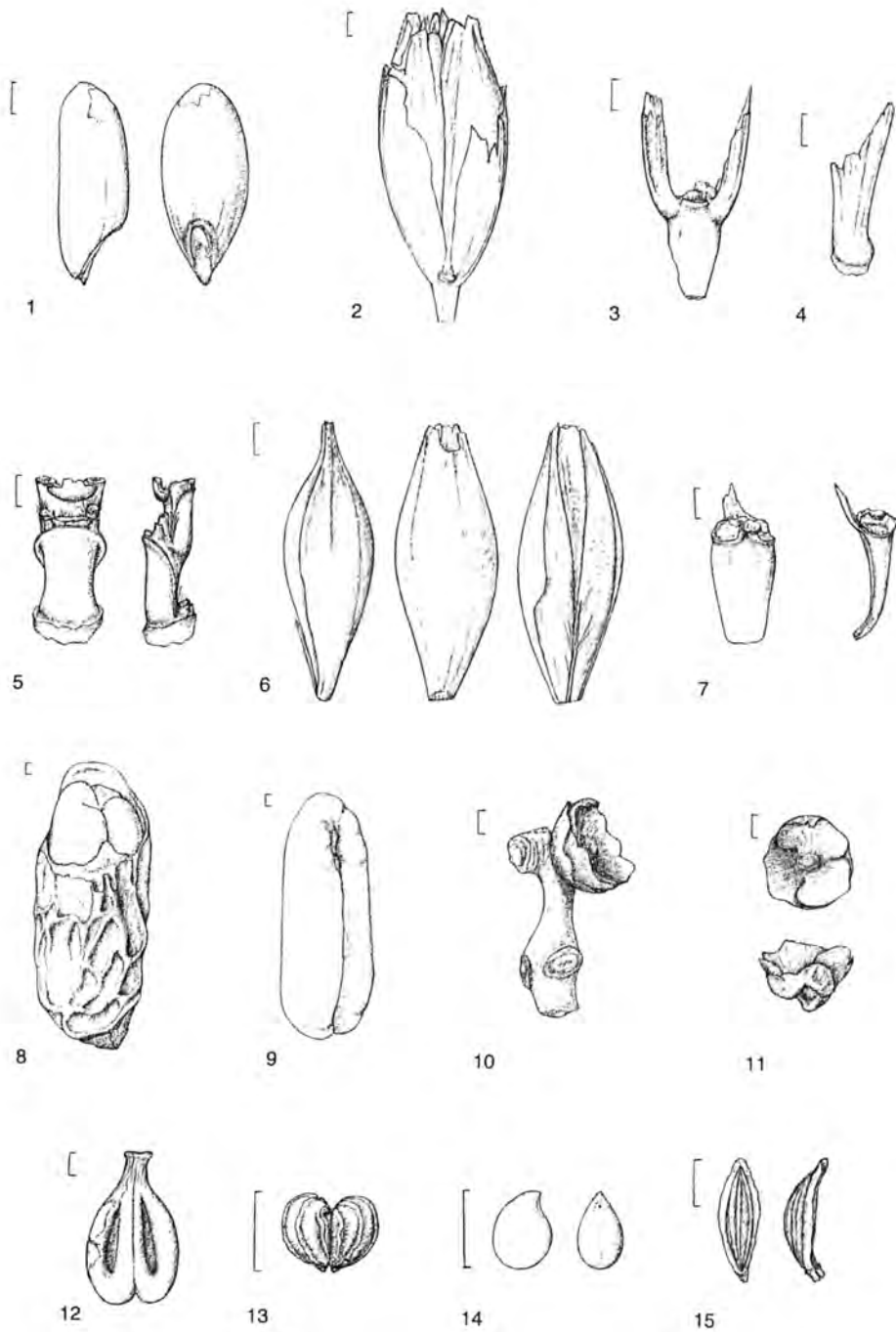


Fig. 9.18. Plant remains from Zinkekrā: 1.-4. *Triticum dicoccum* (Emmer wheat); 5.-6. *Hordeum vulgare* (barley); 7. *Triticum aestivum* (bread wheat); 8.-11. *Phoenix dactylifera* (date); 12. *Vitis vinifera* (grape); 13. *Apium graveolens* (celery); 14. *Ficus carica* (fig); *Anethum graveolens* (dill). All scale bars are 1 mm. (After van der Veen 1992, figs 5-8).

numerous Garamantian cemeteries along the escarpment suggests that the burial grounds may in part have been deliberately located so as to stand as markers of ancestral claims to water rights. A crucial question we are still seeking an answer to is when these systems were abandoned – perhaps in part because of falling water levels in the aquifer. As noted in Chapter 7, the available evidence points towards a key phase of transition prior to the 11th–12th centuries AD.



Fig. 9.19. Vineyard within view of Zinkekrā (January 2001).

Garamantian agriculture was well developed at an early date, to judge from a series of samples dated to the first half of the 1st millennium BC from Zinkekrā (Fig. 9.18, Table 9.1) (van der Veen 1992). Cereal grains and chaff from the Zinkekrā deposits included evidence for emmer wheat, *Triticum dicoccum*, six-row barley, *Hordeum vulgare* and bread wheat, *Triticum aestivum*. There was no occurrence in these 1st-millennium contexts of sub-Saharan cereals such as sorghum. Fruits were dominated by the remains of the date palm, *Phoenix dactylifera*, but seeds of figs, *Ficus carica*, and pips of grapes, *Vitis vinifera* were also present. Even today, a well-established vineyard exists within sight of Zinkekrā (Fig. 9.19). The fruits of two wild plants were also identified: the fruits of sumach, *Rhus tripartitus*, and the seeds of bitter apple, *Citrullus colocynthis*. There was also evidence of the tamarisk tree, *Tamarix* sp. Twenty-four species of herbaceous plants were identified, including a sedge similar to *Cyperus laevigatus* (sedge) and two other species of the family of *Cyperaceae*, similar to *Eleocharis caribaea* (spike-rush) and *Cladium mariscus* (great fen sedge). Also very common were *Aizoon hispanicum*, *Reseda lutea* (mignonette), *Reseda alba/villosa* (mignonette), and *Chenopodium murale* (nettle-leaved goosefoot), common weeds in desert regions. Grasses included: *Phalaris minor* (lesser canary grass); *Phragmites australis* (common reed), a perennial reed-like grass of water edges and marshland; *Hordeum spontaneum* (wild barley); *Dactyloctenium aegyptium* (Egyptian finger-grass); *Panicum turgidum* (millet) and *Pennisetum divisum* (millet), two perennial desert grasses. Another desert shrub was *Cornulaca monacantha*. Present in only small numbers were *Portulaca oleracea* (purslane), *Euphorbia granulata* (spurge), *Medicago laciniata* (medick), *Asphodelus tenuifolius* (asphodel), *Heliotropium* cf. *europaeum* (heliotrope) and the fruits of three aromatic herbs were present: *Apium graveolens* (wild celery), *Anethum graveolens* (dill), and possibly *Foeniculum vulgare* (fennel) (van der Veen 1992, 15-31).

This important work is now supplemented by a sequence of stratified samples from the excavations at Jarma (analysis of this material by Ruth Pelling is in progress and

will be reported on in *Archaeology of Fazzān* 4. On the Saharan botanical background, see Chevallier 1932; Durand and Baratte 1910; van der Veen 1985a/b; 1995). A small amount of faunal evidence from CMD's excavations at Zinkekrā, Sāniat Jibrīl and Jarma (see *Archaeology of Fazzān* 3), is now supplemented by a larger sample from the FP excavations (again in course of study). Some preliminary conclusions are possible. The date palm was central to Garamantian farming, as it has been for all subsequent phases of life in Fazzān (*Encyclopédie Berbère* s.v. dates/dattiers, 2234-45; Lethielleux 1946, 193-239). However, the early appearance of well-developed cereal cultivars (notably bread wheat) at Zinkekrā is significant, as is the presence of other cultivated plants that were not previously native to the region. The weed species for the most part indicate harsh arid background conditions, though a few species might suggest some marshy pools or irrigated fields. Additions to the 'early' list from Zinkekrā are relatively few at Garamantian Jarma, though there is some preliminary evidence that millet and sorghum may have become progressively more important in late Garamantian or early Islamic times (cf. Rowly Conwy *et al.* 1997, for sorghum in Sudan), perhaps indicating the first stages of a more intensive system of double cropping (with these new crops providing the second harvest in high summer).

Site	Cultivated Plants	Domesticated animals
Zinkekrā (Early Garamantian)	Date Palm Bread wheat, Emmer Wheat Barley Grape vine Fig	Pig Sheep/goat Bovines Horse/donkey
Jarma (Classic/Late Garamantian)	Date Palm Bread wheat, Emmer Wheat Barley Grape vine Fig Olive? Sorghum? Pearl Millet	Pig Sheep/goat Bovines Horse/donkey Camel

Table 9.1 Botanical and faunal components of Garamantian farming.

The faunal record also shows a substantially complete range of livestock at Zinkekrā, though it is potentially interesting that the camel is not attested in those early contexts. It is certainly present at the oasis-centre sites of Classic Garamantian date. The pig and horse appear to be other introductions of the Garamantian period, though these appear also at the earlier Garamantian sites.

The Garamantes and the Kushites of Meroe

The Garamantes were not the first state to emerge in the Sahara. The Upper Nile region, above the first cataract at Aswan and extending to Khartūm in Sudan, shows early and impressive development of complex states and some of the oases closer to the Nile Valley also appear to have very early origins (de Flers and de Flers 2000). This was in part due to their greater accessibility to Nilotic culture, but also to the presence of the Nile – forming a thin strip of cultivable land through the desert. There had been an early polity based on Kerma, close to the third cataract from the late 3rd-2nd millennium BC, with the first indications of a successor Kushite state emerging in the early 1st millennium BC, following the collapse of Egyptian New Kingdom control of the region south of the cataracts (Bonnet 1990; Davies 1991; Kendall 1997). The Kushite rulers extended their kingdom to encompass the Lower Nile and established

themselves as the XXVth Dynasty from c.747-656 BC, so it is no surprise that the major monuments at Meroe and other Kushite centres are closely based on Egyptian architecture, notably the temples, palaces and pyramid tombs (Welsby 1996, 99-136). To this extent, the Kushite state differs from the Garamantian one in that it is so closely linked with Egyptian Nilotic civilisation, but it also represents a parallel example of state formation, agricultural development, the spread of writing, and other innovations into the North African desert zone. A comparison with Meroitic culture is instructive about the route by which some of these key cultural components may have passed into Saharan and sub-Saharan Africa. Apart from the presence of pyramid cemeteries in the Wādī al-Ajāl that suggest parallels with those of the Kushites (but could equally plausibly be an echo of those in Lower Egypt), there is nothing to suggest direct contact between Fazzān and Meroe. Indeed the differences are significant. The agricultural components, the physical appearance, the armaments (Garamantes use spears, Kushites primarily bows), all indicate a link with an east-west pattern of transfer to Garamantian lands from the Lower Nile via the oases of the Western Desert of Egypt. The kingdom of Kush thus represents a precocious, but essentially separate, process of state formation to that of the Central Sahara. The Garamantes, on the other hand, were part of a great leap forward of agriculture, metallurgy, trade, urbanism and state formation into the central Sahara and may have served as a stepping stone for the onward transmission of ideas and technology to other areas of the Western Sahara and sub-Saharan zones. The chronology of early state formation in Western Africa and Central Sub-Saharan Africa is still poorly understood and may well have occurred independently of any outside stimulus (McIntosh 1999; McIntosh *et al.* 1996). However, the existence of an incipient state in Fazzān from the 1st millennium BC, with trading interests extending towards both Chad and the Niger basin, could well have been a factor in accelerating such processes. More work is required on exploring the cultural and trade links between Chad and Fazzān in the pre-Islamic age (cf. Holl 1995; Treinen-Claustre 1982).

The relationship between the Garamantes and the Roman empire is clearly an important aspect of the history of the Libyan Sahara. The literary sources indicate that there was an intensification of Roman interest in the remote desert periphery under Augustus. He launched campaigns against not only the Garamantes (20 BC), but also against the Kingdom of Kush (24 BC) and the peoples of the Arabian peninsula (c. 26-25 BC). The close coincidence in dates suggests that the purpose of these campaigns was aggressive imperialism, sizing up possible conquests and the economic resources associated with them. In each case, Rome was taking on desert-based kingdoms of some sophistication. Despite a degree of military success in each case, these campaigns were not followed up by permanent conquest, and it appears that Rome took the decision that the logistics of attempting permanent occupation of these kingdoms was untenable. The subsequent claim in Roman sources that these territories were part of Rome's *imperium* suggests that treaty relations were established and that Rome tried to influence events from a distance. There are clear parallels here again between the Garamantian state and the Kingdom of Kush. Both these desert kingdoms show evidence thereafter of a significantly increased volume of trade and contact with the Roman world, though both remained independent of direct control (Welsby 1996).

The Garamantian economy and trade

As we have seen above, the economy of ancient Fazzān was undoubtedly founded above all on agriculture and the foggaras indicate that this was a period of peak regional production. However, there is also ample evidence to show that the Garamantes were engaged in much more wide-ranging economic activity. Several of the surveyed settlement sites, in addition to excavations at Jarma and Sāniat Jibrīl, have yielded



Fig. 9.20. Metalworking hearth from GER 2.

evidence of metallurgy, both ferrous and copper alloy (Fig. 9.20). Fazzān can be seen as an important early centre of African metallurgy (cf. Grebenat 1993; Shaw *et al.* 1993, 432-550; Vercoutter 1981). As yet there is no evidence of where the Garamantes carried out their primary smelting of iron, though that is likely to have been close to the major regional ore source in the Wādī ash-Shāṭi, an area as yet very poorly explored for its Garamantian remains. The copper source may well have been in West Africa, though Strabo (17.3.11) mentions a copper mine somewhere in the Libyan desert. There is some evidence of casting of small copper ingots at Jarma itself (ingot moulds were found in the 2001 excavations). Sāniat Jibrīl has been identified as a major centre of manufacturing activity, though similar processes were evidently carried out at many other sites. A large number of hearths have been identified from surface traces, along with a crucible fragment and numerous off-cuts of copper alloy. Preliminary analysis shows that both iron smithing and copper-alloy working were being carried out in the same hearths. This conclusion is supported by analysis of finds of hearth bottoms and other metallurgical debris from the FP excavations at Jarma. Given the overall dearth of Roman coins at Garamantian sites (see *Archaeology of Fazzān 2*, Coins from the survey), the ‘concentration’ of 10 silver denarii at Sāniat Jibrīl suggests that some silver-working may also have been carried out there, using the coins as bullion. In this context, we should also note that al-Idrīsī (Levtzion and Hopkins 1981, 121) mentioned a silver mine (by the 11th century of poor yield) located a three-day journey from Tsāwa and thus certainly within Garamantian territory earlier. Finds of gold artefacts and bullion at Jarma hints at gold-working also (Fig. 9.21; Ayoub 1962a, 23; 1967a, 28-31; no date, 25-26 and illustration 7).

There is a mass of evidence for the working of semi-precious stones at Garamantian sites (again small quantities recovered by survey are put in perspective by huge numbers of fragments from excavations at Sāniat Jibrīl and Jarma). The stones involved are the translucent red carnelian (known in the Roman sources as Garamantian carbuncles or Carthaginian stones – the latter reference simply suggests the trade route by which they first reached a Roman market!) and an opaque turquoise material commonly known as amazonite (Fig. 9.22*b*). The sources of the carnelian is

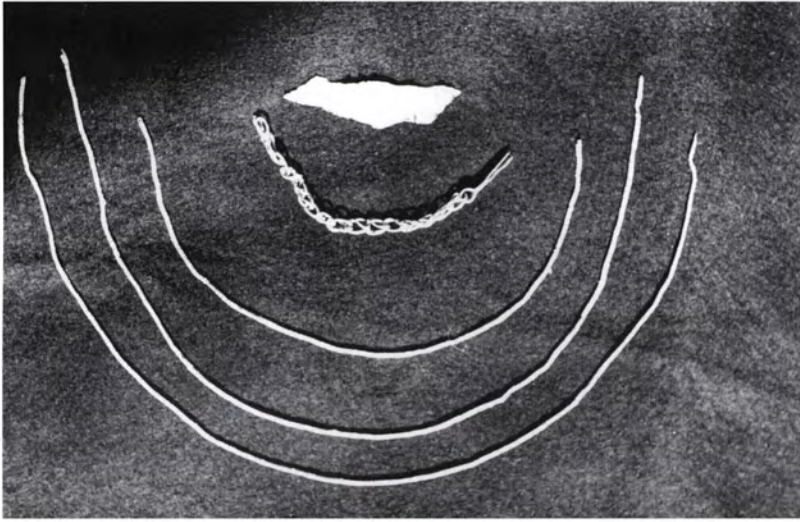


Fig. 9.21. Gold finds from GER 1 (CMD 1963 photo of objects then in Sabbā Museum).

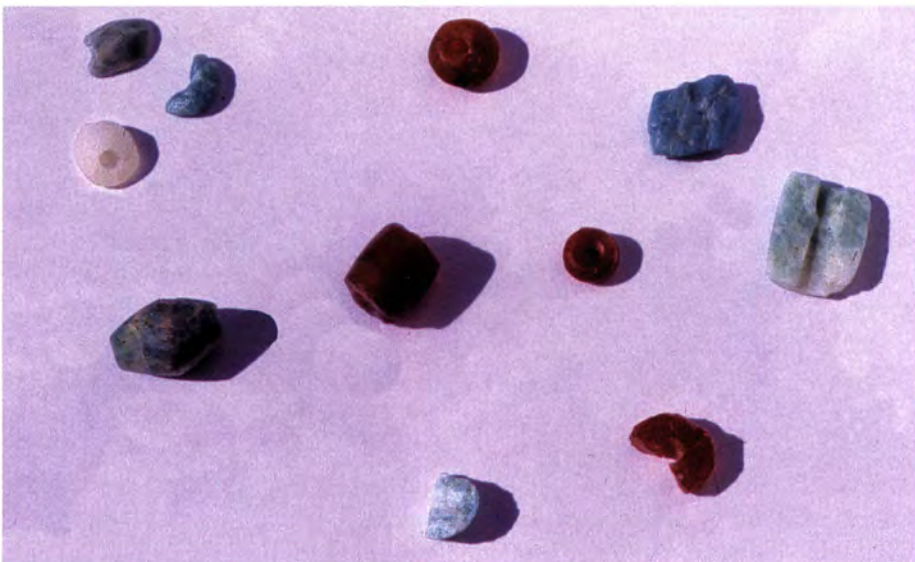


Fig. 9.22. a) Beadmaking equipment; b) stone beads from GER 2.

still uncertain, though in view of the presence of abundant waste material at our excavated sites, they probably lay within Garamantian territory in its most broadly defined sense, rather than further afield. The most likely source of the carnelian is the volcanic area of northern Fazzān, where geologists have reported seeing potential parent material (pers. comm.; cf. also Lefranc 1986, 309-10 who suggested that Jabal al-Ḥassāwana was the area of the *mons Gyri* mentioned by Pliny (NH 5.35-38 as the source of gems). This accords with other indications in Pliny (NH 37.92, 37.104; cf. Strabo 17.3.11 for less precise geographical indications) suggesting that the source could also be considered to lie in the 'Nasamonian mountains', south of the Greater Syrtes. Jabal al-Ḥassāwana lies at the northern extremity of Garamantian lands, where it bordered with the territory of the Nasamones. The amazonite (or 'zuma stone' as it is sometimes known) appears to originate in northern Tibesti. Rainey (1992, 178-79) failed to locate a source near Wāw an-Nāmūs, but Monod (1974; 1984) reported an ancient quarry at 'Eghei Zuma' (ʿArq Zūmā) in northern Tibesti. This latter identification is now confirmed by de Michele and Piacenza (1999), and this appears to be the source of the material found at Jarma (de Michele pers. comm.).

There was a well-established Saharan and sub-Saharan tradition of carnelian bead-making from the latter millennia BC, especially focused on the western Sahara and the Niger area (Calegari 1993b; Gausson 1993), though the possible connection between the 'Garamantian' carnelian and trade with sub-Saharan regions remains to be investigated. The most common local use appears to have been for bead production, though in the Roman world carnelian was predominantly used for ring stones, though Pliny (NH 37.104) noted that the Garamantian carbuncle was not ideal for gem stones as sealing wax tended to adhere. Pliny (NH 37.92, 37.104) attested to the importance of the Sahara as a source of carnelian, when he stated that there were two main types of 'carbuncle' in the Roman world, Indian and Garamantian/Carthaginian. The export of carnelian for use as intaglios and as jewellery in the Roman world is thus a potentially significant export from Fazzān to the Mediterranean, though we have not found evidence as yet for such bezels being produced at our sites. Flawed and broken half-finished beads in these stones attest to local production, as do the grooved stones, which were used to shape and polish both the semi-precious beads and ostrich eggshell beads. These 'bead polishers' have been recorded in very large numbers at Sāniat Jibrīl (Fig. 9.22a), but are also attested at Jarma itself and several other settlements, including Zinkekrā (Daniels 1968, 128 and 173, for illustrations; cf. Camps Fabrer 1966, 23-27, for parallels).

Glass beads are also frequent finds on Garamantian sites (Fig. 9.23) and there are hints at Sāniat Jibrīl that glass working, at least for bead production, also took place there (*Archaeology of Fazzān* 2, Small Finds). There are major local sources of key materials used in glass production, such as the natron deposits of the lakes of the Dahān Ubārī, just to the north-east of Jarma (Bellair *et al.* 1953, 116-31; Despois 1946, 180).

There is also abundant evidence for the local production of pottery and this combination of metallurgy, glass-making and pottery production demonstrates the relative sophistication of Garamantian control of pyrotechnical processes. Local ceramic production in Garamantian Fazzān (Fig. 9.24) included a range of distinctive forms with painted geometric decoration, probably of late Garamantian date (Leone in Mattingly *et al.* 2000a, 239-41; cf. Camps 1955b). Ayoub's claim (1962a, 20) to have found kilns at Sāniat Jibrīl may relate to metalworking hearths, but, although no certain kilns have yet been located, the similarity in fabric with local coarsewares suggests an origin for some of this painted ware close to Jarma. Terracotta figurines of human and animal form, discovered at Jarma in the 2001 excavations of Garamantian levels also appear to be local works (Fig. 9.24b/c).



Fig. 9.23. Glass beads from GER 2.



Fig. 9.24. a) Garamantian painted pottery; b) Garamantian clay figurine head (human); c) Garamantian clay figurine of animal (sheep?). Scale in cm.

Salt was another key commodity of the Sahara (el-Mahi 2000; Lovejoy 1986; Vikor 1979; 1999). Several areas of Fazzān have notable areas of salt flats (*sabkha*) and there is a particularly large one to the north and north-east of Jarma itself. This area has produced vestigial traces of large embankments on the *sabkha*, perhaps created to enhance salt formation. Numerous ashy features identified as salt-refining hearths have been located along the embankments, and these are associated with abundant Garamantian-period pottery. Non-metallic industrial residues, believed to relate to salt production (Ziegert 1974), are common finds on Garamantian settlements near to areas of salt flat and are suggestive of large-scale and well-organised salt production. It is unclear exactly with what the pyrotechnical process was concerned. Saharan and sub-Saharan salt production is normally carried out using simply the evaporative power of the sun (Vikor 1979; 1999; el-Mahi 2000), but some of the non-metallurgical pyrotechnical residues appear to contain salt (see report by Schrüfer-Kolb in *Archaeology of Fazzān* 2). Some specialised forms of salt occur in economically significant quantities in Fazzān. These include natron (a compound widely used in glass-making)



Fig. 9.25. Garamantian grinding equipment: a) early Garamantian rubber and grindstone; b) rotary querns.

from the Dawada lakes in the Dahān Ubārī, and alum (used as a mordant in dyeing and leather curing) from the Ghāt and Serdeles area (Lefranc 1991).

Rotary quern stones make their first appearance in Fazzān around the 2nd century AD (Fig. 9.25a/b). The changeover from simple rubbers to querns is most noticeable at Sāniat bin Huwaydī, where some early burials of the 1st century AD have flat leaf-shaped rubbers (Fig. 6.45a), whilst the later phases of burial, when they include grinding equipment, incorporate rotary querns. Some of the earliest examples, in basaltic lava, were imported from the Roman province to the north, but a distinctive set of models in local stone was soon developed and remained the standard grinding equipment down to the early 20th century.

There are hints in the ancient sources of the Garamantes trading in wild beasts (for the arenas of the Roman world) and in ivory (Ptolemy 1.8; Claudian, *Minor Poems*, 28.20.23; Desanges 1964; 1978, 197–213). Both Ayoub and the FP recovered articles made in ivory at Jarma, notably bracelet fragments, indicating the local availability of the material and (probably) Garamantian working of it into artefacts. Similarly, several notable finds of gold artefacts by Ayoub in his Jarma excavations would seem to confirm the long-held suspicion that the Garamantes were also involved in trading gold across the Sahara (Ayoub 1967a, 28–29, 37). The Classical sources speak of the Garamantes hunting the *troglydytae* and ‘Ethiopians’, a strong hint of slave-raiding against neighbouring peoples (Herodotus 4.183; cf. Tacitus, *Hist.* 4.50). Although the selling-on of such captives northwards across the Sahara is unlikely to have been on a significant scale, it is evident from the large-scale nature of the intensive irrigated cultivation (and the dangerous task of foggara construction) that their own territory in Fazzān could have absorbed an almost unlimited number of slaves.

The existence of Garamantian trans-Saharan trade has long been discussed (Wheeler 1954; cf. Daniels 1970a). The large quantities of Roman trade goods found at Garamantian sites and in their burials (cf. Dore and Keay 1989; Fontana 1995; Hayes 1972) attest to their incorporation of elements of Mediterranean civilisation into their culture. This is particularly notable with a number of items of cast bronze work (Fig. 9.26). The large volume of imported material also indicates that something of value must have been passing the other way. It is likely that the Garamantes for their part traded in surplus agricultural produce, dates, salt, gold, semi-precious stones, manufactured jewellery and natron (Bovill 1968; di Vita 1982, 588–94; Mattingly 1995, 155–57; for an understanding of the trade routes involved, see Law 1967; Liverani 2000c; Luni 1979). As already noted, Roman coins were very few on Garamantian sites and the Garamantes produced none of their own, so their economy was not a



Fig. 9.26. Cast bronze statue arm, from Ayoub's excavations of Building GER 1.3 at Jarma.

monetarised one in a traditional, coin-based, sense. However, money in the Sahara has taken many forms, from gold dust and silver bullion to shells and salt (Milburn 1988). What is clear from our evidence is that the Garamantes had access to and control over a large range of resources that could be used in exchange (metals, salt, semi-precious stones, agricultural produce, people).

In terms of its territorial extent, its settlement and population density and its socio-political organisation, the Garamantian kingdom was quite obviously a major force to be reckoned with in the Central Sahara. The settlement density, the number and scale of the cemeteries and the foggara systems all combine to highlight the Garamantian period as one of peak population and oasis cultivation. With these sorts of demographic and economic resources it is easy to appreciate how the Garamantes could have dominated their neighbours. It is equally apparent, given the huge desert territory involved, why the Roman empire appears to have decided, after several forays into the Sahara, that it was better to deal with the Garamantian kingdom by diplomacy than by attempted conquest and occupation.

Garamantian civilisation was thus the result of raised population levels in the northern Sahara following the development of advanced irrigation systems. The concentration of tens of thousands of people in the largest of these oases allowed them to dominate a large expanse of the Sahara – raiding and trading in equal measure to all points of the compass. The funerary evidence indicates the emergence of a social hierarchy, with a prominent elite order enjoying significantly greater wealth than the majority of the population, who were still buried in relatively simple cairn or shaft graves.

There are important hints in the archaeological record that Garamantian settlements became more overtly defensive in character from the 2nd or 3rd centuries AD. The presence of fort-like structures at the heart of many village sites is one indication of this trend, and at least one 'urban' site was provided with a substantial enceinte wall. This may suggest a decline in the military position of the kingdom vis à vis its neighbours or, alternatively, a progressive fragmentation of political power leading to the rise of numerous local power blocs. As already noted, the cultural differences between different oasis groups suggest that the kingdom was never based on a uniform

‘ethnic’ identity, but was a product of military power and centralised organisation of labour and resources by the dominant group based in the Wādī al-Ajāl.

THE POST-GARAMANTIAN AND ISLAMIC PHASES

In the early Islamic period a number of the Garamantian villages appears to have continued, and additional sites amongst these may have been embellished with mud-brick castle-like structures (*qsur*) (Ruprechtsberger 1997, 77-81, for examples). Both Jarma and Qaṣr ash-Sharrāba (probably to be identified as the site known as Tsāwa by al-Idrīsī in the 11th century) have yielded radiocarbon dates of the 10th–11th centuries AD, demonstrating the continuation of two of the main Garamantian urban centres (and thus confirming also the testimony of the Arabic sources). Over time, however, the number of villages seems to have declined markedly, and some parts of the landscape were abandoned by sedentary cultivators, perhaps linked to the shift from foggara to well irrigation (Figure 9.27). The problem with irrigation based on wells is that water must be mechanically raised by bucket before being fed into irrigation canals – with the result that in general each well can irrigate only a limited area of fields around it (see above, Chapter 7). The late medieval and early modern pattern is thus of small clumps of palms and cultivated fields, clustered around many scattered wells (Fig. 9.28), in contrast with the evidently more extensive areas that appear to have been

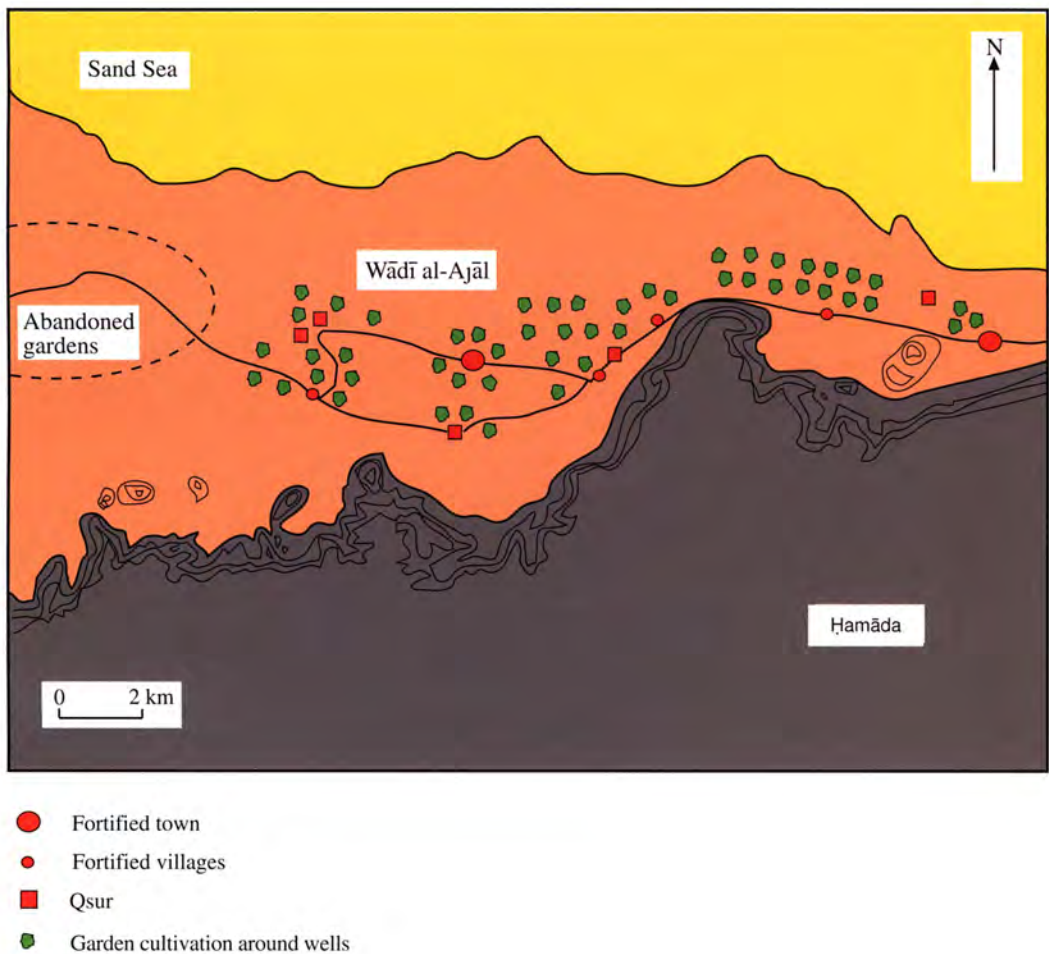


Fig. 9.27. Model of medieval/early modern exploitation of Wādī al-Ajāl.



Fig. 9.28. a) and b) Traditional dalw wells (note the A-frame structures) in small gardens (sāniat) that were still in cultivation in the 1960s.

cultivated whilst the foggaras were operating (cf. Figs 9.15, 9.27). It is not yet clear exactly when this new pattern became established, but it may well have started by the 11th century AD. As argued in detail above, the change appears to be the result of either a progressive fall in the aquifers to the point where the flow in the foggaras could not be guaranteed, or a major change in the available labour (possibly resulting from the break-up of the Garamantian kingdom). The two factors may well have acted in concert, at a temporal scale measured in centuries rather than decades. It is clear that the change in irrigation strategy was both a symptom and a cause of the further decline in the regional fortunes and population.

At present the evidence of early Islamic cultural penetration is slight and mainly focused on the site of Zuwīla, where an Ibādī community appears to have been established from the 8th century, and with its major mosque evidently dating to the 11th-century (Abdussaid 1979; Savage 1997, 84 and 153). The recently identified central mosque at Jarma appears to be of equivalent size and date, but is currently the earliest mosque apart from Zuwīla. This seems to confirm the impression of the historical sources that most of Fazzān remained outside direct Islamic control or

influence until at least the 11th-12th centuries and that even thereafter the area was isolated from the main current of Islamisation (Thiry 1995, 159-75). Other late antique evidence from the well-known 'royal' burial at Tin Hinan in southern Algeria (its location is shown on Fig. 3.1), or the 7th-century burials with red ochre spread over the bodies and headrests from Tajirhī in the Wādī Ḥikma, suggest substantial continuity with earlier 'Garamantian' traditions (Camps 1997b; Bellair *et al.* 1953; Bellair and Pauphillet 1959).

The main focus of change in this period, then, was a dismantling of the previous power structures and fragmentation of the old Garamantian kingdom. Political disruption and the emergence of new mobile enemies in the form of Berber and Arab tribes from the north, such as the Awlād Sulaymān, and the Tuareg from the west, enhanced the tendency for nucleated and fortified settlements. The Tuareg are in all probability in part descendants from the Garamantes, but represent one of several fragments that the kingdom splintered into during its decline. In addition, a new politico-economic access developed linking Tripoli with the kingdom of Bornu/Kānim around Lake Chad by a more direct line through eastern Fazzān. The consequences for the regional geo-political structures were profound. Garama was displaced as the regional capital by sites further east and south (Murzuq, Trāghan, Zuwila), though its substantial walls and *kasba* guaranteed it a role in the politics and warfare of the period (see above, Chapter 3). Under the Ibādī Banū Khaṭṭāb dynasty, Zuwila developed a substantial market, and a large settlement to go with the Cathedral mosque (Fig. 9.29). At some point, and possibly after the site had already been eclipsed by Trāghan and Murzuq, a substantial enceinte was erected in pisé construction. Trāghan has been little explored, and much is now obliterated of the presumed area of the Kānimī capital of the 12th-13th centuries. The pre-15th-century origins of Murzuq are uncertain, though its subsequent growth into the pre-eminent urban settlement of the region is apparent from a glance at its plan (Fig. 9.30). With the exception of Jarma, and of one

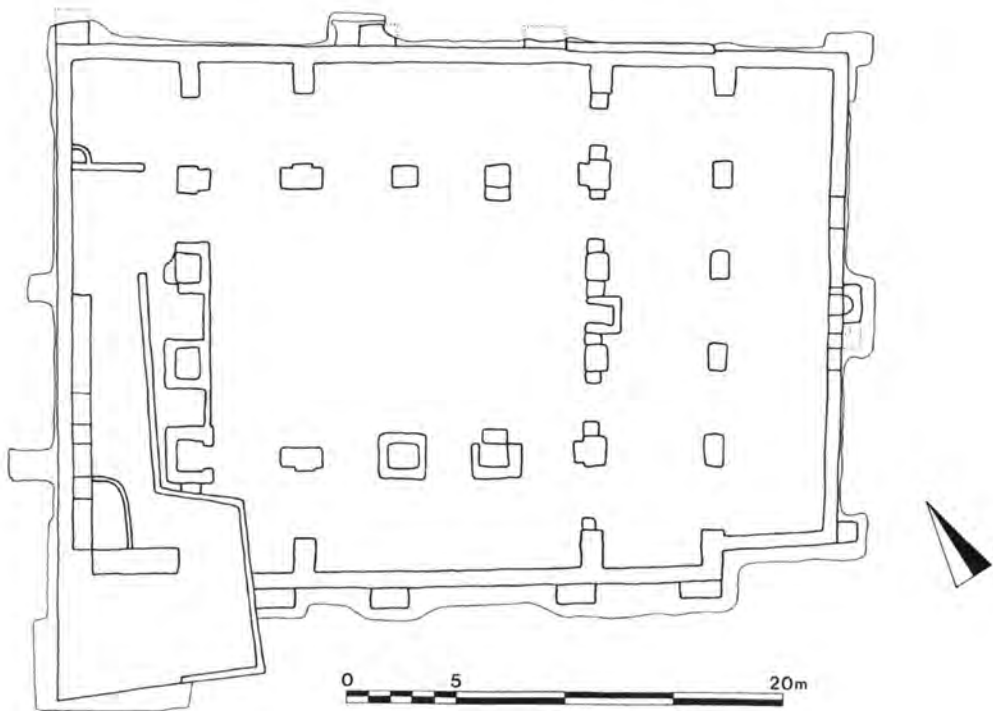


Fig. 9.29. The cathedral mosque at Zuwila (plan after Abdussaid 1978).



Fig. 9.30. Plan of Murzuq town.

or two of the oases of the eastern Wādī ash-Shāṭi and the Sabhā group, no other settlements of Fazzān came close to this urban scale. In contrast to the Garamantian period, when Roman trade goods were widely distributed in Fazzān, the finds of imported goods of Islamic date are meagre and largely concentrated in close proximity to the larger eastern centres (Insoll 1998). Glass bangles are one of the few categories of imported commodities with a wide distribution (Monod 1975). This eastern route was of considerable importance for trade with the salt oasis at Kāwār and with the Chadian kingdom of Kānim, especially for the movement of slaves into the Islamic world. By the 11th century it was somewhat eclipsed by the opening up of two further primary axes of trans-Saharan trade, the first through southern Algeria from Wārjilā to In Ṣalaḥ and Timbuktū, and the second running from Sijilmāsā in southern Morocco to Awdaghūst (Law 1967, 181-86; Savage 1997, 153-58; Thiry 1995, 399-448). However, some Fazzānī commodities, such as natron, remained important into modern times (Denham and Clapperton 1966, 183, recorded annual exports of 400-500 camel loads from the lakes in the Dahān Ubārī in the early 19th century).

Radiocarbon dates from the recent FP excavations at Jarma demonstrate continuing occupation at the site in the period between AD 500 and 1200. Thus, though the Garamantes disappeared from recorded history, it is likely that their descendants continued to occupy the heartlands of the Wādī al-Ajāl and that they are represented by the Khurmān mentioned by 13th-17th centuries sources, and who evidently came from this same region (see above, Chapter 3). However, the loss of Garamantian territorial and demographic dominance in the Central Sahara may also have played its part in the switch from foggara to well irrigation because of a shortage of slave labour, with consequent diminution in the total cultivated area available to them, leading to further declines in population and influence.

THE EARLY MODERN PERIOD

When the earliest European travellers penetrated into the Sahara in the late 18th and early 19th centuries, they found the Wādī al-Ajāl a desperately impoverished region, with many of its villages underpopulated and crumbling, and the bulk of its agricultural production taken as taxes and rents by absentee shaykhs and Turkish officials (Barth 1857: 143-49; Bruce-Lockhart and Wright 2000, 12-13; Denham and Clapperton 1966: 169-77). Malaria was rife in many oases, especially where there were lakes or marshes alongside major population centres (as was the case at Murzuq and Jarma). The contribution of malaria to the progressive demographic decline of Fazzān is uncertain, as is the date when the disease first appeared in the region (Sallares 1991, 271-81 on the antiquity of the disease). Yet it should not be discounted as a possibly important factor in the down-turn of the region's fortunes. The total number of villages and hamlets still occupied into the early part of the 20th century was around 100 (Despois 1946, 241-53, gives 108 sites; Scarin 1937b, 611-44, lists 122), but individual population figures were very low (most villages had less than 300 people). In some cases, villages had migrated from one site to another within a localised area, leaving a much reduced or semi-abandoned old village site as a dependent hamlet of the new site. Jarma itself was treated by the Italian studies as an abandoned site from the mid 1930s. In total, the Wādī ash-Shāṭi accounted for about 27-30 percent of village sites (but 35 percent of the 1931 population census), the al-Ajāl another 23-24 percent of villages (17 percent of population), and the combined area of the 'Utba, Murzuq, al-Ḥufra and ash-Sharqīyāt depressions 34-38 percent (23 percent of population). These figures clearly indicate the overwhelming importance of these three areas, but also their relative rankings in demographic terms in the recent past. What is particularly clear from these figures (based on data in Despois 1946 and Sahara Italiano 1937) is that the process of demographic decline had gone further in the Wādī al-Ajāl than in other parts of Fazzān (though data in Scarin 1934, 186, show that the Wādī still contained 36 percent of all wells and 22 percent of all gardens in Fazzān). Additional studies by Scarin (1934, 190-201) illustrate further interesting aspects to the settlement and demographic distribution in early 20th century Fazzān. His map (1934, 195) combining an analysis of population size with the constructional type of villages, reveals a significant difference in the southern band of oases based on the 'Utba, Murzuq, al-Ḥufra and ash-Sharqīyāt line. With the exception of a handful of medium (Zuwila, Tsāwa) and larger mudbrick settlements (Murzuq, Trāghan, Umm al-Arānīb), the vast majority of settlements there (27) consisted predominantly of houses of palm construction (*zariba* huts). The Wādī al-Ajāl contained a mixture of mudbrick and *zariba* villages, with the former predominating; those of the Wādī ash-Shāṭi and Sabhā oases were almost exclusively of mudbrick build.

Landscape and settlement

As noted already (Chapter 3), the Awlād Muḥammad period (15th–19th centuries) led to an influx of *murābiṭūn* families into Fazzān and the construction of numerous new mosques, *zāwiyas* and *murābiṭ* tombs across the Fazzānī landscape (Fig. 9.31). This increasingly prominent Islamic face to the countryside was further enhanced by the Sanūsī confraternity, with Fazzān being a particular centre for their *zāwiyas*. Both these phases marked profound steps in the progress of the Islamisation of Fazzān, though the monuments have been as yet inadequately recorded and should be one of the priorities of future research (Scarin 1934; 1937a, remain the most detailed studies).

By the Early Modern phase there were no longer any cultural associations between the cultivators (Fazzānī) and the pre-Islamic funerary landscapes, the camelline rock-art and the foggaras. However, the pastoral Tuareg continued to penetrate up the Wādī

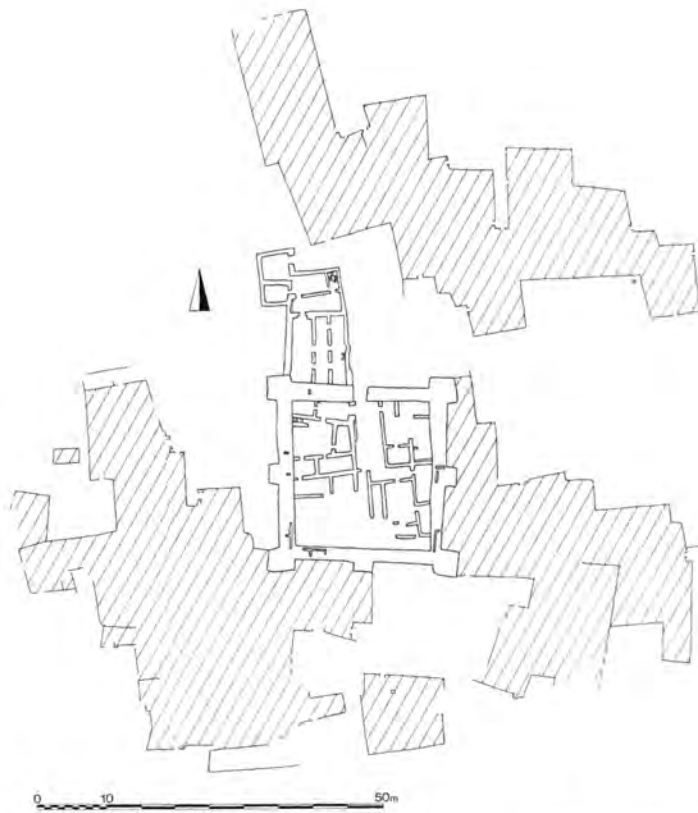


Fig. 9.31. The qaṣr, mosque and village of 'West al-Fjayj' (TEK 10).

Irawān and the Wādī Barjūj from the south-west, entering the Wādī al-Ajāl around Ubārī and exploiting seasonal grazing in the Massāk. The relationship between pastoralists and sedentarists was not always easy. The reputation of both the Tuareg and the Tubu for raiding was founded on periodic clashes with the Fazzānī and ensured the maintenance by the latter of the mudbrick castles (*qṣur*) and other fortifications in the landscape. Some of the larger fortifications may have been built by the inhabitants of the al-Ajāl to protect their autonomy, others by the Kānimī, Awlād Muḥammad, Qaramānli or Ottoman rulers of greater Fazzān, in an attempt to impose their authority on the valley. The landscape of Fazzān in general, and the al-Ajāl in particular, was a heavily contested one in the later medieval and early modern period (see above Chapter 3). Trade continued but its profits were largely controlled by outsiders (Ottoman/Qaramānli, Kānimī), nomadic groups (such as the Tubu and Tuareg) and a few privileged centres such as Murzuq. The archaeology of the recent trade routes is underdeveloped, though well-preserved evidence of lost caravans has been located (Castiglioni and Castiglioni 1978, 145-47).

Labour was a critical resource in this period, with slavery and dependent labour a prominent element of complex relations. Both human and animal power to work wells was often in short supply, leading to poor productivity. With an increasing oppression of the region by Qaramānli and Ottoman administrators at Murzuq, manpower and capital reached a critically low ebb (readily visible in the abandoned settlements and the mean proportions and inferior construction of surviving buildings). There are also indications that the water-table was continuing to decline. Wells in both Jarma and its hinterland were deepened significantly in this period. Every extra metre in depth would add precious seconds to the time taken to raise each *dalw* of water.

The indirect or direct extraction from Fazzān of regional surplus by outside

powers, notably the Qaramānli and Ottoman rulers in Tripoli, was a significant factor throughout the period. Trade was a key component of this exploitation, with the traffic in slaves in particular building to a crescendo in the 19th century (Savage 1992; Wright 1989; 1998). With the exception of a few larger houses in Murzuq and Sabhā, there is little indication of the profits of this trade being invested within Fazzān itself.

THE FUTURE OF SETTLEMENT?

Only in the last 40 years have modern artesian wells reversed the trend of decline and revived the population and agricultural productivity. However, this has been at a cost to the aquifer levels, which are already significantly fallen, with potentially disastrous consequences for traditional springs and wells. In the long term (Figure 9.32) it is possible that agriculture will be forced to contract around a limited group of agricultural settlements with very deep-bore artesian wells serving clusters of individual irrigated crop circles, each of *c.* 300 m diameter (cf. Allan 1979). Such projects have already been set up in several locations and are plainly visible on the satellite images (see Fig. 9.33, cf. Fig. 2.1). Our geo-archaeological studies cannot offer solutions to the problem of where water is to come from next, but they do graphically illustrate the human consequences of past changes in water availability in the desert. Whilst we may take pride in human ingenuity in finding ways to live in the desert, we may also reflect on the environmental costs that such ‘mastery’ brings in its wake. Throughout the last five millennia, people have struggled to maximise their usage of the available groundwater and there have been several major shifts in the strategies employed: first from a reliance on springs, lakes and standing water in the late Pastoral phase, as these sources gradually dried up; then to the development of the foggara irrigation systems,

2100 THE FUTURE

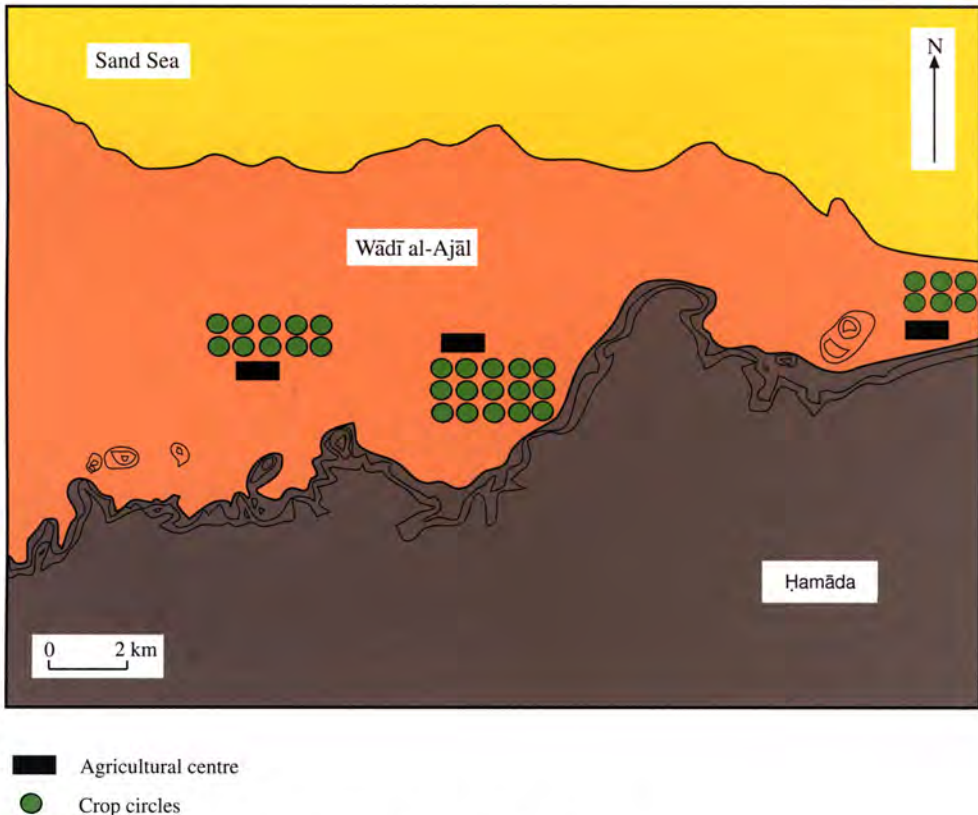


Fig. 9.32. Model of future exploitation of Wadi al-Ajal.



Fig. 9.33. Crop circle irrigation boom.

especially in the al-Ajāl, and the enhancement of spring-fed irrigation where that could be practised (in the ash-Shaṭī and Ghāt region primarily); then, with the progressive abandonment of the foggara systems, a further shift to well technology – initially using the balance beam (*khattāra*) and increasingly over time the *dalw* pulley-based system; finally in modern times, with a radically accelerated abstraction rate of groundwater because of diesel and electric pumps, the rapid deepening and then large-scale abandonment of traditional wells (Fig. 9.34). Modern agriculture is now dependent on fossil water from 100 m and more below the surface and the costs of maintaining present levels of supply are escalating.

A gradual decline in the level of the upper aquifer feeding the oases in the Wādī al-Ajāl is demonstrable across the broad time-scale of the Holocene. The data from the geographical side of the project might, thus, seem to favour environmental factors as the chief motor of change in the desert communities of Fazzān. However, it is equally clear from the archaeological and historical research carried out by CMD and the FP that human factors may have been equally as important in shaping these changes in lifestyle, economy and society. Although the linkage remains unproven at present, the Garamantian development of the foggara irrigation systems may, in the long term, have been a key factor leading to the decline of their civilisation as a result of over-extraction from a non-renewable groundwater source. As in the UNESCO Libyan Valleys Survey, the key conclusion to arise from our work is that it is the interplay of environment and human agency that has shaped the pattern of exploitation of deserts (cf. Barker *et al.* 1996a, 291-363). Nonetheless, the story of Fazzān in the Holocene is essentially one of successive human adaptations to progressively worsening climatic, environmental and hydrological conditions. An improved understanding of this past history of desertification has clear implications for future populations of the Libyan Sahara.



Fig. 9.34. Abandoned well in Wādī al-Ajāl in the 1990s.

A NEW AGENDA FOR LIBYA'S SAHARAN HERITAGE

The work of CMD and the FP has produced a solid foundation on which to build for the future of interdisciplinary geographical, archaeological and historical studies of Fazzān. Yet many questions remain unanswered or lack full supporting documentation in the dossier of data gathered. In presenting the achievements to date, we are acutely conscious that much remains to be done at a time when modern development and increased access to the desert by 4WD vehicles is starting to have a profound impact on the state of preservation of Libya's Saharan heritage. It is striking how much has been lost in the generation that separates the two projects reported on in this volume. What is needed above all is continued (or better still increased) investigation of the region by the relevant Libyan agencies and foreign research teams.

The archaeology of Fazzān is internationally significant given the quality of the data available and the importance of the debates it can address. An overarching theme of research in the Sahara is the long-term linkage between human activity and climatic and environmental change (Barker and Gilbertson 2000a). To advance our knowledge, a prime requirement is more interdisciplinary work, preferably by large teams, such as assembled by the UNESCO Libyan Valleys survey (Barker *et al.* 1996a/b), the FP or the Italians in south-western Fazzān (e.g. Cremaschi and Di Lernia 1998a). What follows is a brief and far from exhaustive list of research desiderata related to the various phases of human activity outlined in this book. These may form the basis of an agenda for future research in Fazzān.

For the **Palaeolithic period**, the potential of the vast lithic scatters of the Massāk Ṣaṭṭafat and Dahān Ubārī remains largely untapped. Detailed study of more of these open 'sites' is long overdue. Almost all of these sites comprise the deflated detritus left

on the surface after Aeolian erosion of the associated soils. Key unresolved questions relate to the accurate dating of the different lithic 'industries' identified. Another priority is to locate Pleistocene material lying in stratified contexts (whether in depressions on the Massāk or eroding out of the base of dunes in the sand seas). Only in these contexts are we likely to find associated material, such as animal bone, or matrices susceptible to scientific dating.

For the **Pastoral period**, the exemplary work by the Italian teams working to the south-west in the Akākūs and Tanzzūft needs to be extended and emulated elsewhere in the region. A vital aspect of this will be the compilation of dating sequences to match that achieved by Cremaschi (1998a, 21, 39; 2001, 7, 16, 19), with ≈ 100 C14 determinations now available from both natural contexts, such as lake deposits, and human occupation sites. The geo-archaeological research begun as part of the FP has made a start in this direction and is continuing to collect further samples for dating.

The FP work has shown the importance of searching for Pastoral phase evidence not only in the inaccessible and remote parts of the landscape (where preservation of features is generally better), but also in the most densely utilised areas, such as the oasis depressions, where the traces are blurred by later activity. The landscapes of the Akākūs and Tanzzūft became increasingly marginal over time after 5000 BP and these are not the locations where we would expect to find the evidence of the earliest agriculture developing. Even in the pre-agricultural phases, the depressions (where the later oases were to arise) were areas with important hydrological resources and will have been central to human activity. Thus, only through work in all sectors of the landscape can we bring out the full complexities of the sequence and characteristics of the transitions to farming in this part of the Sahara.

Excavation or detailed recording of more of the Pastoral phase open sites, in areas like the Massāk or the sand seas, is needed to complement the data acquired from the rock shelters of the Akākūs. In addition, the important work of Di Lernia *et al.* (2001) on pre-Garamantian burial structures and burial rites needs to be extended to other parts of Fazzān and to a larger sample of graves. The archaeology of the Massāk Ṣaṭṭafat and Massāk Mallat was once thought to consist primarily of isolated rock-art images, but is now known to be far richer in terms of the range of sites and activities of Pastoral date. As oil exploration is now proceeding in this area, it is vital that further large-scale survey work be carried out as a priority.

The rock-art research in the Libyan Sahara has understandably focused on the areas with an outstanding density of preserved images, notably the Akākūs and the Massāk Ṣaṭṭafat/Mallat, and the potential for dramatic new discoveries there is far from exhausted (as reports in the journal *Sahara* make clear). The contributions of amateur researchers have been very important in this recording work and must be acknowledged here (notably Lutz and Lutz 1995; van Albada and van Albada 2000). However, amongst both amateurs and professional alike, there is a huge publication backlog, even for the best-known areas. There has also been a tendency to record primarily the scenes judged of greatest antiquity or of highest stylistic quality. The rock-art has rarely been recorded in relation to associated archaeological features (rock shelters, cairns, lithic scatters and so on) or continuously across a stretch of landscape (with, say, every single image accurately mapped and recorded along a stretch of a given wādī on the Massāk). In future work, the tendency to 'cherry-pick' the 'best' images and to present them without considering the full topographic, archaeological and chronological context needs to be resisted. We need much more recording work in future to be truly multi-period in intent and to seek to place the rock-art in its full landscape context. As this report has demonstrated, there is a surprising amount of rock-art and inscriptional evidence preserved on the fringes of the oases zones, as in the Wādī al-Ajāl, and more attention should also be given to these transitional locations (see further Barnett 2002).

The **Garamantian period** can now be appreciated as one of huge significance within the central Sahara and the recognition of their society as an early state or civilisation is one of the key conclusions of this study. Further excavation work at the main Garamantian centres will surely continue to enrich our knowledge of this Saharan kingdom. We also need to extend survey work into other parts of Fazzān that have been hitherto neglected by archaeologists – most notably the Wādī ash-Shāṭi. As the area of Fazzān with the largest number of springs and the most abundant iron deposits, we should expect to find considerable traces of Garamantian period activity here. A key question for further research is the demographic make-up of the people and regional variation across Fazzān. Were the Garamantes a mixed population from the outset and can we detect any social differentiation in ethnic terms over time? One of the ways this could be explored would be through renewed excavation of burials, including graves of differing social rank and date, coupled with human anthropological examination and where possible DNA analysis. It may also be possible to trace the prevalence over time of particular diseases such as malaria through DNA analysis. As the Fazzān was one of the most likely corridors through which malaria reached the Mediterranean, this could shed light on the timing of the spread of malaria from sub-Saharan Africa. Excavation of burials would also advance our understanding of Garamantian burial rites and morphology and how these related to pre-Garamantian practices.

Other issues that require further work include the excavation of secondary Garamantian centres away from Jarma itself, more work on the date and character of early metallurgy and salt-refining at Garamantian sites and further attempts to date the phase of abandonment of the foggaras. The foggaras as a class of monument merit further examination and some effort should be made to preserve them from further degradation in at least one area of Fazzān where they are still visible in the landscape. The Libyan inscriptions of Garamantian and later date need more study to document them in detail, to differentiate between them and, hopefully, to advance understanding of their content.

There is a very large assemblage of finds of Garamantian date, many of which have been the subject of recording by CMD or the FP (a start has been made on compiling a computerised museum catalogue). This includes a large number of imports into the Sahara from the Mediterranean world, including at least 100 intact amphoras now in the Jarma museum. This latter group of material in particular would repay further detailed identification and study.

For the **Islamic period**, the results achieved to date are particularly thin. The sites of Zuwīla and Jarma are the only ones where substantial excavations have yet been carried out, with a new phase of work at the former apparently about to begin. Zuwīla is undoubtedly the key Libyan Saharan centre in the early Islamic phase and merits much more extensive work (both in terms of survey and excavation). The impressive evidence of Garamantian-period trade already available from Jarma could usefully be compared and contrasted with the likely assemblage that will come from major excavations and survey around Zuwīla. Such an assemblage could resolve many current questions about the scale, commodities and direction of early Islamic trans-Saharan trade.

In general, there is a need to create a more secure framework of dating of Islamic sites than can at present be done from the pottery finds associated with these sites. The FP initiative of using AMS dating of small organic samples from mudbrick structures could be usefully extended to a larger sample of sites (Mattingly *et al.* 2002). This technique could initially be used to help identify for fuller investigation sites of early date. Fortifications and mosques of early Islamic date would be particularly useful starting points. The Garamantian site of Qaṣr ash-Sharrāba, which was evidently occupied until at least the 11th century, is one promising candidate for such work, especially as it is not deeply buried beneath later activity.

The work on Garamantian foggaras would be usefully complemented by a more detailed study of traditional wells, preferably backed up by excavation and scientific dating of a number of examples.

The **early modern period** also lacks a clear chronological framework at present and again AMS dating of selected mosques and fortified sites could help considerably. The detailed recording of the architecture of standing buildings is an urgent need as at many sites these have become very dilapidated in recent decades. A corpus of traditional mosques in Fazzān is one clear desideratum, as is a systematic study of the *murābiṭūn* monuments throughout the valley. Knowledge of the names associated with these structures is starting to be lost, though many of the structures are still venerated, no matter how dilapidated they have become. The increasing abandonment of the traditional houses (and the loss of knowledge and understanding of their design and function as generations pass by) is of equal concern. Whilst efforts are underway at both Jarma and Ghāt to present reconstructed or consolidated buildings in the old towns to both local and foreign visitors, it is desirable that this is based on the best quality data.

Finally, palaeoeconomic work on all periods of activity needs to be extended and improved. The CMD/FP work on plant remains and animal bones is going to provide a very exciting picture of the changing pattern of food consumption at Zinkekrā and Jarma over a c. 3,000-year period. But the work needs replicating at other classes of sites in other parts of Fazzān.

As already noted, the *Archaeology of Fazzān* reports present a first synthesis of data, marking the end of the pioneer phase of work in this region. The key challenge of the new phase that is now beginning is to build on this more solid foundation of knowledge and to advance dramatically our understanding of the mundane but changing lifestyles of the ordinary people who have inhabited these extraordinary landscapes over time.

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المستقبل ؟ :

وعلى مدى الأربعين سنة الأخيرة فقط، أدت الآبار الارتوازية الحديثة إلى عكس اتجاه التدهور السكاني والإنتاج الزراعي، وعلى كل فعلى المدى الطويل من الممكن أن تجبر الزراعة هناك إلى الانحسار حول مجموعة ضئيلة من المستوطنات الزراعية المعتمدة على آبار ارتوازية جد عميق تستمر مياهها في ري مجموعات من المزارع المزروعة بحاصلات مروية كل مزرعة بقطر 300 م تقريبا، ويذكر أن مثل هذه المشروعات قد شرع في تنفيذها في عدة مناطق هناك. إن دراستنا الجيواثرية لا تستطيع ان تضع الحلول لهذه المشكلة من أين ستأتي المياه ولكن بإمكانها وضع صورة بيانية تصور التعاقب البشري الناجم عن التغيرات في وفرة المياه بالصحراء في الماضي. وفي الوقت الذي نثق ببراعة الإنسان في إيجاد الطرق للعيش في الصحراء علينا ان ندرك التكاليف البيئية التي تترتب على تلك البراعة، فعلى مدى الخمسة آلاف سنة الأخيرة جاهد الإنسان من أجل استغلال أكبر ما يمكن من المياه الجوفية وكانت هناك تغيرات رئيسية كبيرة حدثت أثناء جهوده المبذولة في ذلك، فأولا اعتمد على مياه العيون والبحيرات والمياه الراكدة في أواخر العصر الرعوي، وعندما جفت تلك المصادر تدريجيا تحول السكان إلى أنظمة الري بالفقارات خصوصا في وادي الحياة (الأجل) والاعتماد على ري العيون إضافة إلى الآبار في الزراعة بمنطقة وادي الشاطئ وغات، وبعد التخلي التدريجي عن أنظمة الري بالفقارات ثم التحول إلى ري الآبار، وفي البداية كان يتم الري عن طريق ذراع التوازن، ثم تحول تدريجيا إلى الري بالدلو وأخيرا في الأزمنة الحديثة صار الاستنزاف الكبير والسريع للمياه الجوفية باستعمال مضخات الديزل والكهرباء والتعميق السريع للآبار التقليدية.

ان الهبوط التدريجي في مستوى الطبقة المائية العليا التي تغذي واحات وادي الحياة (الأجل) ظاهرة ملحوظة بداية من كامل العصر الهولوسيني ، وان المعطيات المأخوذة من الناحية الجغرافية لمشروعات الزراعة هناك قد تكون في صالح العوامل البيئية التي تعد المحرك الرئيسي للتغير في المجتمعات الصحراوية بفزان، وعلى كل فان أبحاث الأتربة وكذلك الأبحاث التاريخية التي أجرتها الفرق الليبية والإنجليزية قد أكدت على ان العوامل البشرية قد كان لها دور مهم بقدر مماثل للدور البيئي في تغيير أنماط الحياة الاقتصادية والاجتماعية السائدة هناك.

وكما حدث في مشروع البونسكو لمسح الأودية الليبية فان الخلاصة الرئيسية التي نود الوصول إليها من خلال عملنا هذا هي التعرف على اوجه التفاعل بين البيئة والبشر كعامل نموذجي لاستغلال السكان للصحارى، ويبقى ان نقول ان قصة فزان في الزمن الهولوسيني ما هي إلا تينبات متعاقبة قام بها الإنسان ليتكيف مع تدهور مستمر كان يجري على الأوضاع المناخية والبيئية والمائية هناك.

ان وضع صورة علمية واضحة لماضي التصحر سينجم عنه رسم صورة جبلية لمستقبل السكان بالصحراء الليبية.

وفي الختام نود ان نشير إلى ان محتويات هذا العمل يضم بين جنباته افضل المعلومات المتوفرة حاليا عن المنطقة. ولا نزعم في ذات الوقت بأننا نقدم الرأي النهائي بالخصوص. ويعد هذا العمل خلاصة للوضع الحالية للبحث وأساسا الذي نأمل ان يقوم الآخرون بمساعدتنا في إرساء المزيد من المعلومات عليه، فلانزال المعطيات غير كاملة ولا تزال الكثير من الأسئلة دونما إجابة ولكننا تقريبا نقر بأننا في نهاية البداية ونأمل ان تعمل المرحلة الموالية من البحث على سد بعض الفراغات وتضيف المزيد من المعلومات بشأن تكيف الإنسان عبر الزمن في محيط صحراوي صرف.

وأخيرا فان مشروع فزان مدينا بصورة خاصة إلى الأستاذ علي امحمد الخضوري رئيس مصلحة الآثار والى موظفيه الذين ساعدونا في تنفيذ هذا العمل.

ونود ان نشكر خصوصا مصطفى الترجمان الذي قدم لنا عوننا خاصا في ترجمة هذا العمل كما نود ان نقدم شكرنا أيضا إلى جمعة قرصع وجمعة العناق ومحمد الشكشوكي ومحمد المشاي و ابراهيم العزابي، كما نقدم شكرنا إلى الدكتور علي عبد السلام مراقب آثار الجنوب وأعضاء إدارته عبد القادر الشريف، ومحمد عريدة لمساعدتهم المتواصلة والقوية وتشجيعهم وتأبيدهم لهذا العمل كما نقدم شركنا إلى سعد صالح عبد العزيز في جرمة على عمله المتواصل من أجل دعم هذا المشروع.

متفشيا في عدة واحات خصوصا في تلك التي توجد بها بحيرات أو اسباخ قرب المراكز التجاري السكانية الرئيسية (كما كان الحال في مرزق وجرمة) غير ان مساهمة الملاريا في التدهور الديموغرافي المستمر بفزان ليس مؤكدا حتى الان إذا ما نظرنا إلى ذلك التناقص وتاريخ ظهور ذلك الداء في تلك الأنحاء ، ومع ذلك لا ينبغي علينا إغفاله كعامل محتمل اسهم في التقليل من موارد المنطقة ، لقد كان العدد الإجمالي من القرى التي لا تزال مأهولة في الجزء الأول من القرن العشرين حوالي المائة قرية ولكن تعداد السكان كان جد قليل (فمعظم القرى كانت اقل من 300 نسمة) وفي بعض الحالات يلاحظ وجود قرى قد تحولت إلى موقع آخر تاركة الموقع الأول شبه مهجور أو كقرية صغيرة معتمدة على الموقع المأهول حديثا ، وعلى العموم فإن وادي الشاطئ كان يضم من 27 إلى 30% من عدد القرى (35% من السكان تعداد عام 1939) أما وادي الحياة (الأجال) فكان يضم 23-24% من القرى (17% من سكان منخفضات وادي عتبة ، مرزق ، الجفرة ، الشرقية ، مجتمعة ضمت 34-38 من عدد الواحات يومئذ أي 23% من السكان) ومن الجلي ان هذه الأرقام تشير إلى الأهمية الكبيرة للمواقع الثلاثة تلك ، كما أنها تشير إلى أهميتها النسبية من الناحية الديموغرافية.

لقد أدت فترة حكم أولاد محمد خلال الفترة من القرن الخامس عشر إلى القرن التاسع عشر) إلى تدفق عائلات المرابطين إلى فزان ، كما شهدت المنطقة تشييد اعداد كبيرة من المساجد الجديدة والزوايا وأضرحة الأولياء في كافة أرجاء فزان ، زد على ذلك الحركة السنوسية التي أصبحت منطقة فزان مركزا مهما لزاويهم، وكلا هذين العاملين زاد من ترسيخ الثقافة الإسلامية في المنطقة ، علما بان المعالم الدينية لم يتم تسجيلها بالصورة المناسبة ويجب ان تكون من أولويات البحث مستقبلا.

وبداية وبداية من مطلع المرحلة الحديثة لم تكن هناك أية علاقات ثقافية بين المزارعين الفزانة والأماكن الجنائزية التي تعود إلى ما قبل الإسلام ، ورسومات الجمل بالفنون الصخرية ونظام الري بالفقارات ، وعلى كل فان سكان الطوارق الرعاة واصلوا اختراقاتهم لوادي اروين ووادي برجوج من الجنوب الغربي وصولا إلى وادي الحياة (الأجال) حول اوباري مع استغلالهم لربوع امساك في رعي حيواناتهم أثناء بعض المواسم ، ولم تكن العلاقة بين الرعاة والسكان المستقرين على ما يرام، إذ اشتهرت قبائل الطوارق والتبو بغاراتهم التي كانوا يشنونها على الفزانة من حين لآخر وقد تأكد لنا ذلك من خلال القلاع (القصور) التي كانوا يشيدونها أهالي فزان في مختلف أماكن استيطانهم. من ناحية أخرى، استمر النشاط التجاري ولكن عائد ذلك النشاط يسيطر عليه عموما الغرباء (العثمانيون، القره مانليون، والكانميون) وكذلك القبائل البدوية (مثل التبو و الطوارق) والقليل من المراكز المتميزة الأهلة بالسكان مثل مرزق.

وكان النشاط البشري في تلك الأنحاء يومئذ يمر بفترة حرجة وكانت هناك علاقات معقدة ذات مردود محدود بسبب قلة موارد المياه المعتمدة على الآبار. ومع تزايد عوامل القمع بالمنطقة من قبل رجال الإدارة القره مانلية والعثمانية بمرزق وصلت القوى العاملة وكذلك راس المال إلى قدر عظيم من الانحطاط (يمكن ملاحظة ذلك عيانا من خلال المستوطنات المهجورة ورداءة نوعية بناء تلك الفترة القائمة إلى يومنا هذا) كذلك هناك عدة أدلة على استمرارية نزوح المائدة المائية، فقد تم تعميق الآبار في جرمة والمنطقة المجاورة لها بصورة ملحوظة في هذه الفترة وكل متر إضافي يتم تعميقه سيضيف ثواني مهمة تستغرق من الوقت في سحب كل دلو ماء من البئر.

ان الاستقطاع المباشر أو الغير مباشر لحاصلات فزان من قبل القوى الخارجية، خصوصا الحكام القره مانليين والعثمانيين بطرابلس كان له أثرا كبيرا على المنطقة طيلة تلك الفترة، أما فيما يتعلق بالتجارة فقد كانت عاملا مهما تأتي في خدمة ذلك الاستغلال لاسيما تجارة الرقيق بصورة خاصة في القرن التاسع عشر ولكن باستثناء القليل من البيوت الكبيرة في مرزق وسبها لا نلاحظ إلا القليل من الأدلة التي تشير إلى استثمار أرباح تلك التجارة داخل فزان نفسها.

فترة ما بعد الجرمنيين والعصور الإسلامية :

يبدو ان هناك عدد من القرى الجرمنية ظلت تعج بالحياة في العصر الإسلامي المبكر ، التي أضيفت إليها قصور بنيت من الأجر الطيني (قصر) وكانا كلا من قصري جرمة وقصر الشارابة (والذي يحتمل ان تمت الإشارة إليه من قبل الادريسي في القرن الحادي عشر بموقع تشاوة) يعودان تاريخيا حسب التأريخ الكربوني إلى القرن العاشر والحادي عشر لميلاد المسيح ، وقد مثل هذان الموقعان استمرارية المركزين الرئيسيين الجرمنيين (مع التأكيد على ذلك من قبل المصادر العربية) ولكن مع الوقت يبدو ان عدد القرى قد تناقص بشكل ملحوظ كما ان بعض أجزاء من الأراضي الزراعية قد هجرها المزارعون الذين كانوا مستقرين بها ولعل مرد ذلك يعود إلى التحول من الري بنظام الفقارات إلى الري بالأبار . أن مشكلة نظام الري المعتمد على الأبار هي ضرورة سحب المياه عن طريق الدلو قبل نقلها إلى قنوات الري الأمر الذي ينتج عنه محدودية مساحة الحقول التي يمكن ريها حول البئر (انظر فصل 7) وقد انحصر النموذج الزراعي في أواخر العصور الوسطى وأوائل العصور الحديثة في مجموعات صغيرة من النخيل وفي الحقول المزروعة التي تجمعت حول بعض الأبار المتناثرة هنا وهناك ، وهذه مساحات جد محدودة مقارنة بالمساحات الشاسعة نسبيا التي تم زراعتها باعتماد نظام الري بالفقارات في الماضي، وليس من المعروف تحديد متى تم استعمال هذا النوع الجديد من الري ولكن على الأرجح انه بدأ مع القرن الحادي عشر لميلاد المسيح.

و حاليا يتوفر لدينا دليل بسيط عن تجذر الثقافة الإسلامية في ذلك التاريخ ، جاء من موقع زويلة حيث قام بنو الخطاب بتأسيس مملكة لهم هناك بداية من القرن الثامن ، وقاموا بتأسيس مسجدا رئيسيا خلال القرن الحادي عشر ، وهنا نلاحظ ان المسجد الرئيسي الذي تم التعرف على معالمه مؤخرا في جرمة كان على نفس الحجم ومن نفس التاريخ ، بل انطباع المصادر - كما يبدو - يعد حاليا اقدم مسجد في المنطقة باستثناء مسجد زويلة السالف الذكر ، ويؤكد لنا هذا التاريخية بان معظم إنحاء فزان ظلت خارج نطاق السيطرة أو التأثير الإسلامي ، حتى القرن الحادي عشر على اقل تقدير وحتى بعد ذلك التاريخ ظلت المنطقة بمنأى عن التيار الرئيسي للثقافة الإسلامية ، ونشير هنا إلى وجود شاهد اثري من العصور الكلاسيكية المتأخرة عثر عليه في قبر ملكي معروف في (تن هنان) وفي عدة قبور اخرى تعود إلى الفترة من القرن السابع إلى القرن التاسع استخدمت فيها نقوشا جرمنية قديمة.

لقد تمثل التغيير الرئيسي خلال هذه الفترة في فك بناء القوة السابقة ، وتشظية مملكة جرمة القديمة ، ان التمزق السياسي هذا وظهور قوة معادية منتقلة من قبائل البربر والعرب قادمون من الشمال مثل أولاد سليمان وقبائل الطوارق من الجنوب، قد عزز التوجه نحو إقامة مستوطنات محصنة منصوبة على نفسها ، زد على ذلك ظهر في تلك الأثناء اقتصادي أدى إلى تطور العلاقة بين طرابلس ومملكة برنو و كانم حول بحيرة تشاد بواسطة طريق -تعامل سياسي مباشر ربط بينهما يمر عبر شرق فزان ، فكانت نتائج التغييرات السياسية تلك جد عميقة ، حيث استبدلت جرمة كعاصمة للإقليم بمواقع تقع على مسافة بعيدة شرقا وجنوبا مثل (مرزق وتراغن و زويلة) وذلك على الرغم من ان اسورها الرئيسية والقصبه التي بها لعبت دورا كبيرا في السياسة والحروب التي شهدتها تلك الفترة (انظر فصل 3). ويلاحظ ان زويلة في عهد بني الخطاب قد أصبحت سوقا رئيسية وموقع استيطاني كبير بها مسجد عظيم . وخلال فترة ما وربما بعد ان حجبت أهمية ذلك الموقع (جرمة) كل من تراغن ومرزق ، شيد حول جرمة سور من الطين. هذا ويذكر انه لم يتم الكشف على تراغن بشكل موسع ولو أنها كانت مغمورة بسبب شهرة عاصمة مملكة كانم إبان القرنين 12 و 13 م ، أما مرزق فإن أصولها السابقة للقرن الخامس عشر الميلادي غير معروفة رغم تطورهما المدني اللاحق جعلها مستوطنة معروفة بالمنطقة، وهذا واضح وجلي من خلال مخططها ، فباستثناء جرمة وواحة او واحتين من واحات شرق وادي الشاطئ ومجموعة واحات سبها لا توجد أية مستوطنة في فزان ، ارتفعت الى هذا المستوى من الحجم العمراني الذي وصلته مرزق حينئذ. في المقابل نلاحظ ان الفترة الجرمنية وعندما كانت السلع التجارية الرومانية توزع بصورة موسعة في فزان كانت السلع المستوردة إبان الفترة الإسلامية قليلة ومعظمها يتركز في المراكز الكبرى شرق فزان . وقد كان الطريق الشرقي ذا أهمية كبرى من ناحية التجارة مع واحة الملح في كاوار ومع مملكة كانم بتشاد وخصوصا فيما يتعلق بحركة الرقيق ، ومع حلول القرن الحادي عشر حدث تهميشا إلى حد ما للمنطقة بعدما تم افتتاح طريقين رئيسيين للتجارة عبر الصحراء الأولى يبدأ من ورقلة جنوب الجزائر إلى عين صالح ومنها إلى تمبكتو والثاني يسير من سيجلماس جنوب المغرب إلى اوداغاست.

الفترة الحديثة المبكرة :

عندما اخترق أوائل الرحالة الأوربيين الصحراء في أواخر القرن الثامن عشر ، ومطلع القرن التاسع عشر وجدوا وادي الحياة (الأجال) منطقة يعمها البؤس والفقر بقرائها العديدة المتسمة بقلتها سكانها وعدم تماسكها ، وإنتاجها الزراعي الذي يؤخذ كضرائب واجور للمشائخ الغير موجودين بالمنطقة أو للمسؤولين الأتراك ، وكان داء الملاريا

ورداءة نوعية بناء تلك الفترة القائمة إلى يومنا هذا) كذلك هناك عدة أدلة على استمرارية نزوح المائدة المائية، فقد تم تعميق الآبار في جرمة والمنطقة المجاورة لها بصورة ملحوظة في هذه الفترة وكل متر إضافي يتم تعميقه سيضيف ثواني مهمة تستغرق من الوقت في سحب كل دلو ماء من البئر .

ان الاستقطاع المباشر أو الغير مباشر لحاصلات فزان من قبل القوى الخارجية، خصوصا الحكام القره مانليين والعثمانيين بطرابلس كان له أثرا كبيرا على المنطقة طيلة تلك الفترة، أما فيما يتعلق بالتجارة فقد كانت عاملا مهما تأتي في خدمة ذلك الاستغلال لاسيما تجارة الرقيق بصورة خاصة في القرن التاسع عشر ولكن باستثناء القليل من البيوت الكبيرة في مرزق وسبها لا نلاحظ إلا القليل من الأدلة التي تشير إلى استثمار أرباح تلك التجارة داخل فزان نفسها.

المستقبل ؟:

وعلى مدى الأربعين سنة الأخيرة فقط، أدت الآبار الارتوازية الحديثة إلى عكس اتجاه التدهور السكاني والإنتاج الزراعي، وعلى كل فعلى المدى الطويل من الممكن أن تجبر الزراعة هناك إلى الانحسار حول مجموعة ضئيلة من المستوطنات الزراعية المعتمدة على آبار ارتوازية جد عميق تستمر مياهها في ري مجموعات من المزارع المزروعة بحاصلات مروية كل مزرعة بقطر 300 م تقريبا، ويذكر أن مثل هذه المشروعات قد شرع في تنفيذها في عدة مناطق هناك. إن دراستنا الجيوأثرية لا تستطيع ان تضع الحلول لهذه المشكلة من أين ستأتي المياه ولكن بإمكانها وضع صورة بيانية تصور التعاقب البشري الناجم عن التغيرات في وفرة المياه بالصحراء في الماضي. وفي الوقت الذي نثق ببراعة الإنسان في إيجاد الطرق للعيش في الصحراء علينا ان ندرك التكاليف البيئية التي تترتب على تلك البراعة، فعلى مدى الخمسة آلاف سنة الأخيرة جاهد الإنسان من أجل استغلال أكبر ما يمكن من المياه الجوفية وكانت هناك تغيرات رئيسية كبيرة حدثت أثناء جهوده المبذولة في ذلك، فأولا اعتمد على مياه العيون والبحيرات والمياه الراكدة في أواخر العصر الرعوي، وعندما جفت تلك المصادر تدريجيا تحول السكان إلى أنظمة الري بالفقارات خصوصا في وادي الحياة (الأجال) والاعتماد على ري العيون إضافة إلى الآبار في الزراعة بمنطقة وادي الشاطئ وغات، وبعد التخلي التدريجي عن أنظمة الري بالفقارات ثم التحول إلى ري الآبار، وفي البداية كان يتم الري عن طريق ذراع التوازن، ثم تحول تدريجيا إلى الري بالدلو وأخيرا في الأزمنة الحديثة صار الاستنزاف الكبير والسريع للمياه الجوفية باستعمال مضخات الديزل والكهرباء والتعميق السريع للآبار التقليدية.

ان الهبوط التدريجي في مستوى الطبقة المائية العليا التي تغذي واحات وادي الحياة (الأجال) ظاهرة ملحوظة بداية من كامل العصر الهولوسيني، وان المعطيات المأخوذة من الناحية الجغرافية لمشروعات الزراعة هناك قد تكون في صالح العوامل البيئية التي تعد المحرك الرئيسي للتغير في المجتمعات الصحراوية بفزان، وعلى كل فان أبحاث الأثرية وكذلك الأبحاث التاريخية التي أجرتها الفرق الليبية والإنجليزية قد أكدت على ان العوامل البشرية قد كان لها دور مهم بقدر مماثل للدور البيئي في تغيير أنماط الحياة الاقتصادية والاجتماعية السائدة هناك.

وكما حدث في مشروع اليونسكو لمسح الأودية الليبية فان الخلاصة الرئيسية التي نود الوصول إليها من خلال عملنا هذا هي التعرف على اوجه التفاعل بين البيئة والبشر كعامل نموذجي لاستغلال السكان للصحارى، ويبقى ان نقول ان قصة فزان في الزمن الهولوسيني ما هي إلا تبنيات متعاقبة قام بها الإنسان ليتكيف مع تدهور مستمر كان يجري على الأوضاع المناخية والبيئية والمائية هناك.

ان وضع صورة علمية واضحة لماضي التصحر سينجم عنه رسم صورة جلية لمستقبل السكان بالصحراء الليبية. وفي الختام نود ان نشير إلى ان محتويات هذا العمل يضم بين جنباته افضل المعلومات المتوفرة حاليا عن المنطقة. ولا نزعم في ذات الوقت بأننا نقدم الرأي النهائي بالخصوص. ويعد هذا العمل خلاصة للوضع الحالية للبحث وأساسا الذي نأمل ان يقوم الآخرون بمساعدتنا في إرساء المزيد من المعلومات عليه، فلاتزال المعطيات غير كاملة ولا تزال الكثير من الأسئلة دونما إجابة ولكننا تقريبا نفر بأننا في نهاية البداية ونأمل ان تعمل المرحلة الموالية من البحث على سد بعض الفراغات وتضيف المزيد من المعلومات بشأن تكيف الإنسان عبر الزمن في محيط صحراوي صرف.

وأخيرا فان مشروع فزان مدينا بصورة خاصة إلى الأستاذ علي امحمد الخضوري رئيس مصلحة الآثار والى موظفيه الذين ساعدونا في تنفيذ هذا العمل.

ونود ان نشكر خصوصا مصطفى الترجمان الذي قدم لنا عوننا خاصا في ترجمة هذا العمل كما نود ان نقدم شكرنا أيضا إلى جمعة قرصع وجمعة العناق ومحمد الشكشوكي ومحمد المشاي و ابراهيم العرابي، كما نقدم شكرنا إلى الدكتور علي عبد السلام مراقب آثار الجنوب وأعضاء إدارته عبد القادر الشريف، ومحمد عريدة لمساعدتهم المتواصلة والقوية وتشجيعهم وتأييدهم لهذا العمل كما نقدم شكرنا إلى سعد صالح عبد العزيز في جرمة على عمله المتواصل من أجل دعم هذا المشروع.

الرئيسية والقصبة التي بها لعبت دورا كبيرا في السياسة والحروب التي شهدتها تلك الفترة (انظر فصل 3). ويلاحظ ان زويلة في عهد بني الخطاب قد أصبحت سوقا رئيسية وموقع استيطاني كبير بها مسجد عظيم . وخلال فترة ما وربما بعد ان حجبت أهمية ذلك الموقع (جرمة) كل من تراغن ومرزق، شيد حول جرمة سور من الطين. هذا ويذكر انه لم يتم الكشف على تراغن بشكل موسع ولو أنها كانت مغمورة بسبب شهرة عاصمة مملكة كانم إبان القرنين 12 و 13 م ، أما مرزق فإن أصولها السابقة للقرن الخامس عشر الميلادي غير معروفة رغم تطورهما المدني اللاحق جعلها مستوطنة معروفة بالمنطقة، وهذا واضح وجلي من خلال مخططها ، فباستثناء جرمة وواحة او واحتين من واحات شرق وادي الشاطئ ومجموعة واحات سبها لا توجد أية مستوطنة في فزان ، ارتفعت الى هذا المستوى من الحجم العمراني الذي وصلته مرزق حينئذ. في المقابل نلاحظ ان الفترة الجرمنية وعندما كانت السلع التجارية الرومانية توزع بصورة موسعة في فزان كانت السلع المستوردة إبان الفترة الإسلامية قليلة ومعظمها يتركز في المراكز الكبرى شرق فزان .وقد كان الطريق الشرقي ذا أهمية كبرى من ناحية التجارة مع واحة الملح في كاوار ومع مملكة كانم بتشاد وخصوصا فيما يتعلق بحركة الرقيق ، ومع حلول القرن الحادي عشر حدث تهميشا إلى حد ما للمنطقة بعدما تم افتتاح طريقين رئيسيين للتجارة عبر الصحراء الأولى يبدأ من ورقلة جنوب الجزائر إلى عين صالح ومنها إلى تمبكتو والثاني يسير من سيجلماس جنوب المغرب إلى اوادغاست.

الفترة الحديثة المبكرة:

عندما اخترق أوائل الرحالة الأوربيين الصحراء في أواخر القرن الثامن عشر ، ومطلع القرن التاسع عشر وجدوا وادي الحياة (الأجال) منطقة يعمها البؤس والفقر بقراها العديدة المتسمة بقلة سكانها وعدم تماسكها ، وإنتاجها الزراعي الذي يؤخذ كضرائب واجور للمشاخ غير موجودين بالمنطقة أو للمسؤولين الأتراك ، وكان داء الملاريا متفشيا في عدة واحات خصوصا في تلك التي توجد بها بحيرات أو اسباخ قرب المراكز التجاري السكانية الرئيسية (كما كان الحال في مرزق وجرمة) غير ان مساهمة الملاريا في التدهور الديموغرافي المستمر بفزان ليس مؤكدا حتى الان إذا ما نظرنا إلى ذلك التناقص وتاريخ ظهور ذلك الداء في تلك الأنحاء ، ومع ذلك لا ينبغي علينا إغفاله كعامل محتمل اسهم في التقليل من موارد المنطقة ، لقد كان العدد الإجمالي من القرى التي لا تزال مأهولة في الجزء الأول من القرن العشرين حوالي المائة قرية ولكن تعداد السكان كان جد قليل (فمعظم القرى كانت اقل من 300 نسمة) وفي بعض الحالات يلاحظ وجود قرى قد تحولت إلى موقع آخر تاركة الموقع الأول شبه مهجور أو كقرية صغيرة معتمدة على الموقع المأهول حديثا ، وعلى العموم فإن وادي الشاطئ كان يضم من 27 إلى 30% من عدد القرى (35% من السكان تعداد عام 1939) أما وادي الحياة (الأجال) فكان يضم 23-24 % من القرى (17% من سكان منخفضات وادي عتبة ، مرزق ، الجفرة ، الشرقية ، مجتمعة ضمت 34-38 من عدد الواحات يومئذ أي 23% من السكان) ومن الجلي ان هذه الأرقام تشير إلى الأهمية الكبيرة للمواقع الثلاثة تلك ، كما أنها تشير إلى أهميتها النسبية من الناحية الديموغرافية.

لقد أدت فترة حكم أولاد محمد (خلال الفترة من القرن الخامس عشر إلى القرن التاسع عشر) إلى تدفق عائلات المرابطين إلى فزان ، كما شهدت المنطقة تشييد اعداد كبيرة من المساجد الجديدة والزوايا وأضرحة الأولياء في كافة أرجاء فزان ، زد على ذلك الحركة السنوسية التي أصبحت منطقة فزان مركزا مهما لزاوياتهم، وكلا هذين العاملين زاد من ترسيخ الثقافة الإسلامية في المنطقة ، علما بان المعالم الدينية لم يتم تسجيلها بالصورة المناسبة ويجب ان تكون من أولويات البحث مستقبلا.

وبداية من مطلع المرحلة الحديثة لم تكن هناك أية علاقات ثقافية بين المزارعين الفزانة والأماكن الجنازية التي تعود إلى ما قبل الإسلام ، ورسومات الجمل بالفنون الصخرية ونظام الري بالفقارات، وعلى كل فان سكان الطوارق الرعاة واصلوا اختراقاتهم لوادي ارابين ووادي برجوج من الجنوب الغربي وصولا إلى وادي الحياة (الأجال) حول اوباري مع استغلالهم لربوع اسماك في رعي حيواناتهم أثناء بعض المواسم ، ولم تكن العلاقة بين الرعاة والسكان المستقرين على ما يرام، إذ اشتهرت قبائل الطوارق والتبو بغاراتهم التي كانوا يشنونها على الفزانة من حين لآخر وقد تأكد لنا ذلك من خلال الفلاح (القصور) التي كانوا يشيدونها أهالي فزان في مختلف أماكن استيطانهم. من ناحية أخرى، استمر النشاط التجاري ولكن عائد ذلك النشاط يسيطر عليه عموما الغرباء (العثمانيون، القره مانليون، والكانميون) وكذلك القبائل البدوية (مثل التبو و الطوارق) والقليل من المراكز المتميزة الأهلة بالسكان مثل مرزق.

وكان النشاط البشري في تلك الأنحاء يومئذ يمر بفترة حرجة وكانت هناك علاقات معقدة بين الرقيق والعمالة المأجورة، وكانت كلا الطاقة العاملة البشرية والحيوانية العاملة في الحقول ذات مردود محدود بسبب قلة موارد المياه المعتمدة على الآبار. ومع تزايد عوامل القمع بالمنطقة من قبل رجال الإدارة القره مانلية والعثمانية بمرزق وصلت القوى العاملة وكذلك راس المال إلى قدر عظيم من الانحطاط (يمكن ملاحظة ذلك عيانا من خلال المستوطنات المهجورة

وحجم المقابر وأنظمة الفقارات ، كل هذا يؤكد على ان فترة الجرمنت كانت اعظم فترة من حيث عدد السكان وحجم الزراعة بالوحدات ، ومن خلال هذه الوضعية الديموغرافية ، والموارد الاقتصادية يصبح من السهل التعرف على الكيفية التي سيطر فيها الجرمنتيون على جيرانهم ، من ناحية اخرى ندرك تماما السبب الذي جعل الإمبراطورية الرومانية بعد عدة محاولات لعبور الصحراء ، تفضل التعامل مع مملكة الجرمنت ، التي تسيطر على إنحاء صحراوية شاسعة، دبلوماسيا بدلا من محاولة الغزو والاحتلال.

ومن هنا نصل إلى ان الحضارة الجرمنتية كانت حصيلة ارتفاع في مستويات حياة سكان شمال الصحراء نتيجة التطور في الأنظمة السقوية ، إذ ان تركيز عشرات الآلاف من السكان في اكبر الواحات ذلك جعلهم يسيطرون على مساحة شاسعة من الصحراء ، عسكريا وتجاريا ، وعلى أبعاد متساوية بالاتجاهات الأربعة ، كما تشير الشواهد الجنائزية على ظهور مجتمع طبقي مبني على نظام نخبة متألقة تستمتع بالنصيب الأوفر من الثروة قياسا بالأغلبية الأخرى من السكان الذين ظلوا ينفون موتاهم في مقابر بسيطة عليها ركام من الحجارة.

اضف إلى ذلك هناك دلائل اخرى في السجل الأثري تفيد بان المستوطنات الجرمنتية صارت ذات صبغة دفاعية بصورة اكبر بداية من القرن الثاني أو القرن الثالث لميلاد المسيح ، ان وجود مباني شبيهة بالفقار في قلب العديد من مواقع القرى لهي دلالة على صحة هذا الرأي ، علاوة على ذلك تم التعرف على ما لا يقل عن موقع مدني واحد كان مزودا بسور دفاعي رئيسي ، ولعل هذا التوجه الدفاعي إشارة إلى تدهور الوضع العسكري للمملكة وتفتت بنيان قوتها السياسية الأمر الذي أدى إلى ظهور العديد من القوى المحلية ، وكما مر بنا نلاحظ ان الفروقات الثقافية بين جماعات الواحات المختلفة ماهي إلا إشارة على ان المملكة هذه لم تتركز اطلاقا على كيان عرقي موحد ولكنها كانت نتاج لقوة عسكرية ونظام متمركز من العمالة وموارد اقتصادية احكمتها جماعة استقرت في وادي الحياة (الأجال).

فترة ما بعد الجرمنتيين والعصور الإسلامية :

يبدو ان هناك عدد من القرى الجرمنتية ظلت تعج بالحياة في العصر الإسلامي المبكر ، التي أضيفت إليها قصور بنيت من الأجر الطيني (قصر) وكانا كلا من قصري جرمة وقصر الشارابة (والذي يحتمل ان تمت الإشارة إليه من قبل الادريسي في القرن الحادي عشر بموقع تشاوة) يعودان تاريخيا حسب التأريخ الكربوني إلى القرن العاشر والحادي عشر لميلاد المسيح ، وقد مثل هذان الموقعان استمرارية المركزين الرئيسيين الجرمنتيين (مع التأكيد على ذلك من قبل المصادر العربية) ولكن مع الوقت يبدو ان عدد القرى قد تناقص بشكل ملحوظ كما ان بعض أجزاء من الأراضي الزراعية قد هجرها المزارعون الذين كانوا مستقرين بها ولعل مرد ذلك يعود إلى التحول من الري بنظام الفقارات إلى الري بالأبار. أن مشكلة نظام الري المعتمد على الأبار هي ضرورة سحب المياه عن طريق الدلو قبل نقلها إلى قنوات الري الأمر الذي ينتج عنه محدودية مساحة الحقول التي يمكن ربيها حول البئر (انظر فصل 7) وقد انحصر النموذج الزراعي في أواخر العصور الوسطى وأوائل العصور الحديثة في مجموعات صغيرة من النخيل وفي الحقول المزروعة التي تجمعت حول بعض الأبار المتناثرة هنا وهناك ، وهذه مساحات جد محدودة مقارنة بالمساحات الشاسعة نسبيًا التي تم زراعتها باعتماد نظام الري بالفقارات في الماضي، وليس من المعروف تحديد متى تم استعمال هذا النوع الجديد من الري ولكن على الأرجح انه بدأ مع القرن الحادي عشر لميلاد المسيح.

واليا يتوفر لدينا دليل بسيط عن تجذر الثقافة الإسلامية في ذلك التاريخ ، جاء من موقع زويلة حيث قام بنو الخطاب بتأسيس مملكة لهم هناك بداية من القرن الثامن ، وقاموا بتأسيس مسجد رئيسيا خلال القرن الحادي عشر ، وهنا نلاحظ ان المسجد الرئيسي الذي تم التعرف على معالمه مؤخرا في جرمة كان على نفس الحجم ومن نفس التاريخ ، بل انطباق المصادر – كما يبدو – يعد حاليا اقدم مسجد في المنطقة باستثناء مسجد زويلة السالف الذكر ، ويؤكد لنا هذا التاريخية بان معظم إنحاء فزان ظلت خارج نطاق السيطرة أو التأثير الإسلامي ، حتى القرن الحادي عشر على اقل تقدير وحتى بعد ذلك التاريخ ظلت المنطقة بمنأى عن التيار الرئيسي للثقافة الإسلامية ، ونشير هنا إلى وجود شاهد أثري من العصور الكلاسيكية المتأخرة عثر عليه في قبر ملكي معروف في (تن هنان) وفي عدة قبور اخرى تعود إلى الفترة من القرن السابع إلى القرن التاسع استخدمت فيها نقوشا جرمنتية قديمة.

لقد تمثل التعبير الرئيسي خلال هذه الفترة في فك بناء القوة السابقة ، وتنشيط مملكة جرمة القديمة ، ان التمزق السياسي هذا وظهور قوة معادية متنقلة من قبائل البربر والعرب قادمون من الشمال مثل أولاد سليمان وقبائل الطوارق من الجنوب، قد عزز التوجه نحو إقامة مستوطنات محصنة منضوية على نفسها ، زد على ذلك ظهر في تلك الأثناء اقتصادي أدى إلى تطور العلاقة بين طرابلس ومملكة برنو و كانم حول بحيرة تشاد بواسطة طريق –تعامل سياسي مباشر ربط بينهما يمر عبر شرق فزان ، فكانت نتائج التغييرات السياسية تلك جد عميقة ، حيث استبدلت جرمة كعاصمة للإقليم بمواقع تقع على مسافة بعيدة شرقا وجنوبا مثل (مرزق وتراغن و زويلة) وذلك على الرغم من ان اسورها

MEROE كذلك من الواضح انه كانت علاقات متوازية ربطت بين دولة الجرمنت ومملكة كوش (الكائنة في ميريوي القديمة (بالسودان)) وان كلا هاتين المملكتين الصحراويتين كانت لهما علاقة تجارية كبيرة واتصالات مهمة مع العالم الروماني رغم بقائهما مستقلتين عن السيطرة الرومانية المباشرة .

لقد عرفنا فيما سبق ان اقتصاد فزان القديمة قد اعتمد دونما أي شك على الزراعة، وانه باستعمال نظام الفقارات في الري وصلت المنطقة أوج ازدهارها في الإنتاج الزراعي ، علاوة على هذا هناك أيضا أدلة كثيرة اقرب تبرز لنا ان الجرمنيين قد مارسوا أنشطة اخرى في عدة مجالات اقتصادية ، وقد أسفرت بعض المواقع الاستيطانية الممسوحة إضافة إلى الحفريات التي أجريت في جرمة وسانية جبريل عن العثور على شواهد لخلط بعض المعادن مثل الحديد والنحاس ، وقد عرف موقع سانية جبريل بأنه كان مركزا مهما لممارسة أنشطة صناعية علاوة على ظهور شواهد مماثلة في مواقع اخرى تدلنا على ممارسة نفس الأنشطة الاقتصادية، هذا فضلا عن اكتشاف عدد كبير من المواد التي عثر عليها فوق السطح مع بعض شظايا لبوتقة (rucible) والعديد من كسر النحاس المخلوط.

من ناحية اخرى هناك أدلة كثيرة على وجود مشغولات تخص أحجار شبه كريمة بالمواقع الجرمنتية مثل سانية جبريل وجرمة وقد شملت تلك الحجارة العقيق الأحمر الشفاف (عرف في المصادر الرومانية العقيق الأحمر الجرمنتي أو الحجارة القرطاجنية والإشارة الأخيرة تشير إلى مسار الخط التجاري الذي سلكه الجرمنتيون للوصول إلى الأسواق الرومانية) وكذلك الفيروز المعتم وهو مادة شاع استعمالها تحت اسم الامازونيت.

هذا إلى جانب الخرز الزجاجي الذي كثيرا ما يعثر عليه في المواقع الجرمنتية وعلى كل فهناك دلائل في موقع سانية جبريل السالف الذكر تفيد بوجود صناعة للزجاج كانت تمارس في إنتاج الخرز على الأقل ، وتجدر الإشارة هنا إلى ان هناك مصادر محلية رئيسية تحتوي على عناصر تستخدم في إنتاج الزجاج مثل مادة النظرون الموجودة برسوبيات بحيرات ادهان اوباري الكائن شمال شرق جرمة مباشرة. وكان يعد الملح من أهم سلع الصحراء ويذكر ان هناك عدة مساحات في فزان تضم مسطحات ملحية (اسباخ) من بينها على نحو خاص سبخة تقع إلى الشمال والى الشمال الشرقي من جرمة وتحتوي هذه المنطقة على آثار لجسور كبيرة على السبخة ربما مدت للمساعدة في تكون الملح ، كما لوحظت بقايا عديدة لمادة الرماد لصناعة الملح على طول تلك الجسور فسرت بأنها مواد لصناعة الملح علاوة على ارتباط تلك المواد بانتشار صناعة الفخار الجرمنتي يومئذ.

لقد صار من الواضح وجود نمط مميز لإنتاج الفخار محليا في فزان الجرمنتية شملت سلسلة من الأشكال المتميزة المطلية بزخرفة هندسية ، وعلى الرغم من عدم الوقوف على أفران فخار محددة بالموقع لهذا النوع إلا ان التشابه النسيجي مع بعض الصناعات الفخارية الخشنة هناك يشير إلى ان بعض المصنوعات من الفخار المطلية اصله يرتبط بجرمة ، ويذكر ان المجسمات المصنوعة من الطين المحروق لأشكال آدمية وحيوانية المكتشفة في حفريات جرمة عام 2001 ف في مستويات الفترة الجرمنتية تبدو هي الأخرى من صنع محلي.

من ناحية اخرى توجد إشارات في المصادر القديمة لتجارة الجرمنيين في الحيوانات المتوحشة (لامداد حلبات المصارعة في العالم الروماني بذلك النوع من الحيوانات)، وكذلك في العاج وقد عثر حاليا على مصنوعات عاجية في جرمة ، وعلى نحو مماثل عثر الأستاذ أيوب خلال حفرياته في جرمة على مجموعة من المشغولات الذهبية الأمر الذي يؤكد على ممارسة الجرمنيين تجارة الذهب عبر الصحراء التي طالما صار جدل حولها ، من جانب آخر تتحدث المصادر القديمة على مطاردة الجرمنيين لسكان الكهوف و" الزوج" ، وهذه إشارة قوية على غاراتهم للحصول على الرقيق من السكان المجاورين (هيرودوت 183.4) نفس المصدر (ناسيتوس هست 4.50) وعلى الرغم من استبعاد الاتجار في مثل هؤلاء المأسورين في الأسواق الشمالية عبر الصحراء ، إلا انه كان استعمالهم يتم بشكل موسع بحكم النشاط الزراعي المروي المكثف ، وبحكم المهمة الصعبة في بناء (الفقارات) لذا فإن أرجاء فزان كانت على الأرجح مكانا لاستيعاب اعداد لا حصر لها من أولئك الرقيق.

لقد تعرضت تجارة الجرمنيين عبر الصحراء لجدل طويل ، ذلك ان الكميات الكبيرة من السلع التجارية الرومانية التي عثر عليها بالمواقع الجرمنتية وطريقة دفن موتاهم تشهد على اندماج عناصر الحضارة البحر متوسطة في ثقافة الجرمنيين، في ذات الوقت نلاحظ ان الكميات الهائلة من المواد المستوردة تشير هي الأخرى إلى حتمية وجود سلع ذات قيمة تذهب (تصدر) إلى الطرف الآخر ، ومن المرجح ان الجرمنيين كانوا يصدرون فائض إنتاجهم من المنتجات الزراعية مثل التمور ، الملح ، الذهب ، الأحجار الشبه كريمة والنظرون والحلي المصنع ، ومن خلال الشواهد التي لدينا نصل إلى انه كان للجرمنيين سيطرة على مجموعة كبيرة من المصادر والمواد التي يمكن ان تستعمل في مجال المقايضة ، (مثل المعادن ، الملح ، الأحجار الشبه كريمة ، الحاصلات الزراعية... الخ).

وبحكم اتساع أراضي تلك المملكة والنمط الاستيطاني هناك إضافة إلى الكثافة السكانية والنظام السياسي والاجتماعي جعل الجرمنيين القوة الرئيسية الضاربة التي يعد لها ألف حساب في الصحراء الوسطى ، ان الكثافة السكانية وعدد

المرحلة الجرمننتية الكلاسيكية من 1 الى 300 لميلاد المسيح:

ومع الوقت صارت جرمة عاصمة للجرمننتيين خلال فترة ازدهار الإمبراطورية الرومانية وتم تزيين تلك المدينة بعدة مباني عامة ومعابد واستخدموا حجارة جيدة التهذيب لم تشاهد فيما سبق ، وحيث ان لا يوجد دليل يفيد باحتلال الرومان لفزان فإن هذا النوع من المعمار كان حصيلة اتصال سياسي وتجاري بين الإمبراطورية الرومانية ومملكة الجرمنت وقد لاحظنا ان الثقافة الجرمننتية، وهي لم تصور لنا في أي مكان آخر افضل من بروزها العمارة الجنازمية، كانت ثقافة انتقائية بشكل جيد أي متنوعة كما ان اختلاف أنماط الصور التي تعود إلى ذلك الزمن تعكس تمايز هويات القبائل التي تتصوي ضمن بنيان الدولة.

المرحلة الجرمننتية المتأخرة من 300 الى 700 بعد ميلاد المسيح:

يمكن ان نصف هذه المرحلة بأنها استمرار للمرحلة الكلاسيكية السابقة مع تزايد التركيز على البناء الدفاعي مثل الأسوار والقصور وما إلى ذلك.

ان تطور نمط المستوطنات في تلك الربوع يعكس تزايد تمركز النشاط الزراعي في الواحات على طول قاع المنخفض (الوادي) وإضافة إلى التوسع الإنشائي لمركز جرمة ، كان من الواضح ان هناك عدد من المستوطنات الرئيسية التي يمكن من خلال حجمها وتنظيمها الداخلي ان تطلق عليها بلدات وهنا لدينا قصر بن دوغبا بوادي الحياة (الأجال)، يعد أحد النماذج الجيدة في هذا الصدد مثله مثل قصر الشارابة في منطقة وادي عتبة برجوج ، بيد انه لا بد وانه كانت هناك قصور أو مستوطنات اخرى، ولعل مواقع ادري في وادي الشاطي وسبها وزويلة واغرام نادريف (غرب غات) من المواقع المرجحة في المقام الأول على احتوائها لمستوطنات جرمننتية قديمة، وعلى كل فانه بات من الواضح الآن ان المستوطنة الجرمننتية كانت عبارة عن جماعة منضوية على نفسها تستوطن وسط الأودية حيث تمارس النشاط الزراعي، وبالإضافة إلى المستوطنات المدنية كانت هناك قرى كبيرة كثيفة السكان وأخرى صغيرة على طول وادي الحياة (الأجال) وهذا ما يفسر الشواهد (الجنازمية) الموجودة على طول سفح المنحدرات هناك، إذ تجدر الإشارة هنا إلى ان المنطقة المحيطة بجرمة تضم مباني تحتوي على أكثر من 20 قرية وان كافة منطقة وادي الحياة (الأجال) بها ما يزيد عن 50 قرية أيام الجرمننتيين.

واغلب الظن انه كانت هناك مجموعة من المستوطنات (ربما اقل كثافة) في وادي الشاطي شبيهة بنموذج المستوطنات التي تعود إلى زمن الجرمنت (وذلك حيث توجد مصادر الحديد) وتحديدا في واحة سبها ومنخفضات أودية برجوج وعتبة ومرزق والجفرة والشرقية ، أما الجهات الثانية مثل وادي تانزوفت قرب غات وفي وادي هكيما كانت اقل وفرة في إمدادات المياه الجوفية مع انه هناك دلائل تؤكد على ان الواحات الرئيسية في تلك المناطق كانت مستوطنات مزدهرة إبان الفترة الجرمننتية.

هذا وعلى الرغم من ان الكثير من الأراضي الجرمننتية كانت عبارة عن صحراء قاحلة عديمة المياه إلا ان اكبر حجم جغرافي وصلته المملكة يومئذ بامتداد على طول سلسلة الواحات ، هو 250.000 كم² وفيما يخص العدد الإجمالي للقرى والبلدات فانه لا يمكن اقتراح رقم يمكن الاعتماد به في هذا الخصوص ، ومع ذلك فيمكن القول بأنه من المؤكد أنها كانت تفوق بكثير عدد 100 بلدة وقرية التي تعود إلى أوائل العصر الحديث.

أما في يتعلق بالسكان فانه من المنطقي جدا القول بان أوج ارتفاع تعداد فزان الجرمننتية يفوق بكثير 33.500 نسمة الذي سجله الإيطاليون لعدد سكان فزان عام 1936 ، إذ انه من غير المستبعد ان يتراوح تعداد سكان المنطقة أيام الجرمننتيين بين 50.000 و 100.000 نسمة كحد أعلى.

وفيما يتعلق بأنظمة الري المعروفة بالفقارات فهي ميزة وخاصة للبيئة والمحيط هناك ، حيث توجد ما لا يقل عن 600 فقارة (تشمل اكثر من 100.000 بئر محفورة بعمق يصل إلى 40 متر وجميعها مربوطة بقنوات تحت الأرض على امتداد يزيد عن 1000 كم) ، وعلى الرغم من ان مثل هذه الخاصية من الصعب جدا تأريخها إلا أننا متأكدين بأنها تعود في المقام الأول إلى الفترة الجرمننتية وأوائل الفترة الإسلامية (انظر فصل 7) وهذا النمط من أنظمة الري قد ساعد بكل تأكيد في قيام النشاط الزراعي الموسع والمكثف لواحات قاع الوادي في تلك الفترة، ويبقى هناك سؤال صعبا لازلنا نبحث عن إجابة له وهو متى تم التحلي عن استخدام نظام الري هذا ؟ ولعل غور مستويات مياه الصهاريج الجوفية أحد أسباب ذلك.

وعلى الصعيد السياسي نلاحظ ان العلاقة بين الجرمننتيين والإمبراطورية الرومانية قد شكلت جانبا مهما من تاريخ الصحراء الليبية ، وعلى الرغم من بعض النجاح العسكري الذي أحرزته الحملات الرومانية على الصحراء ، إلا انه لم يترتب عليها أي سيطرة دائمة إطلاقا على المنطقة، ويبدو ان روما في ذلك الوقت قد توصلت إلى قناعة بان الاحتلال الدائم لتلك المنطقة يتعذر الحفاظ عليه ، وان المزارع التي تقيد بان تلك الأنحاء كانت جزءا من الإمبراطورية الرومانية ماهي إلا إشارة بان هناك علاقات مبنية على معاهدات موقعة بين الطرفين وان روما حاولت بسط نفوذها من على بعد.

الجرمنت :

شهدت فترة الجرمنت (فيما بين 900 ق م إلى 500 بعد ميلاد المسيح)سلسلة من التغيرات الكبيرة يمكن أجمالها فيما يلي :

- ظهور دولة رئيسية وقيام حضارة في الصحراء.
- تطور الأوضاع الإنسانية.
- تطور المجتمع الطبقي مع احتمالية استخدام نظام الرقيق.
- اعتماد خط كتابي للغة الليبية.
- تزايد التطور الزراعي بهدف استزراع مجموعة من المحاصيل البحر متوسطية و الصحراوية التي تتطلب نظام ري مكثف مثل الحبوب والكروم والزيتون والنخيل.
- استقدام الخيول والإبل ووسائل النقل المجرورة إلى الصحراء.
- إحداث حركة تجارية وربط العلاقات السياسية التي امتدت شمالا إلى حوض البحر المتوسط وشرقا إلى مصر وجنوبا إلى دول صحراء أفريقيا.
- إحداث توسع ديموغرافي كبير بمستوى لم تشهده المنقطة على الأرجح مرة أخرى إلا خلال الأربعين سنة الأخيرة (يذكر ان دانيلز قد قدر وجود ما لا يقل عن 120.000 قبر جرمنتي في وادي الحياة(الأجال وحده).

وكما لاحظنا يعتبر الجرمنيتون ،إلى حد ما ،كحلقة وصل لفترة العصر الحجري الحديث. وهذا ما نتبينه بوضوح من اللقى الحجرية والفخارية في طبقات استقرارهم المبكرة ، من ناحية أخرى يحتمل ان الجرمنيتيين شكلوا اتحادا عظيما لعدة قبائل ، وفي هذا الصدد هناك دلائل تقيد بوجود عناصر قد هاجرت من واحات تقع في مواطن بعيدة ناحية الشرق قرب مصر جلبت معها (أو تحصلت على خبرات خلال رحلتها عبر الطريق الصحراوي نفسه) خبرة لتقنية متطورة استخدمت في زراعة الواحات (نظام الفقرات خصوصا).

هذا وان معظم المستوطنات الجرمنتية المعروفة حاليا تقع على طول حافة الجبل والكثير منها في مواقع دفاعية مثلما هي الحالة في القلعة الجبلية لزنكرا ،وقد أظهرت التحاليل المخبرية التي أجريت على بقايا عضوية تعود إلى النصف الأول للألف الأول قبل الميلاد ان الزراعة المروية قد بدأت في تلك الربوع منذ ذلك الزمن المبكر.

ولاشك في ان المجتمع الجرمنتي لم يظهر في ذلك التاريخ فجأة مكتملا ناضجا وسط الصحراء ،فمن الأخرى ان ذلك التطور قد جاء نتيجة لعملية تطور شهدها المجتمع على مر 1500 سنة تقريبا والتي يمكن تقسيمها عموما إلى ثلاث مراحل كل مرحلة 500 سنة تقريبا أما الفترة الجرمانتية فيمكن تقسيمها إلى اربع مراحل واسعة وذلك على النحو الموالي:

المرحلة الجرمنتية المبكرة 1000-500 قبل ميلاد المسيح

هذه المرحلة تتصل جذورها الثقافية بنواميس العصر الرعوي المتأخر الذي يعود إلى الألفية الثالثة الألفية الثانية — قبل ميلاد المسيح وقد بنيت مستوطنات هذه الفترة على مسطحات محصنة عند حافة انحدار وادي الحياة (الأجال) على النمط الذي شيدت عليه مستوطنة زنكرا،وقد تم التعرف حتى الآن على ما لا يقل عن 13 نموذجا من التلال المحصنة أو مواقع استيطان حواف المنحدرات بمنطقة وادي الحياة (الأجال) . وما القرى المرتفعة في ادري وتمسة في وادي الشاطئ إلا قرى ظهرت على ما يبدو خلال العصور الوسطى على أنقاض مستوطنات جرمنتية ، ولا غرو في ان البحث المنهجي الدقيق في وادي الحياة (الأجال) وفي أماكن أخرى من فزان سيسفر عن العثور على المزيد من النماذج المماثلة للمواقع الجرمنتية المبكرة ولو أنها على ارتفاع أقل وتعود في نسيجها المعماري إلى مرحلة مدنية احدث واقرب زمنيا إلى المرحلة الجرمانتية الكلاسيكية (انظر فيما بعد) . لقد انتهت أول مرحلة استيطان في زنكرا حوالي 500-400 ق.م وهو الزمن الذي بدأ موقع انساني جديد يظهر في وسط الوادي بموقع جرمة (جرمة القديمة) غير انه من المرجح ان استيطان زنكرا ظل مستمرا على نحو اقل حتى القرن الأول قبل الميلاد على اقل تقدير.

المرحلة الأولى لاستيطان جرمة : 500-1 قبل ميلاد المسيح

وهي المرحلة التي ظهر خلالها الاستيطان المدني المبكر لجرمة في وسط الوادي.

لعدد من البحيرات قد ألقى المزيد من الضوء على السكان في الوادي المذكور ، ويعتقد ، وهذا لم يتم تأكيده عن طريق التأريخ بالإشعاع الكربوني ، بان البحيرات في بطن الوادي قد عاشت إلى فترات أطول قياسا بتلك التي كانت ببحر الرمال ، وتجدر الإشارة إلى ان نتائج المسح قد افضت الى دلالات مؤكدة على وجود موسع للعصر الهولوسيني هنا (انظر فصل 4) ولكن طبيعة الاستيطان الجرمنتي وطبيعة الأنشطة الزراعية المتأخرة للمنطقة قد غطت على كثير من تفاصيل آثار ذلك العصر ، ولا تزال هناك تساؤلات مهمة حول المرحلة الانتقالية صوب النشاط الزراعي والعلاقة بين المزارعين الأوائل ورعاة العصر الرعوي المتأخر ، ويلاحظ ان بعض المصنوعات الحجرية التي تعود إلى آخر فترات العصر الرعوي وكذلك المصنوعات الفخارية التي لها علاقة بأسلوب النماذج الرعوية التي سجلت في مناطق ابعد إلى الجنوب الغربي قد جاءت من سلسلة قلاع التلال الجرمنتية الكائنة على الحافة الجنوبية لوادي الحياة(الاجال) ، وهذا يعني على ما يبدو ان هناك شيء من الاستمرارية أو التواصل بين سكان العصر الرعوي المتأخر بالمنطقة وبين الجرمنتيين . ان استراتيجيات الإنسان لاستغلال الصحراء غالبا ما تمثلت في سلسلة من فترات تطويرية إلى الأمام من مراحل الصيد والتقاط القوت إلى مرحلة الرعي فمرحلة الزراعة ، ولكن هذه المراحل ليست مراحل متلازمة في كل الأحوال ومن الأرجح ان الأسلاف المباشرين للجرمنت أبان أواخر الألفية الثانية قبل الميلاد قد باسروا كل تلك الأنشطة مجتمعة .

ان التذبذب المناخي الكبير في تلك الفترة قد سبب في إحداث مرحلة تراجع إلى فترة الزراعة بفزان وفي واقع الحال وغيرها من الحيوانات الأخرى (كالكلاب والحمير) كان تطورها حاسم نلاحظ ان استئناس الماشية والضأن والماعز لمرحلة أواخر البلاستوس بمنطقة الصحراء ، ورغم نشوء آراء مختلفة بالخصوص ، فإن بالإمكان تتبع مراحل استئناس تلك الحيوانات من خلال كل من الفنون الصخرية ، ومن خلال بعض الكهوف الصخرية المنقب عنها .

أما فيما يتعلق بتزايد استغلال المصادر النباتية فقد تجسد بوضوح من خلال حجارة الطحن في مواقع (منتجات) العصر الحجري الحديث خصوصا في مرحلة الحصان ، بيد انه في الوقت الحاضر يعوزنا الدليل الواضح على المراحل الأولى للنشاط الزراعي في مواقع أواخر العصر الرعوي رغم وجود الأدلة على قيام زراعة القمح قمح الخبز والشعير والعنب في وادي الحياة (الاجال).

ولكن أهم ما يميز هذه المرحلة الانتقالية بصورة خاصة هو ان استزراع المنطقة يومئذ كان على الأرجح جهادا ضد بيئة قاسية وليست ملائمة ، إذ تحول السكان في ذلك الوقت إلى ممارسة تربية الحيوان والزراعة هنا عندما طرأت تغيرات مناخية كبيرة ترتب عليها تغير في وجود المياه مما جعل الاعتماد على نشاط الصيد وجمع الغذاء مصدرا لا يعتمد عليه بصورة ثابتة .

ويرجح أن تعقد عملية الانتقال من فترة المجتمعات الرعوية المتأخرة الى المجتمع الجرمنتي الزراعي قامت بها جماعة من قدامى السكان المحليين (قدامى البربر) على اعتبار انهم أناس من سكان حوض البحر الأبيض المتوسط وليسوا زنوجا قد نزحوا إلى الصحراء في أواخر الألفية الثانية قبل الميلاد ، وتبدو تلك التحركات السكانية واضحة في الفنون الصخرية حيث تلاحظ ملامح البربر بكل وضوح إلى جانب السكان السابقين من الزنوج ، إضافة إلى ذلك ان انتشار الحصان والعربات يتناسب ومثل تحركات السكان من وادي النيل غربا علاوة على كل ذلك هناك شواهد هياكل تلك الهجرة على نحو جماعي وتجدر الإشارة - على ما يبدو -عظمية تعزز هذا الرأي . غير انه يبقى ان نقول انه لم تكن (2.32) والذي ذكر فيها ان هناك جماعة من خمسة - هنا إلى القصة التي أوردها المؤرخ هيرودوت (هيرودوت 2.33) شباب من قبيلة النساميون المستقرة في واحة اوجلة قد عبروا الصحراء إلى النيجر فلعل هؤلاء الخمسة قد شجعوا المزيد من الفرق الصغيرة من المسافرين باستعمال جياد في اختراق عمق الصحراء من واحة اوجلة .

فما الذي نعرفه فعلا عن الجماعات الناشئة في المنطقة خلال الألفية الثانية والأولى قبل الميلاد ؟ ان الشواهد المختلفة في البقايا الجنائزية وأساليب الدفن إضافة إلى الفنون الصخرية وحضور السكان في الرسوم الصخرية فضلا عن المعلومات المحدودة المستخلصة من ثقافتهم المادية يؤكد كل ذلك ان المجتمع المعني كان يمر بمرحلة انتقالية، ولكن هناك شيء واحد جدير بالملاحظة هنا وهو التغير الجذري في الأسلحة ذلك ان رامي السهام في المرحلة الرعوية قد اصبح رماحا في مرحلة الحصان ، مع ظهور أسلحة ذات رؤوس معدنية في فترة متأخرة .

علما بان المرحلة الرعوية المتأخرة اتسمت بتسارع التغير الاجتماعي بسبب تدهور الوضع المناخي والبيئي في المنطقة حيث اتسمت تلك المرحلة بوصول سكان جدد وظهور تقنية جديدة في المنخفضات ، وخلال هذه الأوضاع الجديدة انبثقت حضارة الجرمنتيين الذين أضفوا مرحلة مهمة ومميزة عبر التطور الثقافي في منطقة الصحراء .

ولعل أهم إنجازات عمل مشروع فزان هذا حتى تاريخه ، هي زيادة التعرف على مدى اتساع البحيرة القديمة في تلك المنطقة وقد انطلق هذا الموضوع من عمل سابق قام به زيغرت⁽¹⁾ ولكن زادت عليه دراسات مشروع فزان الكثير من النقاط التي تضيف عليه جوانب من الدقة ، من جانب آخر توجد بوفرة المصنوعات الحجرية التي تعود إلى الفترة البلايستوسينية في كل من هضبة امسك وعلى سفوح منحدراتها بالقرب من حافة البحيرة الجنوبية ، ومن هنا نعرف ان الجماعات البشرية كانت تعيش في منطقة امسك وعلى طول الشريط الضيق الكائن بين منحدر الهضبة والبحيرة ، أضف إلى ذلك نلاحظ كثرة تناثر المصنوعات الحجرية التي تعود إلى العصر القديم شمال وادي الحياة (الأجال) وفي الممرات المتخللة للكتبان الرملية ، وهذه تشير هي الأخرى إلى استيطان بشري لهذه المنطقة لها علاقة بسكان امسك.

الفترات الرعوية (العصر الحجري المتوسط والعصر الحجري الحديث)

ان الظهور المجدد للتواجد السكاني ملحوظ في العصر الحجري الوسيط والعصر الحجري الحديث (وهي ذات الفترة التي يشار إليها بمرحلة ما قبل العصر الرعوي والعصر الرعوي) ويمكن رد سبب ذلك إلى فترة شهدت خلالها المنطقة زيادة مجددة في سقوط الأمطار وكانت المنطقة في ذلك الوقت لاتزال خضراء بشكل ملحوظ بها نباتات وأعشاب تعيش عليها قطعان كبيرة من الحيوانات خصوصا على سطح الهضبة وفي بطون الأودية بيد انه في مراحل لاحقة شهدت المزيد من التغير المناخي ، سواء كان تغير رئيسي نحو المناخ المتذبذب أو التحول نحو التصحر التام مما زاد تركيز الاستيطان السكاني في المناطق التي توجد بها المياه على عمق قريب من سطح الأرض ، لذا فإننا نلاحظ ان الكثير من المواقع والتي يفترض أنها كانت منتجعات قد انحسرت في منخفضات وادي الحياة (الأجال) وحول البحيرات الصغيرة على حواف بحار الرمال (في ادهان اوباري ومرزق وعرق وان كاسا).

وتجدر الإشارة إلى ان الفريق الإيطالي العامل بالمنطقة قد تمكن من رسم صورة مفصلة بتتابع تاريخي جيد للمواقع الاستيطانية في منطقة تادرارات اكاكوس ومنطقة وادي تانزوفت، ولكن بقي ان ننظر إلى أي مدى يمكن ربط هاتيك المواقع بالشواهد الأثرية التي عثرنا عليها بوادي الحياة (الأجال).

ان التباين المحلي في مجال المياه والمناخ قد يكون له أهمية كبرى في تلك المرحلة من تاريخ المنطقة التي كان يتغير فيها المناخ السائد باتجاه الجفاف ، ويلاحظ هنا ان منطقة تادرارات اكاكوس ومنطقة وادي تانزوفت من الناحية الجغرافية اكثر ارتباطا بكتلة تاسيلي النيجر مقارنة من جانبها الغربي إذا ما قارن ارتباط ناحيتها الشرقية بفزان.

لقد تناول مسحنا هذا ثلاثة مناطق شاسعة حيثما توجد المواقع الرعوية قديما، في مسك، ومنخفض وادي الحياة(الأجال)، بالبحيرات القديمة الكائنة عند حافة بحر الرمال. وقد تم حصر مواقع المصنوعات الهولوسينية على طول حواف البحيرات القديمة مع قلة وجودها على ظهر سطح الحمادة وان الوادي الرئيسي تشير شواهد إلى وجود استيطان بشري خلال الفترة من 7 آلاف إلى 4 آلاف سنة قبل الوقت الحاضر. وهذا يعني مبدئيا قبل المراحل الرعوية المتوسطة والمتأخرة، كما أن هناك أدلة تشير إلى تواجد سكاني أقل حجما في مطلع العصر الهولوسيني، وكانت معظم المصنوعات الحجرية التي عثر عليها في مشروع فزان هي عبارة عن مصنوعات صغيرة متفرقة وتحتوي على نمط واضح يمثل تباين في المواد التي صنعت منها ، وتظل مادة الصنع العنصر الذي يبرز حجم إعادة تصنيع الأدوات وانخفاض كمية مادة التنوية ومدى علاقتها بمواد العصر الحجري المتوسط ، والتي نعتقد بان كل هذا له علاقة بمسألة استغلال المواد الخام، ويذكر ان مواقع عصر البلايستوسين قد استعملت كمورد للمواد الخام وهذه الحالة نفسها لاحظها المشروع المشترك الليبي الإيطالي في منطقة تادرارات اكاكوس وهو المكان الذي شهد أعمال منتظمة لاستخراج مواد خام في تلك الأزمنة.

ان حجم الفنون الصخرية المحفورة على الصخر والمعروفة حاليا بمنطقة امسك (فصل 8) له علاقة بمواقع الاستقطاع الحجري وبمواقع المنتجعات ، أو الكهوف الصخرية وانصاب الحجارة وغيرها من المعالم الجنازية والتي تشير في مجملها إلى أهمية هذه المنطقة المرتفعة في المراحل الرعوية رغم محدودية المسح الذي اجري على هضبة مسك وهو ما أكده عمل غير منشور يعد جزء من مسح أجرته شركة نفطية في المنطقة، ولعل خطوات إقامة ذلك المسح قد أدت إلى حصر عناصر طبيعية تركزت على هضبة امسك ، حيث يزداد تركيز الفنون الصخرية ، وعلى كل فإن الأمر لا يزال يحتاج إلى دراسة أكثر تفصيلا لمنطقة المرتفعات.

وفي الوقت الراهن نتقصنا المعلومات التي تعطينا أزمنة دقيقة لمواقع العصر الحجري في منخفض وادي الحياة (الأجال) (علما بأنه لم يتم للأسف التعرف هناك على مخابئ صخرية بها آثار طبقية) ولو ان مقارنة هذا بصورة أنشطة الإنسان في بيئات مشابهة بمنطقة الاكاكوس تمدنا بفكرة واضحة في هذا الصدد . ومن الواضح ان حجم التطور المتوالي للوحدات بوادي الحياة(الأجال)، قد طمس كثيرا من البقايا الأثرية للأنشطة الرعوية هناك ، غير ان الوجود المثبت بالأدلة

(1) - عالم الماني أجرى العديد من الدراسات في الصحراء الكبرى ، المترجم.

- دراسة البقايا العضوية وعظام الحيوانات ، وبقايا الهياكل البشرية بهدف معرفة الغذاء والأوضاع الصحية لسكان فزان القديمة.

- دراسة العلاقات الاقتصادية للمنطقة عبر التاريخ

- تطوير أعمال أيوب ودانيلز الغير منشورة والعمل على نشرها

وقد اشتمل العمل على حفريات موسعة بجرمة القديمة ، إضافة إلى المسوحات الاستطلاعية التي أجريت على الأقدام والمسح الطبوغرافي والدراسات الجغرافية والجيومورفولوجية، هذا وتم استعراض النتائج التفصيلية للمسح المكثف الذي اجري على الأقدام في (الفصل الرابع من هذا العمل) وقد أسفر ذلك المسح عن التعرف على مخيمات مواقع (استيطانية) ما قبل تاريخية على حافة بحر الرمال ، علاوة على مواقع عديدة لمستوطنات جرمنتية وإسلامية بمنطقة الواحة ، وستضم اجزاء (مجلدات) آثار فزان نتائج مفصلة للأبحاث القديمة التي أجراها دانيلز معززة بتعديلات مهمة ناجحة عن العمل الميداني المجدد ضمن مشروع فزان.

وتجدر الإشارة إلى انه لم توضع في السابق دراسة تيبولوجية منظمة للمواقع التي يتصادف معها بوادي الحياة (الأجال) وإن المحاولة لتقديم مثل هذا الإطار من العمل في هذا الجزء ما هي إلا خطوة مبدئية في هذا الاتجاه (انظر الفصلين 5-6) لقد خصصنا الفصل الخامس لتناول الاستيطان التيبولوجي بداية من عصور ما قبل التاريخ فالجرمنت ثم الفترة الإسلامية فالحدثة أما الفصل السادس فقد اختص بالمعالم الدينية (المعابد والمساجد) وعلى الإنشاءات الجنائزية الطقوسية (تعود إلى فترة الجرمنت).

أما فيما يخص الزراعة في تلك الربوع فقد كانت تعتمد على نظام الري في المناطق المنخفضة ، وكان في معظم أنحاء فزان يحتاج إلى نظام مبتكر للوصول إلى المياه الجوفية ، وقد تمت مناقشة تقنية الري في (الفصل السابع) بالتفصيل، مع إيجاد الدليل للتاريخ الذي استخدمت فيه القنوات السفلية لجر المياه أبان الفترة الجرمنتية وكان تدهور استعمال تلك الأنظمة المعقدة في فترة ما بعد العصر الجرمني إضافة إلى قلة كفاءة آبار الري قد أدى إلى تقلص الأراضي القابلة للزراعة.

ويتعرض (الفصل الثامن) للفنون الصخرية والى النقوش الكتابية بالأبجدية الليبية من مواقع مختلفة بوادي الحياة (الأجال) وكانت هذه الدراسة اشمل بكثير مما تم تناوله عن الموضوع ، وهي توضح مواضيع مهمة من جوانب الاختلاف والتشابه بالمادة المحلية في منطقة امسك ازطافت المجاورة.

أما (الفصل التاسع) فنحاول ان نقدم مسحا لوضع جميع المعلومات مع بعضها البعض كمحاولة مبدئية تبرز لنا النشاط الانساني القديم في منطقة فزان.

العصر الحجري القديم:

كانت المنطقة في العصر الحجري القديم معروفة باختلافها التام عن البيئة الصحراوية التي تسودها اليوم، فعلى سبيل المثال نتوقع ان هضبة مساك ازطافت الكائنة جنوب وادي الحياة (الأجال) كانت منطقة غنية خضراء مغطاة بنبات السافانا مع وفرة في هطول الأمطار عليها وتشققها انهار وترع المياه، وتوفر الحياة والمعيشة لجماعات كبيرة من البشرية وقطعان الحيوانات، والكميات الكبيرة من المصنوعات الحجرية الموجودة على سطح المنطقة تدل على ذلك، ومنذ فترة من الوقت صار معروفاً وجود مساحة كبيرة بوسط فزان كانت مغطاة ببحيرة فسيحة وقد ألقى عملنا بالمنطقة المزيد من الاضواء على هذه المسألة مما أتاح لنا فرصة اختيار جانبيين أو نموذجين من الافتراضات. ويذكر ان المناطق المنخفضة في وسط فزان والتي ينخفض مستواها بـ 500 م عن مستوى سطح البحر هي الأرجح بأنها كانت تشكل جزءا من بحيرة (أوبحيرات) قبل 80.000 سنة قبل الوقت الحاضر، وتشمل تلك الأثناء وادي الحياة (الأجال) ووادي بروجوج وأحواض مرزق إضافة إلى بحر الرمال مرزق ،زد على ذلك نجد انه من الواضح ان العديد من الكتيان الرملية ببحر الرمال اوباري كانت وقتئذ موجودة ولكن يرجح أنها كانت مغطاة بغطاء نباتي في ذلك الوقت ، وان النشاط الإنساني كان يمتد ليشمل الممرات الكائنة عند الجانب الشمالي من وادي الحياة (الأجال) ويذكر ان احدث الأبحاث التي تناولت التغيرات المناخية وفقا لمختلف الفترات الزمنية التي مرت على المنطقة بالتوالي (تم تلخيصها في الفصل الثاني) تشير إلى حدوث فترة طويلة (وربما سلسلة من الفترات المتتابعة) اتسمت بحدّة جفافها بعد 70.000 سنة قبل الوقت الحاضر ، كما ان من المتفق عليه عموما بان الفترة من 60.000 إلى 14.000 سنة قبل الوقت الحاضر كانت هي الأخرى متسمة بشدة جفافها وهذا ما انعكس في قلة وجود شواهد النشاط الإنساني في ذلك الزمن.

لقد كان للبعثات العلمية الإيطالية والفرنسية التي أجرت دراسات أثرية بفزان خلال الثلاثينيات والأربعينيات القرن العشرين دورا كبيرا في زيادة معرفتنا بالأوجه التاريخية لهذه المنطقة. فبالإضافة إلى العلماء الجغرافيين ، عمدت الحكومة الإيطالية إلى إرسال فريق من ثلاثة أثريين هم (جاكمو كابوتو ، ببادجو باشي ، وسيرجيو سيرجي) الذين قاموا خلال زيارة قصيرة مدتها أربعة اشهر تمت في صيفي 1933-1934 باجراء مسح سطحي مع إجراء حفريات مختارة بوادي الحياة (الأجال).

وبعد استقلال ليبيا عام 1951 كان الأثرى محمد سليمان أيوب مراقبا لأثار فزان وقام في عام 1961 بمشروع تمثّل في إجراء سلسلة من الحفريات على مواقع الجرمنت بمنطقة جرمة ، وأستهدفت تنقيباته يومئذ ، مجموعة من المواقع المهمة ، كالمقبرة الكائنة جنوب جرمة بداية من اكبر القبور (والذي أشار إليه بأنه مقبرة ملكية) والمدينة القديمة بجرمة حيث أجرى حفريات موسعة خلال السنوات 1962-1967 مكتشفا سلسلة من المباني من العهد الجرمنتي ذات مميزات معمارية معقدة وبموقع المقبرة المركزية بالواحة المعروفة في سانبة بن هويدي.

وفي حقيقة الأمر نلاحظ انه بالرغم من ان طريقة أيوب في إجراء حفرياته لا تتفق والمعيار الحديث للتنقيب الطبقي وعدم النشر عنها بصورة كاملة إلا ان أعماله تعتبر ذات أهمية لعدة أسباب أولها انه تكمن من إمطة اللثام عن بعض المعلومات عن عاصمة الجرمنتيين (جرمة) ومع انه ورد ذكر ذلك الموقع كمدينة في المصادر الرومانية إلا ان الصورة الرائعة التي جاءت نتيجة حفريات أيوب من خلال كشفه لبعض اساسات مبانيها كانت مفاجئة للعديد من الملاحظين.

وكانت أبحاث ما قبل التاريخ بفزان قد اضطلعت بها مجموعة من البعثات الإيطالية التي قامت بتسجيل الفنون الصخرية وإجراء حفريات في كهوف تادرات اكاكوس.

لقد واصلت بعثة جامعة روما التي كان يرأسها فابريسيو موري أعمالها في المنطقة بتركيز متزايد على الاستيطان الموسع والمسح البيئي مع استكمال الدراسات السابقة الخاصة بالفنون الصخرية ولعل من أهم أعمال تلك البعثة الجديرة بالذكر حفرياتها في كهوف ومخابئ وان شابو و وان افودا ووان موهاج ووان تيلوكات ، وهي مواقع تقدم الآن تسلسل تاريخي جيد للأوضاع الثقافية والاقتصادية للمنطقة تغطي فترة الانتقال إلى المرحلة الرعوية وبداية مرحلة الجفاف والتصحّر.

ان طرق التحاليل المختلفة والتي استخدمت في هذا الصدد والتواريخ المتعددة المتحصل عليها عن طريق الراديو كربون والحجم الكلي والقيمة التي عليها اللقى الأثرية الناتجة عن تلك الأعمال تجعل جهود تلك البعثة ذات أهمية كبرى في معلوماتنا عن التسلسل التاريخي لعصر الهولوسيين في جنوب ليبيا. والى جوار عمل البعثة هذه اكتشف الأستاذ ماريو ليفراني مجموعة مهمة من المواقع الجرمنتية في منطقة غات خصوصا في حصن اغرام ناداريف حيث تم إجراء حفريات هناك ، بيد انه تجدر الإشارة إلى انه ينبغي ان نعترف بان هذا العمل الدراسي يأتي خارج الحدود الأصلية لمنطقة فزان.

وعندما قام تشارلز دانيلز بزيارة فزان لأول مرة صحبة اولوين بروغان وديفيد سميث في شتاء عام 1958، كانت نقطة البداية لارتباط الاول بالمنطقة وبالجرمنتيين خصوصا، حيث قام " تشارلز دانيلز " المتقدم ذكره بالمزيد من الزيارات الاستطلاعية في عام 1959 و عام 1963 قبل ان يشرع في مشروع دراسي موسع عام 1965 وقد اكمل ذلك المشروع في سبعة مواسم عمل ميداني قبل ان يصل النهاية في عام 1977 مسفرا عن الكثير من المعلومات الجديدة. وتأكد له بان أوج ازدهار الموقع يعود إلى الفترة من 900-500 ق.م مع اكتشافه لبعض الأدلة والشواهد التي تتعلق باستيطان بشري ومقابر متأخرة (معظمها على المنحدر الجنوبي من الجبل) ويذكر ان هناك حصون مماثلة أنشئت على تلال أو على منحدر ، قد تم حصرها والتعرف عليها في مواقع أخرى من وادي الحياة (الأجال) (علما بان هناك مستوطنات جرمنتية مبكرة كانت توزعت في عدة أنحاء من ذلك الوادي).

من جانب آخر تمكن دانيلز من التعرف على واحات استيطانية اصغر حجما بالمنطقة (مثل سانبة جبريل وسانبة غريدا) مع توقعه بوجود المزيد من مثل هذه المستوطنات ، كما انه قام بدراسة مهمة على العديد من مواقع المقابر واجرى مسوحات أثرية في بعض القطاعات و أجرى حفريات اختيارية في عدة أماكن خصوصا في سانبة بن هويدي.

وكانت أهداف مشروع فزان (1997-2001) حسبما وضعت من البداية:

- دراسة تاريخ استيطان فزان خلال الاثنى عشر الف سنة الأخيرة (أي منذ 12 الف سنة مضت)
- وضع خريطة مفصلة للبقايا الأثرية قرب جرمة.
- القيام بحفريات طبقية بمدينة جرمة القديمة (جرمة عاصمة الجرمنت).
- دراسة وتقييم الأوضاع البيئية والمناخية السائدة في المنطقة قديما.
- دراسة تقنية استغلال المياه بالواحة عبر التاريخ.

عرق وان كاسا و أجزاء من جبال تادراوات اكاكوس ، وإذا ما نظرنا إلى هذه المواقع إجمالاً نلاحظ إنها تشكل حاجزا يميز منطقة فزان وواحة غات في وادي تانزفت على الجانب الغربي من الاكاكوس ، وبالتحرك من غات غربا يصعد المرء جبال تاسيلي نيجر جنوب الجزائر ، وإلى الجنوب من فزان نلاحظ ان جميع المسالك تعبر هضبة صخرية عالية يصل ارتفاع بعض أجزاءها حتى تصبح سلسلة جبلية مثل ما هو الحال في تيبستي شمال تشاد أو في اير النيجر ، اما الطريق المؤدية إلى مصر و إلى شرق الصحراء فهي تأخذ مسارا تقليديا باتجاه الشمال الشرقي متبعة خط واحات زلة اوجلة سيوة.

انه بدراسة العلاقة بين الوضع التضاريسي لفزان وبين مراكز تواجد واحاتها دراسة دقيقة سيتضح ان تلك المراكز تتلازم مع المنخفضات المحاذية للمنحدرات الجبلية وبحار الرمال ، فهناك يمكن إيجاد المياه عند سطح الأرض أو قريب منها كما يذكر ان هذه المنخفضات قد احتفظت بأقدم الشواهد لتطور الحياة في واحات الصحراء . ان الارتباط الغير مألوف بين الأوضاع التضاريسية والمائية يجعل منطقة فزان أحد أهم المناطق التي استوطنت بشكل مكثف بالصحراء إذا ما قورنت بواحات جنوب الجزائر مثل تيديكليت وتوات وجورارا.

وتجدر الإشارة إلى ان المنطقة التي تركزت عليها موضوعات سلسلة التقارير التي بصدد نشرها ، هي منطقة وادي الحياة (وادي الأجال سابقا) وهو يضم مجموعة من الواحات الى الجنوب الغربي من العاصمة الحديثة للإقليم "سبها" ، وتشكل تلك المنطقة أيضا القطاع الأوسط من فزان وواحدة من الأماكن المستغلة زراعيًا ، وتقع منطقة الدراسة هذه على بعد 1000 كم من طرابلس أي مسيرة يوم واحد بالسيارة على طريق معبد ، وهي ذات المسافة التي كان في الماضي يستغرق قطعها من 20 إلى 30 يوم عبورا بمسالك الصحراء على ظهور الإبل ، وإذا ما جننا إلى تضاريس وادي الحياة (الأجال) فانه عبارة عن مجرى لوادي متقطع أو قل أهدودا متأكلا، يضم في مساره الفسيح أماكن حصوية ومسطحات سبخية وطينية بشرط متقطع من الواحات. بمعنى آخر هو عبارة عن منخفض بين مرتفعات، وتكمن أهميته كموقع للاستيطان البشري في حقيقة احتواءه على مخزون مائي جوفي على عمق قليل من سطح الأرض، ويلاحظ إلى الشمال منه توجد تشكيلات ضخمة من كتبان ادهان اوباري (بحر الرمال) وإلى الجنوب يوجد منحدر لهضبة من الحجر الجيري يتراوح ارتفاعها من 200م. 300 م.، وتتجه تلك المنحدرات جنوبا إلى وادي بروجوج وادهان مرزق وتشققها أودية سحيقة تستمر في اتجاهها جنوبا وإلى الجنوب الشرقي.

لقد كان هدف مشروع فزان (1997-2001) هو إجراء دراسة دقيقة وبحثا مفصلا عن التغيرات المناخية والمائية والبيئية تم التعرض إليها تفصيلا من قبل أخصائيين في الجغرافية في الفصل الثاني من هذا التقرير . ولاشك في ان المياه هي العامل الرئيسي للحياة سواء كانت متحصل عليها عن طريق الأمطار أو البحيرات أو من المياه الجوفي عن طريق الآبار أو العيون ، وتجدر الإشارة إلى ان فترة عصر الهولوسين في ليبيا اتصفت ببداية التذبذب المناخي تلتها مرحلة من الجفاف الكامل والمتواصل سادت جميع أرجاء الصحراء منذ 3000 سنة قبل الميلاد على وجه التقريب ، وحتى الآن ، ويلاحظ ان المرحلة الانتقالية هذه من طقس مطير إلى مناخ مفرط الجفاف ، الذي هو عليه الآن ، قد تراكمت مع الانخفاض المستمر لمستوى المياه الجوفية ولمياه العيون ، ويرجح انه بينما كان المناخ يتجه نحو الجفاف الكامل حوالي 3000 سنة قبل الميلاد كانت المنطقة أكثر خضرة وزراعة باعتبار سهولة الوصول إلى المياه الجوفية ، وهذا موضوع هام يتمثل في دمج البحث الجغرافي بالأثرى ومن تم تقييم السبل التي تم بواسطتها استغلال الصحراء بنجاح على طول الزمن من قبل الإنسان وعن طريق تطبيق أساليب استعمال المياه ، وعلى مر العصور التاريخية أخذت وسائل الري أشكالاً وأنماطاً معقدة وصور متباينة من طرق السقي (لقد تم تناول موضوع الري بالتفصيل في الفصل السابع).

ويشكل الجرمنتيون جانبا رئيسيا في مسيرة ماضي فزان ، وقد أفردنا لذلك الفصل الثالث من هذا العمل الذي تعرض للمصادر التاريخية التي تناولت هذه المملكة المهمة التي ازدهرت من 500ق.م و حتى 500م. تقريبا ، ويلاحظ ان دراسة قدامى سكان الصحراء الليبية والبلدان المجاورة تعد ناقصة إذا ما قارناها بتلك التي أجريت على حضارات البحر الابيض المتوسط التي قامت بالمناطق الساحلية الشمالية (مثل الحضارات الفينيقية واليونانية والرومانية) . لقد لفت الجرمنتيون انتباه عدد كبير من العلماء لعدة أسباب، وكان هيرودوت الإغريقي قد ذكرهم في معرض حديثه عن الصحراء مع إشارته إلى ماشيتهم التي كانت ترعى المراعي وهي تسير إلى الخلف (بسبب فرط طول قرونها المتجهة أماما) وهذا الوصف قد شد خيال قدامى الكتاب الآخرين إضافة إلى العلماء المحدثين ، وعلى كل فانه بالرغم من الإشارات المبكرة لهيرودوت فيما يتعرض بالأنشطة الزراعية للجرمنتيين فإن النظرة العامة للمصادر القديمة تفيد بان الجرمنتيين قبائل بدوية ليست ذات حكومة يعيش معظمهم في خيام أو في قرى متفرقة من الأكواخ ولكن في الدراسات الحالية برز ومن خلال الأدلة الأثرية ان الجرمنتيين كانوا على غير ذلك من الحياة.

آثار فزان ملخص عربي

بقلم : ديفيد ماتنغلي و آخرون

ترمي ترمي تقارير آثار فزان هذه إلى التعريف بالاستقرار البشري والتكيف مع البيئة في أكبر صحاري العالم ، ألا وهي الصحراء الكبرى (في شمال أفريقيا) . وتشمل هذه التقارير نتائج الأبحاث الأثرية الليبية الإنجليزية المشتركة التي أجريت في فترات مختلفة بداية من دراسات تشارلز دانيلز في الخمسينيات والستينيات والسبعينيات من القرن الماضي ونهاية بمشروع فزان الذي نفذ تحت إشراف البروفيسور ديفيد ماتنغلي خلال الفترة من 1997 إلى 2001 إفرنجي. ومن المؤمل ان يتم نشر تلك الأبحاث في أربعة اجزاء أولها الذي بين أيدينا الآن.

تعني فزان كامل المنطقة الصحراوية الكائنة جنوب غرب ليبيا . وهي تغطي مساحة تتراوح بين 550.000 كم² و 640.000 كم² وكانت إبان فترة الاحتلال الإيطالي وحتى مطلع الستينيات من القرن المنصرم واحدة من أقاليم ليبيا الثلاثة (إضافة إلى إقليم طرابلس شمال غرب ليبيا وإقليم برقة شمال شرق ليبيا) وتشكل واحات فزان مجموعة متميزة بالصحراء الكبرى وهي تختلف من عدة جوانب عن مثيلاتها بجنوب الجزائر وجنوب تونس . كما يلاحظ الجفاف المفرط الذي يسيطر على المنطقة بمتوسط أمطار يكاد لا يذكر تتراوح أعلى معدلاته بين 5 مم و 12 مم سنويا ، وتصل درجة حرارة تلك الربوع إلى 50 درجة صيفا أما اشهر الشتاء فهي دافئة وجافة خلال النهار بينما تصل درجة البرودة إلى الجمود في بعض الأحيان ليلا ، اما الرطوبة فهي منخفضة مع هبوب الرياح الساخنة والعواصف الرملية بشكل متواتر عموما.

وتجدر الإشارة إلى ان واحات فزان في عمومها صغيرة الحجم ، ولكنها ذات كثافة عنقودية متمثلة في مجموعة مواقع مأهولة بالسكان تفصلها كثبان رملية أو مسطحات صخرية بارئفاع يبلغ متوسطه بين 400 م و 600م . ووفقا لإحصائية عام 1969 لم تتجاوز المساحة المزروعة بالمنطقة 2700 هكتار إضافة إلى 1200 هكتار من أشجار النخيل (أي ما يعادل 40 كم² من الأراضي المزروعة تقريبا).

ولكن المفهوم الحالي لكلمة فزان يغطي منطقة أكبر حجما بكثير عما كان يعنيه في الماضي فعلى مدى التاريخ وحتى القرن التاسع عشر .كان إقليم فزان يعني منطقة محدودة تنحصر في الجزء الجنوبي الغربي من الصحراء الليبية ، ولكن التوسع العثماني زاد السيطرة الإدارية لإقليم فزان ليشمل حتى واحة غدامس في الشمال الغربي (من الإقليم) وغات عند الجنوب الغربي (من الإقليم ذاته) ، إضافة إلى احتواءه مناطق تيبستي وأراضي التبو جنوبا ، وقد ورث الإيطاليون هذه الحدود الشاسعة . اما عن الاستيطان البشري لمنطقة فزان فهو ينقسم تقليديا إلى ثلاث مجموعات من الواحات تقع بين خطي عرض 24-28 على وجه التقريب متمثلة في وادي الشاطئ في الشمال ووادي الحياة¹ ، ووادي برجوج ووادي البوانيس الحد الشمالي ، مع وادي برجوج - عتبة ومنخفضات مرزق ، الجفرة إلى الجنوب . وبشكل وادي الشاطئ وسبها ووادي عتبة ومنخفضات مرزق ، التي تشكل الحدود الجنوبية لتلك الواحات ، باستثناء سلسلة الواحات الصغيرة الكائنة قرب القطرون على الطريق المؤدية إلى تشاد والنيجر جنوبا . اما الناحية الشرقية فتحدها سلسلة من الواحات النائية التي تعد عموما ضمن إقليم فزان مثل تمسة والفقهاء وووا الكبير ، بينما تشكل واحات غات والبركت وسيرادليس وخدامس ، والتي لم تضم إلى فزان إلا إبان الاحتلال التركي والإيطالي الحدود الغربية للإقليم ، وفي واقع الأمر كانت تلك الواحات بمثابة أماكن مأهولة مجاورة لمنطقة فزان رغم ارتباطها التاريخي الوثيق بالمنطقة ، ومن هنا ندرك ان المعنى المتعارف عليه لمصطلح فزان هو ما ينسحب على مجموعة من الواحات الكائنة جنوب غرب ليبيا وان الفزانين هم المزارعون المستوطنون بالواحات تمييزا لهم عن غيرهم من الجماعات البدوية المتنقلة على مساحات شاسعة من الأراضي مثل الطوارق والتبو والعرب.

ان معظم هذه الصحراء ليست محيطا من الرمال كما هو سائد في أذهان الناس ، على ان الإقليم الكائن تحديدا جنوب غرب ليبيا يحتوي على منطقتين رئيسيتين من الصحراء الرملية هما : ادهان اوباري (64.000 كم²) وادهان مرزق (58.000 كم²) اما الأطراف الشمالية من فزان فهي تتمثل في مرتفعات صخرية صحراوية (الحمادة الحمراء) وجبال السوداء والهروج والهروج الابيض . ويذكر ان بحرا الرمال المتقدم ذكرهما بفزان مفصولان بمرتفع اللاتيني وهو امتداد لمرتفع مساك ميليت ومساك ازطافت والى الغرب من مساك ميليت يقع L يمتد على شكل حرف

¹ - وادي الحياة هو الاسم الحديث لوادي الأجال ، المترجم

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الجزء الأول

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نشر

الجمهورية العربية الليبية الشعبية الاشتراكية العظمى

طرابلس-مصلحة الآثار

جمعية الدراسات الليبية ، لندن

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الجمهورية العربية الليبية الشعبية الاشتراكية العظمى

طرابلس-مصلحة الآثار

لندن-جمعية الدراسات الليبية



The Libyan Sahara is one of the richest desert areas for the study of human adaptation to changing environmental and climatic conditions. This is the first volume in a projected series of four reports reporting the combined results of two Anglo-Libyan projects in Fazzān, Libya's south-west province. The late Charles Daniels led the first expeditions between 1958 and 1977, with David Mattingly directing the subsequent Fazzān Project from 1997-2001. The interdisciplinary work combines study of the geography, climate, hydrology, and environment with archaeological and historical research across a very broad time-frame. The archaeological approaches include both survey and excavation, as well as detailed reports on finds, rock-art, irrigation technology, flora and fauna. This first volume presents a synthesis of the results. The later volumes will provide the detailed evidence from survey and excavation.

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'The Garamantes have emerged from the shadows. This study of the Fazzān from remotest antiquity to the present day, including the area formerly occupied by the once powerful but little-known Garamantes peoples, is striking for the extent and range of the enquiry, the meticulousness of its documentation, and the clarity of its exposition. And this is a mere hors d'oeuvre for the feast of detailed evidence that is to come. The completed volumes will immediately become the standard work on this remote region, and seem unlikely ever to be superseded.'
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