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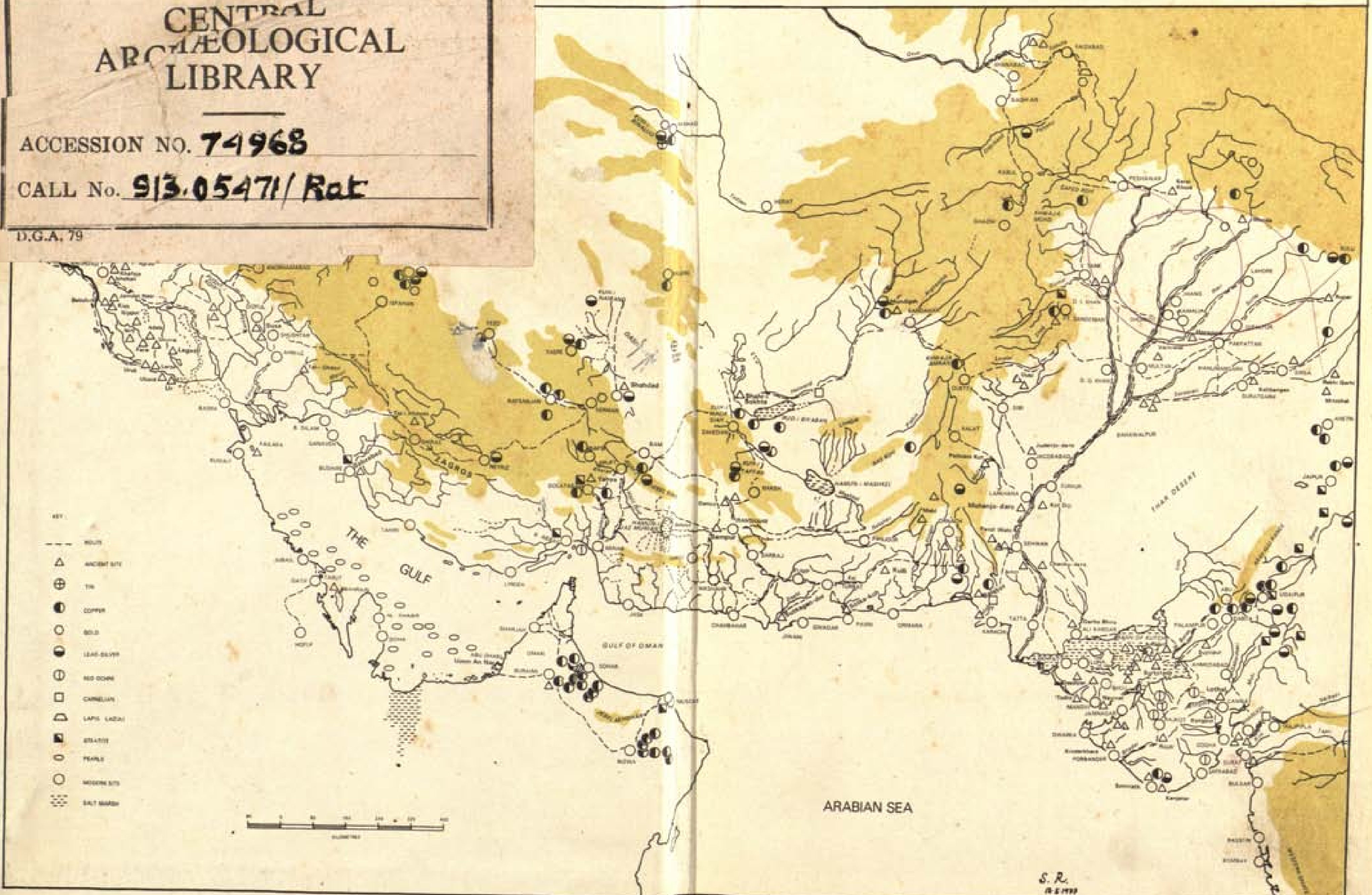

Encounters
The Westerly Trade of the Harappa Civilization

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SHEREEN RATNAGAR

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For
F.R.R. and T.F.R.

Preface

This is a revised version of a thesis approved for the Ph D degree of the Jawaharlal Nehru University. Romila Thapar, who supervised the dissertation, taught me that archaeological research can reach out to matters beyond the technicalities of artefacts, strata and dates. If I have posed a set of historically useful questions in this study, my debt is entirely to her. Responsibility for errors and inadequacies is, of course, solely mine.

I thank Peder Mortensen, Nicholas Postgate, Rudi Jäckli of Petroleum Development (Oman) Ltd., and A. J. Russell of Prospection Ltd. for help with data of various sorts.

In 1975 I made a study trip to Bahrain, Kuwait and Iraq, during which I received assistance from the British Committee for Arabian and Gulf Studies and the British Archaeological Expedition to Iraq. I thank the Directorate-General of Antiquities, Government of Iraq, and in particular Dr Fawzi al-Rashid, then Director of the Iraq Museum, for granting me facilities to study material in Baghdad.

The major part of this research was carried out during the years 1973 to 1976 at the Deccan College Postgraduate and Research Institute, Pune. I am grateful to Professor H. D. Sankalia, the Director, the Librarian, and the library staff for the facilities extended to me. Gerry Talbot, Heather Bell and Isobel Thompson of the Library of the University of London Institute of Archaeology were kind enough to provide me with numerous publications, without which my collection of data would have been incomplete.

On completion the dissertation was read by George Dales, Margaret Drower, Inez During Caspers, Gregory Possehl, Professor Sankalia and B. K. Thapar. I thank them for their comments and criticism. Several of my colleagues at the Centre for Historical Studies, J.N.U., listened patiently while I thought aloud on the enigmatic Harappans: I hope they enjoyed the discussions as much as I did.

Shehrnaz Panthaky always obliged with her expertise, and Mithi

Choksi, M. S. Ganesh, Shirin Kudchedkar, Malti Nagar and Statira Wadia helped in several ways. S. Chainani, V. da Silva and F. Courtney gave me much information on boats, not easily available in books.

I am also grateful for the expert advice and guidance of the Oxford University Press, Delhi.

To my mother and father, always generous with practical help and moral support, this book—for what it is worth—is dedicated.

SHEREEN RATNAGAR

Contents

MAPS

TABLES

Abbreviations

AfO	Archiv für Orientforschung
AI	Ancient India
AJ	Antiquaries Journal
AJA	American Journal of Archaeology
Amer. Anthr.	American Anthropologist
Anc. Pak.	Ancient Pakistan
ANET	Ancient Near Eastern Texts Relating to the Old Testament (ed. J. B. Pritchard), Princeton, 1955 (second edition).
ARASI	Annual Records of the Archaeological Survey of India
Arch.	Archaeology
ARM	Archives Royales de Mari (series)
Art. Asiae	Artibus Asiae
BASOR	Bulletin of the American Society of Oriental Research
Bibl. Or.	Bibliotheca Orientalis
BSOAS	Bulletin of the School of Oriental and African Studies
Bull. Inst. Arch.	Bulletin of the Institute of Archaeology
CAD	The Chicago Assyrian Dictionary
CAH	The Cambridge Ancient History (third edition)
CHI	The Cambridge History of Iran
Curr. Anthr.	Current Anthropology
EW	East and West
Gaz.	*Gazetteer*
GJ	Geographical Journal
GSI	Reports of the Geological Survey of Iran
HUCA	Hebrew Union College Annual
IAR	Indian Archaeology: a Review

IJHS	Indian Journal of the History of Science
JAOS	Journal of the American Oriental Society
JCS	Journal of Cuneiform Studies
JEA	Journal of Egyptian Archaeology
JESHO	Journal of the Economic and Social History of the Orient
JNES	Journal of Near Eastern Studies
JRAI	Journal of the Royal Anthropological Institute
JRAS	Journal of the Royal Asiatic Society
Jr. B. B. R. A. S.	Journal of the Bombay Branch of the Royal Asiatic Society
Jr. Or. Inst. Baroda	Journal of the Oriental Institute, Baroda
MASI	Memoirs of the Archaeological Survey of India
MDP	Memoires de la Delegation en Perse
MGSI	Memoirs of the Geological Survey of India
MEJ	Middle East Journal
OIC	Oriental Institute (Chicago) Communications Orientalia
Pak. Arch.	*Pakistan Archaeology*
PPS	Proceedings of the Prehistoric Society
Proc. Zool. Soc.	Proceedings of the Zoological Society
RA	Revue d'Assyriologie
SAT	Studies in Ancient Technology, R. J. Forbes, Leiden, 1955 ff.
ZA	Zeitschrift für Assyriologie

JN	Jamdat Nasr period
ED	Early Dynastic period
Ur III	Period of the Third Dynasty of Ur
OB	Old Babylonian period

Introduction

The civilization of Harappa is one of the more fascinating enigmas of archaeology. Not the least remarkable of its features are the amazing extent of the civilization—we now have evidence of its existence not only in the northwest of the Indian subcontinent but in Central Asia as well—its stability of form over a considerable period of time, and the sophistication of urban life manifest in its material remains.

Despite all this one receives the impression that it is a dead civilization. Cultural achievements in the Harappan period do not appear to be integral to the continuity of Indian civilization. When the Harappan material style ceased to be in evidence, several of its settlements were abandoned, and the subsequent period saw a number of regional cultures in the erstwhile Harappan area, characterized by small settlements, an eclipse of urban life, and immensely humbler material remains. It was about a thousand years after the Harappan period that an urban tradition again took root in the Indian subcontinent, and that too in a totally different geographic and technological milieu.

True, certain elements of Harappan life did survive, and some of these are evident even in modern times; there are, for example, the elements of religious iconography, the cart and boat forms, particular types of dice and ivory combs, and the divisive scheme of the weight system. And such survivals should not surprise us unless we were to suggest that after the desertion of their cities the Harappans vanished into thin air. But if we consider aspects of material culture which reflects the ordering of local communities and local traditions into a civilizational nexus, we see that no legacy of the Harappan system of writing, town planning, urban facilities or metallurgy survived down the centuries.

While the Harappa culture stands apart from the mainstream of Indian history, it is but one of several bronze age cultures scattered through Asia between the Euphrates and Gujarat. We will be considering here the lower Mesopotamian plains (Sumer and Akkad), the plains of Khuzistan with their adjoining mountain region (Elam), the Arabian/Persian Gulf* (the Barbar and Umm an-Nar cultures), the southern Zagros and the mountain zone south of Kerman (the Yahya culture), Seistan and the lower Helmand valley (with Shahr-i Sokhta as the most prosperous settlement), and Persian and Pakistani Baluchistan (the Bampur and Kulli cultures); this brings us to the western fringes of the Harappan zone, spread eastward up to the Indo-Gangetic divide and present-day Gujarat.

With the exception of parts of the Harappan region, this entire area shares one general geographic feature: an arid or semi-arid climate with summer droughts and an unevenly distributed and unreliable rainfall in the winter months amounting to less than 250 mm per annum. Characteristic of such arid lands is an economy based on winter agriculture and the herding of animals, mainly sheep and goat.

This of course is not to imply that the entire region presents one environmentally undifferentiated belt. The particular geographic conditions of each culture region will be described in Chapter I, and it will be seen to what extent each zone shared in the arid-zone characteristics mentioned above. As we come to the eastern units of the area under study we find that in Kathiawad and, to a much greater extent, coastal south Gujarat, there is an appreciable monsoon rainfall, whereas the upper Ganga–Jumna doab is transitional between the arid Indus plains and the monsoon Ganga plains, forming the eastern limits for winter farming in the north of the subcontinent. The Thar desert forms a greater physical and cultural divide than is often realized, and it needs to be emphasised that a large part of the Indo-Pakistani territory under study bears many geographic affinities with regions with the west as well as with monsoon India.

To some extent, therefore, the Harappa civilization may represent the eastern manifestation of the bronze age phenomena of the arid zone. This in no way implies that cultural origins or urban processes in any part of this zone are to be explained by 'diffusion' from one or more centres, much less by geographic determinism. But much archaeological evidence and data from Mesopotamian cuneiform texts has come to light which shows that between the

*Henceforth the Gulf.

bronze age cultures listed above there were interactions which took the form of exchange of goods. Therefore it is important to ascertain to what extent the Harappa civilization was westward-looking.

It is the problem of intercultural trading relationships which forms the subject of this study—a subject which is, of course, by no means new. Several scholars have tackled the interpretation of those cuneiform texts which refer to Mesopotamian intercourse overseas. Some archaeologists have analysed the artefactual evidence for encounters between particular cultures, while other studies have concentrated on the distribution or typology of particular classes of artefacts, such as manufactured objects or precious stones or seals.

Here, however, the aim is not conclusive in-depth analyses of particular bodies of artefactual or textual data, but a stock-taking of all the published evidence. I have tried to present an overview: to give due importance to both archaeological and literary evidence, and to consider the region from Mesopotamia to northwestern India as a whole rather than focus on exchange between selected regions.

How does the archaeologist come to terms with such a wide investigative area? Trade being our theme, the first requirement is to consider local environments and the economic potential of each region for external exchanges. A social group may reside in an area containing resources which can be exchanged with other groups. Or else the economy of a group may be based on trade not because it is particularly wealthy, but because it is located in an area where the handling of merchandise is profitable. When some cultures show more artefactual or documentary evidence for external trade than others we have to enquire into local physiography (the natural isolation or otherwise of a particular area), into local fertility and mineral resources, and into the existence of social conditions which make organized trade possible. Thus in Mesopotamia and Elam we have conditions of high subsistence productivity, the feasibility of communications by land, river and sea, and a level of social organization of sufficient complexity to maintain sustained encounters with foreigners. (In fact in our entire area it is the Mesopotamian and Elamite urban traditions which were the most long-lived.) On the Harappan side again we see the natural potential for food production and movements by land and water—the Harappan occupation of a long seaboard cannot have been accidental—and the existence of a few very large cities populated by specialist craftsmen and traders. Urbanization in the upper Gulf and in Seistan, however, was relatively short-lived, as in northwestern India. If at Shahr-i Sokhta the environment provided opportunities for ample food production and craft manufacture, the city was not ideally located for long-distance contacts. In the upper Gulf we have the reverse situation: here the location of world routes made up for very poor natural resources. We also deal with societies with no particular natural advantages in their neighbourhood apart from some mineral resources: in regions of difficult overland or seaward transport and low fertility. Yet the ancient peoples of Oman, Kerman and Baluchistan bear good testimony to human ingenuity in that they too, albeit to a lesser extent, were in contact with the world about them, in one case even as suppliers of specialized goods to a very wide region.

As we proceed through Chapter I, surveying the setting of sites within the larger landscape and simultaneously also the geographic content of texts relating to the world about Mesopotamia, it will become apparent that we cannot ignore regions outside the culture areas defined above. The Anatolian plateau, the Levant, the western Zagros, northeastern Iran and Turkmenia, the inaccessible mountain reaches of northeastern Afghanistan, the hill-forest regions of northern India, the Malwa region and the Deccan, feature in this study as sources of raw materials or as peripheral trading partners.

Concerning the simultaneous utilization of textual and archaeological data mentioned above, we must consider the problem of identifying important places mentioned in the cuneiform texts (mainly Dilmun, Magan and Meluhha). We would not seek the location of these places just anywhere. Because they are frequently referred to as sources of goods or as destinations of trading trips, we may assume that Dilmun, Magan and Meluhha would refer to areas archaeologically known to have been inhabited in the third and second millennia, and known to produce the respective goods or to have been in contact with Mesopotamia. In actually delineating the areas concerned we would be on safer ground in ascribing a particular region to a particular name if it could be shown archaeologically that the entire region was characterized by some form of social interaction.

Further problems confront us when we proceed with such identifications. The period when texts refer to one of these areas may not coincide with the archaeological dates for the floruit or external contacts of the identified culture(s). Such problems have been elucidated in Chapter IV and lead to modifications of existing ideas on the pattern of the trade.

Another important question for consideration is the kinds of goods which were carried between peoples in the bronze age; raw materials or manufactured items, utilitarian goods or 'luxuries'. Here it has been found profitable to consider various sorts of merchandise individually: to investigate their natural occurrence or manufactured source as well as their subsequent utilization throughout our area. The mobility of certain goods, sometimes over hundreds of kilometres, is indeed astonishing, as is the total range of merchandise which interested our early traders.

We also have to justify and analyse our notion of 'trade'. If goods moved between regions as a matter of accidental encounters, we cannot talk of trade, which is a matter of sustained endeavour. If we are considering the latter, we have to ask if sea and overland traffic could have been reliable and regular in bronze age conditions. How did intercultural exchanges come about? And what exactly did 'trade' involve? A study of the seals and the cuneiform trade texts gives clues as to the organization of the trade, the involvement of states in trade, and other matters.

Among the questions implicit in this work is the role of long-distance trade in the Harappan economy in particular and in Harappan urban development in general. Did Harappan technology depend on external sources for its raw materials or artefacts? If, for example, bronze metallurgy was indispensable to Harappan agriculture or craft production, and copper and tin were not available locally, we could suggest that long-distance trade was indeed a central aspect of the Harappan urban system.

But it has long been recognized that few economic systems are solely concerned with food, shelter and clothing. The satisfaction of needs determined by kinship or status obligations or ruling-class ideologies are equally important, and cannot be distinguished from 'purely economic'needs. Trade in non-utilitarian or prestige goods might be of key importance if it contributed to the maintenance of social relationships or alliances or to the privileged position of individuals at the higher levels of the social hierarchy. For instance, in Mesopotamian royal inscriptions and epic literature we see how important a royal obligation was the decoration of temples with exotic materials such as fine timber, gold and lapis lazuli, all of which were available at great distances. We need to know if parallel situations existed in Harappan society.

Finally, we consider a wider historical problem—one concerning the possibility of a causal connexion between the origins of sustained long-distance trade on the one hand and the emergence of a stratified urban society in northwest India on the other.

M. R. Mughal (1970) has made a valuable contribution to our understanding of the pre-urban period, now termed Early Indus. In brief this was a period in which the Indus plains were widely colonized, plough agriculture was practised, craft production began in a small way, and three major ceramic styles appeared: the Amrian, Kot Dijian and the Sothian. There is no evidence for urbanism, for writing, or for the widespread use of seals. Mughal shows that these plains cultures were contemporary with Damb Sadaat II–III and related sites in the Quetta valley, and that there was substantial intercourse between northern Baluchistan and the plains, as is evident from similarities in architecture, bone tools, some flint tool types and terracotta animal figurines.

It is now known that the 'Quetta' painted pottery style manifest in the Quetta valley in this period is found also at Mundigak in period III (gradually fading out in period IV 1–3), at Shahr-i-Sokhta I, and at Namazga III sites in southern Turkmenia. As this ceramic style appears to have developed in Turkmenia (Mughal 1970: 308), and as there is evidence for the abandonment of sites on the Geoksyur delta after the Namazga III period, it is generally assumed that this distribution of Quetta painted pottery represents a movement southward from Turkmenia, perhaps first to the Helmand valley and subsequently into northern Baluchistan (Biscione 1973; Hlopin 1974: 65–71). That this movement from Turkmenia coincided with social and economic changes in Baluchistan is perhaps indicated by the greater number of sites, the appearance of public architecture at Damb Sadaat (Mughal 1970: 259) and Mehrgarh (Jarrige and Lechevallier 1977), and full-time craft specialization at Mehrgarh (Audouze and Jarrige 1977).

It appears that in the mature Harappa period the main thrust of external connexions was no longer northwestwards towards

Turkmenia but directly westwards. True, there is evidence for the existence of some six mature Harappan sites on the Oxus, but it should be noted that these sites are located substantially east of the most convenient route between Turkmenia and the Kandahar–Quetta region. At Shahr-i Sokhta and Mundigak artefactual parallels with the Namazga IV horizon do exist (Tosi 1973–4: 51–5), but in northern Baluchistan the Quetta period appears to have marked the final occupation of the majority of sites, and the mature Harappa culture has no affinities with the cultures of the Helmand. It has recently been pointed out by Gupta and Schetenko that some manner of connexion with Turkmenia was maintained in the Harappa period. The more striking evidence is the occurrence in Turkmenia of a few Harappan-type ivory rods, and of a silver seal from a grave at Altyn-Depe depicting a three-headed hybrid animal of a type occasionally found on the Indus seals (Gupta 1970). Future research may show that the Harappans maintained regular communications with southern Turkmenia, but for the purpose of this study Turkmenia remains a peripheral region.

The proliferation of long-distance trade coincided with urbanization in northwestern India. Urbanism refers to the spatial ordering of the activities of a community. With a proliferation of economic activities other than subsistence procurement (craft production, mining, transportation, and so on), the clustering of some part of the population—especially of non food-producers—in cities is economically advantageous at the aggregate level. By definition the activities of urban dwellers reach out to a region much wider than the perimeters of the city itself. Food has regularly to be produced for non food-producers, and raw materials and fuels for manufacturers. In turn cities provide goods and services including exchange facilities for their rural regions.

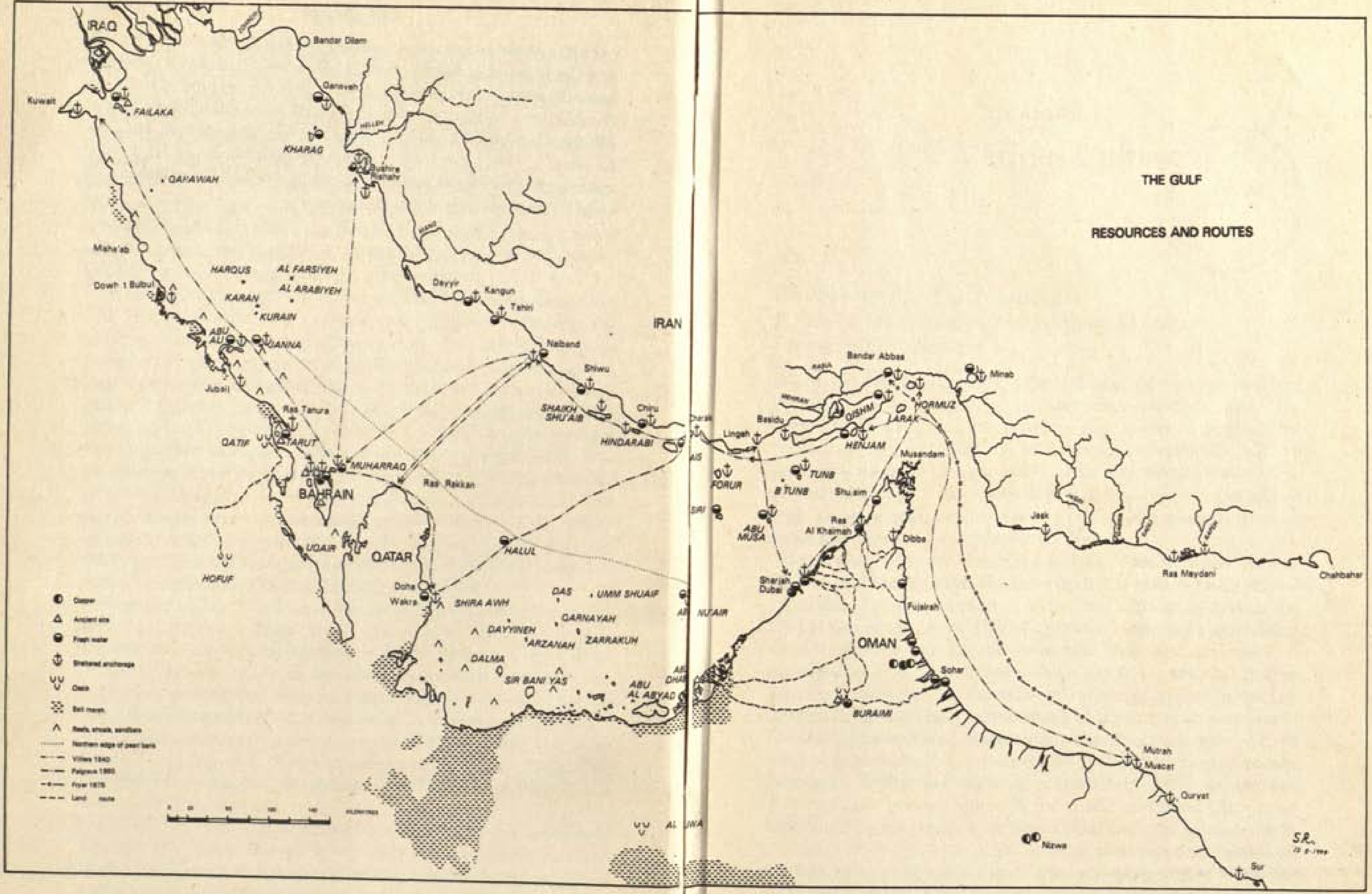
With at least two of their cities approximately 400 (or more) acres in area and evidence of public stores, seals, a regulated weight system and a wide range of manufactures at not only Mohenjo-daro and Harappa but other centres as well, one cannot accept the view that Harappan urbanization was not as fully developed as the Mesopotamian. The degree of urbanization of any region is not indicated by the number of large-size settlements, but by settlement-size hierarchies and the percentage of total population living in cities.

Urban societies, then, are relatively complex societies with a considerable degree of economic specialization. It is generally believed that such complexity cannot be sustained unless regulated by a state mechanism, however rudimentary that state. There is now voluminous literature on the definition and character of the early state. Without going into theoretical details we may consider the state the manifestation of a stratified society in which members do not have equal access to basic resources, or to the social product. The ruling élite appropriates some portion of the produce of others. The state machinery may be considered an overarching mechanism which regulates the functioning of and relations between the constituent specialized subsystems of a complex culture.

In the following pages the reader will find frequent references to 'the Harappan state'. I do not wish to categorize archaeological periods as blocks in an evolutionary scale: the mature Harappan period may in fact have seen the gradual change from social ranking based on kinship and genealogical relations to a system in which power was based on economic privilege and the legitimate use of force. Ranked societies (or chiefdoms) and state systems need not be viewed as watertight compartments, and kinship networks, for example, may well be important in inchoate states. Neither does the term 'the Harappan state' imply that there was necessarily one monolithic state apparatus in equal control of all parts of the Harappan area. What is important is that the mature Harappan period follows on after the early Indus period not as more of the same, but with a radically altered form of social organization.

How this radical social transformation may have been connected with long distance trade forms the subject of a speculative hypothesis in the concluding chapter. Rather than seek the sources of social differentiation in increased agricultural production or warfare or competition for land, greater emphasis has been laid on intertribal competition in investment in personal relationships (rather than in durable assets or permanent commodity stores) by way of the giving away of wealth rather than its accumulation. The transition to investment in storable wealth or land is viewed as a subsequent development.

I have found that a wide range of enquiry such as this has been of considerable value. though it contends with imponderables and leaves points such as the identification of places or the origins of certain items of trade unproven (matters which may in fact never be proved), it brings us to terms with the fact that human interactions over the whole area were surprisingly complex, that cultural boundaries were not necessarily social boundaries. Moreover it is only by spreading our investigating net wide that we become alive to the complexities and inconsistencies of data from different sources or different regions. This in turn raises a new set of questions, attempts to answer which can lead to new comprehensions, or to the discovery of exciting hypotheses awaiting further investigation, or even to fresh investigations themselves.


THE GULF
RESOURCES AND ROUTES
IRAQ
Kuwait
FAILAKA
Bandar Dilam
Ganaveh
KHARAG
Bushire
Rishahr
QAHAWAH
Misha'ab
HARQUS
AL FARSIYEH
AL ARABIYEH
Dowh t Bulbul
KARAN
KURAIN
ABU
ALI
JANNA
Jubail
Ras Tanura
QATIF
TARUT
MUHARRAQ
BAHRAIN
Ras Rakkan
QATAR
UQAIR
HOFUF
Doha
Wakra
SHIRA AWH
HALUL
DAS
UMM SHUAIF
QARNAYAH
DAYYINEH
ARZANAH
ZARRAKUH
DALMA
SIR BANI YAS
ABU
AL ABYAD
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SHAIKH
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Charak
Lingeh
Basidu
QISHM
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FORUR
TUNB
B TUNB
Musandam
Shu'aim
ABU
MUSA
Ras
Al Khaimah
Dibba
Sharjah
Dubai
Fujairah
OMAN
Sohar
BURAIMI
Jask
Ras Maydani
Chahbahar
Mutrah
Muscat
Qurvat
Nizwa
Sur
Ancient site
Fresh water
Sheltered anchorage
Oasis
Land route
SR

CHAPTER I

The Various Cultures

Environmental Background and Potential for Trade: Archaeological Evidence for their Interrelations

We begin with a description of the different cultures involved to a greater or lesser extent in long-distance exchanges. Their environmental conditions and potential for production of goods for 'export' or for consumption of 'imported' merchandise will be surveyed, together with the evidence for interrelations with other cultures. Much of what is said here is already known, but salient facts must be repeated in order to outline the context in which sustained interregional trade was conducted.

In dealing with the numerous culture zones between the Euphrates and the Aravallis the historian has to contend with several problems. There is a wealth of textual and artefactual data on the civilization of the lower Tigris-Euphrates basin, and a reasonably clear understanding of the economic base and processes of economic and political change in this area can be obtained. But we are comparatively ill-informed on similar matters regarding even its nearest neighour, Elam, not to speak of contemporary societies in the Gulf or eastern Iran, Baluchistan or northwestern India. We are obliged to consider the period marked by the occurrence of mature Harappan artefactual traits in northwestern India as one undifferentiated period, although social and economic changes of significance must surely have taken place over the seven to eight centuries of its duration. In the absence of written documents and the lack of a stratigraphic framework for the key sites of Mohenjo-daro and Harappa, there is no internal chronology for the Harappa period, much less any clues to political developments, as there is in contemporary Mesopotamia, where a clear line of development is evident—from the establishment of monarchies in the Early Dynastic (ED) period, through attempts at military unification of a larger area under the Akkadian dynasty, to a period of bureaucratic centralization and intensification of economic control under the Third Dynasty of Ur (Ur III), to the final reversion to political fragmentation and economic decline in southern Mesopotamia in what is known as the Isin-Larsa period.

Cuneiform documents reveal that different cities of Mesopotamia rose to pre-eminence at different times. But while sheer size marks off Mohenjo-daro and Harappa as the economic and political nuclei of the Harappan civilization, we do not know the relationship between the two cities, and cannot even be certain that they were exactly contemporary. Nor do we know how the communities of Kathiawar, for example, were organized in relation to those of Sind.

It must also be noted that culture areas are not always coterminous with particular geographic regions. For example, Elamite settlements appear to be scattered over the Khuzistan plains as well as the mountain regions over a large part of Iran. Harappan sites also are spread over a very large area in diverse environmental zones. Therefore the discussion in this chapter, although it proceeds culture-wise, also takes into account regional location. The coastal sites of Makran, for example, are considered separately rather than under the heading of the Harappan civilization.

Mesopotamia

The lower Mesopotamian plains are an arid region receiving not more than 125 mm of winter rainfall per annum. They are watered, however, by two substantial river systems which are fed by precipitation in much more humid areas, namely the mountains of eastern Turkey. The Tigris and Euphrates provide not only a plentiful and reliable exogenous source of surface water, but also deposit alluvium on their banks during annual floods.

Given an unlimited supply of water from the rivers, the agricultural potential of the plains is high: as early as the third millennium, the seed-to-harvest ratio, for example, far exceeded that of Italy under the Roman empire. As in most arid and semi-arid regions of Asia, stock-rearing is also important, and sheep and goat provide valuable meat, milk and wool. Pastoralism is more evident in the upper than the lower plains, and in the Assyrian lands, where rainfall is slightly higher. Nevertheless, the particularly close symbiosis between irrigation agriculturalists and stock-rearers in Mesopotamia is important. A peculiar feature of the Tigris–Euphrates lowlands is the prevalence of 'enclosed nomadism' (Rowton 1973), where areas of pasture are encircled, partly or completely, by urban settlement. Tracts of land too high to be irrigated can be utilized for grazing.

From the earliest times the Tigris–Euphrates plains have been able to support dense settlements living on cereals, dates, meat, milk, and fish. The complexity and variety of the subsistence base is an important feature of the Mesopotamian economy.

The chief factor in the external relations of Mesopotamia has been the combination of this rich, varied and therefore dependable subsistence base with an almost complete lack of mineral resources. The plains consist of alluvium deposited over the centuries by rivers, with few outcrops of rock or mineral. Moreover, the scanty rainfall cannot support vegetation yielding good timber.

Bordering the Mesopotamian plains on the north and east are the Zagros ranges, offering as resources, timber, marble, chert, gypsum, alabaster, limestone and a certain amount of metal.On the juncture between plains and mountain folds are many seepages of bitumen. At greater distances, the Iranian and Anatolian plateaux offered even more valuable metals and semiprecious stones. These zones were, in contrast to the plains, zones of low agricultural potential. Easy access to the plains from these mineral-rich areas is afforded by several natural routes of communication. The more important of these are the routes which follow the Euphrates from north Syria, the Greater Zab from the Zagros into the Assyrian plains, or the Diyala from the Kermanshah region to the central plains. An important route in the bronze age connected the Assyrian plains with south-central Anatolia by crossing northwestward over the northern steppe and then going via present-day Mardin, Diyarbakir and Malatya. In short, there are few barriers to movement into Mesopotamia from any direction except in the west where until the regular use of the camel the Syrian desert afforded a natural frontier.

Thus in the bronze age Mesopotamia, with its high surpluses and dense population, was able to export basic commodities such as cereals, oils and wool at presumably low prices, and at the same time demanded large quantities of resources produced or traded by regions agriculturally much poorer. Mesopotamia also had other items to exchange abroad: objects manufactured from imported materials as well as commodities bought in one area and sold elsewhere for a 'profit' (Leemans 1960: 114–6).

Southern Mesopotamia stands at the head of the Gulf, across which it conducted much of its trade with regions to the east and southeast. Today the lower part of the plains has a very low gradient and is consequently characterized by sluggish water flow, lagoons and oxbow lakes, braided channels, and extensive marshland. Long stretches of the Tigris and Euphrates are navigable both upstream and downstream and see much boat traffic. Canals and natural waterways were the chief means of transport in the south. Thus it is not surprising that ancient rulers of Ur, Lagash and even Akkad claimed that ships from overseas docked at the quays of their cities.

To what extent physical conditions in the third millennium were similar to present-day conditions in the lower plains, we do not know. Moreover, the location of the ancient southern shoreline of Mesopotamia is still the subject of controversy, which During Caspers (1971a: 25–7) has excellently summarized. In brief, the problem has not yet been solved and it is not impossible that the coastline in the third millennium was located substantially further northwest that the present shores of Mesopotamia. If so, this might explain why ancient texts refer to Ur, one of the southernmost cities (and incidentally a city which handled much overseas trade in the third millennium), as being situated on the sea.[1] It is also possible that south of Ur there extended a stretch of marsh or lake, an ancient precursor of the present Lake Hammar, a body of water which in ancient times was considered part of the Gulf (Jacobsen 1960: 185).

The archaeologically attested foreign contacts of Mesopotamia with cultures to its east and southeast will be discussed later.[2]

[1]Clay cones of Ur-Nammu state that 'on the shore of the "sea", in the registry-place', this ruler 'saw the sea traders safely home' (Jacobsen 1960: 184–5). The Chronicle of Early Kings refers to Shulgi providing abundance for Eridu 'which is on the seashore' (See A. K. Grayson, *Assyrian and Babylonian Chronicles*, New York, 1975, p. 154).

[2]Here we may list 'non-trade' elements which indicate some manner of interaction between the Mesopotamians and Harappans, and which are attested in Mesopotamia from the Early Dynastic period onwards.

Archaeological evidence gives but a one-sided picture of the trading contacts of Mesopotamia. In fact there is little such evidence, as the trade was mainly in perishable articles and in raw materials, so that appreciable quantities of immediately recognizable 'exotic' elements are scarce. It is the texts which indicate how much trade there was in commodities such as wood, stone, metals, cereals, oils and other items. This textual evidence is as follows:

Numerous Sumerian and Akkadian documents reveal that communications of some kind were maintained with the inhabitants of three lands, Dilmun, Magan and Meluhha. That these communications took place by sea is indicated in several references to boats from these lands coming to Ur, Lagash and Akkad, and to merchandise being carried to them by boat. It is thus clear that these regions were reached by way of the Gulf.

These texts, dating from the Early Dynastic to the Isin-Larsa periods, are of various genres. In a number of Sumerian myths Dilmun plays an important part as a paradise or a blessed place. What are commonly called Royal Inscriptions refer to conquests by certain Mesopotamian rulers of Dilmun, Magan or Meluhha, or to booty received from them, or to the proud fact that commercial

A. Mesopotamian influence in the Indian subcontinent:

1. Sumerian stylistic features on a stone head from Dabarkot (During Caspers 1963: 294) and on figurines from Chanhu-daro and Mohenjo-daro (Dales 1968b: 21–22).

2. Mesopotamian type mythological 'heroes' on Harappan seals: 'bull man' (Marshall 1931: nos. 356, 357); probable 'bull man' dressed in leaves (ibid: pl. CXVII. 16); hero flanked by two lion-like animals rising on their hind legs (Mackay 1938: 337, nos. 75, 86, 454).

3. Two small amulets from Mohenjo-daro (Mackay 1938: 523, pl. CXXXVI. 74, 75) of 'door-post' type are, according to During Caspers (1972b: 169), typically Mesopotamian.

B. Harappan influence in Mesopotamia:

1. Harappan stylistic features on three Nippur figurines (Dales 1968 b: 19–21).

2. Trefoil pattern on bull figurines from Ur III Lagash and Uruk (During Caspers 1970–1: 114–16).

3. Indian bull with manger on a stone vase from Tell Agrab (Frankfort 1955: 45–6); on an Ur cylinder seal (Gadd 1932: no. 6); and on a stand from Susa Dd (During Caspers 1972b: 185) as well.

4 Cylinder seal depicting an elephant, rhinoceros and *gharial* from Akkadian period Tell Asmar (OIC 16: 51–2).

5. Cylinder seal of unknown provenance showing a rhinoceros with a bird perched on its back (van Buren 1939: 78).

6. Lapis lazuli amulet from Kish incised with two elephant figures (ibid.)

relations were maintained with them. Lexical texts make occasional references to these lands as the source of particular commodities. Finally there are groups of economic texts: palace or temple documents (concerning imports and exports, or consignments handed out from public stores for trade overseas, or accounts of tithes received from seafaring merchants) and private documents (mainly loans negotiated by individual merchants for capital for their maritime expeditions).

Mesopotamian trade with Dilmun appears to have begun by the ED period. Ur-Nanshe of Lagash (ED IIIa) refers to Dilmun boats bringing cargos of wood (Sollberger and Kupper, 1971: 1C 3a, d, e). Texts of the reign of Lugalanda of Lagash (ED IIIb) enumerate imports, mainly of copper, from Dilmun, for which barley, flour, cedar wood and other items were exchanged (Lambert 1953b: 60–3).

In the time of Sargon the quay of Akkad was visited by boats from Dilmun, Magan and Meluhha (Hirsh 1963: 37–8). Naram Sin claims to have defeated the ruler of Magan (Thureau-Dangin 1907: 164–7), whereas one version of an inscription of Manishtusu mentions a conquest of Meluhha (Gadd 1971b: 439). A 'historical' text, the 'Curse of Akkad' (Kramer 1970: 62–6), states that when the glory of Akkad was at its height the people of Meluhha used to bring their exotic wares to the city.

Gudea of Lagash makes references (Thureau-Dangin 1907: 66 ff) to several products he obtained from Dilmun, Magan and Meluhha either through tribute or trade.

For the Ur III period, several texts from Ur testify to trade with Dilmun and Magan, financed and organized by the temple (UET III: Leemans 1960: 18–22). Religious texts and lexicons of the same period, for example, 'Enki and Ninhursag' (ANET: 37–41), 'Enki and the World Order' (Falkenstein 1964), HAR.ra = *hubullu* (Landsberger 1962; Reiner 1956: 146–7); and *lipšur* (Reiner 1956), indicate that Magan and Meluhha were sources of several valuable commodities. Clay cones found at Diqdiqqeh, and a passage in the law-code of Ur-Nammu (Jacobsen 1960: 184–5) mention sea traders from Magan docking at the 'registry-place' at Ur.

For the earlier part of the Isin-Larsa period several texts concern tithes paid to the temple of Ningal (at Ur) by seafaring merchants after the conclusion of Dilmun trips. Texts dating to the time of Rim Sin of Larsa describe loans taken by travelling merchants as capital for business trips to Dilmun (UET V–Oppenheim 1954; Leemans 1960: 23–36; 36–55).

Elam

The plains of Elam lie to the east of the southern Mesopotamian plains, with no physical barrier between them. To the north and east of Elam lie the Zagros ranges, running from northwest to southeast in a series of parallel ridges. To the south lies the Gulf. The plains are watered by rivers flowing from the mountains to the sea mainly in a southwesterly direction, and form the largest single expanse of true lowland in Iran.

The major rivers are the Karkheh, and the Karun with its tributary, the Diz. The Karun is Iran's only navigable river, providing a potential route of communication between southernmost Mesopotamia and the heart of Susiana. For part of the year the Karun today ends in a marsh above its confluence with the Shatt al-Arab, but in the wet season its extensive floods deposit valuable alluvium on the plains. The plains, moreover, usually receive sufficient rainfall for agriculture—200 to 300 mm per annum—and it is not surprising that Khuzistan is one of the biggest wheat-producing regions of Iran.

The ancient land of Elam, however, extended not only over the plains (Elamite *Shushun*), but also the mountains to the north and east (*Anshan*). Hinz (1972: 20–1) has emphasised the fact that a continuous symbiosis between mountains and plains was vital for the economic prosperity of Elam. Within the Zagros zone are also to be found long, fertile valleys and high-altitude plains, some of the valleys serving as routes of communication. The resources of the mountains include timber (especially oak), copper, lead-silver and various stones such as diorite, alabaster, marble, basalt and carnelian. It is thus clear that a variety of natural habitats and resources were available in Elam.

The mountain regions, however, are relatively unknown today, being inhabited mainly by nomads (Maunsell 1925: 432–7), and there are barriers to north–south communication between mountains and plains. The Diz and Karun flow through deep gorges in places which have been avoided by traditional routes (CHI: 20–2) choosing instead dry passes such as the Zagros Gates for access to Kermanshah, or the way via Dezful and the Karkheh river towards

Khurramabad (Hinz 1972: 20). Alternatively, it is possible to go northwestward across the plains towards Baghdad and then gain access to the Kermanshah region via the Diyala valley.

To the southeast of the Karun river there are also barriers to communication. The Khirsan, Mehran (Marun) and Zohreh rivers in their upper reaches are turbulent and flow through steep-sided channels. Thus the major route in this direction goes via Shushtar and the Izeh[3] pass to either Isfahan or Shiraz (Hinz 1972: 20).

It is as yet not possible to delimit the exact frontiers of ancient Elam, but in general it may be assumed that its influence covered Khuzistan (though probably not the area south of Ahwaz), the Zagros north up to about Khurramabad, and east up to about Shiraz, and a few parts at least of the Gulf coast. The sites of the plains are well known, and include Susa, Choga Zambil, Haft Tepe, Tepe Musian, Tepe Farukhabad, and Tal-i Ghazir.

Sites with proto-Elamite elements are as far-flung as Susa, Tal-i Ghazir (Ramhormuz plain), Tal-i Malyan (north of Shiraz), Sialk, and Tepe Yahya. At Sialk, the proto-Elamite culture is intrusive and arrives after level III buildings were burnt: there is no cultural continuity between periods III and IV (Ghirshman 1938: 58–71).

Textual evidence indicates the markedly federal structure of Elam in the Elamite period also (Hinz 1972: 87–9). Besides Susa there were other cities which functioned as capitals at different times: Awan, probably near Shushtar, Simash probably near Khurramabad (Hinz 1971: 647 ff), and Anshan, identified as the site of Tal-i Malyan (Sumner 1972: 1973 b). There is a hint of third millennium occupation on the south coast as well. On the Bushire peninsula an Elamite site of the second millennium known as Liyan was excavated on the tell of Sabzabad (MDP XV). According to Pézard (MDP XV : 3–4) there is also evidence for pre- or proto-Elamite occupation here in earlier deposits. It is not unreasonable to suppose that Liyan was an Elamite port, at least in the second millennium, especially as it was important enough to be fortified and to be provided with a temple by a succession of rulers (MDP XV: 1–5, 67 ff.) The earlier levels at this site need to be re-explored to ascertain their precise date and to indicate at what periods Elam could have directly participated in the sea trade. An Elamite port in the vicinity of Ganaveh (Stiffe 1897: 312–13) is not an impossibility

[3]The presence of Elamite rock reliefs in the vicinity of this pass indicates the importance of this route (Hinz 1972: 15).

either. Until we have more information on Elam's sea ports, however, it is necessary to bear in mind the possibility that the Elamite plains were fed from the east by land routes alone.

It should be pointed out that there are serious limitations to our knowledge of Elamite material culture due to the paucity of excavated sites, and the lack of well published objects from these. Thus Elamite history relies heavily on Elamite and Akkadian texts which are mostly of a political nature. There are few economic texts: certain ED documents from Lagash reveal trade relations (Lambert 1953b: 62–5) and recent exposures of level 14 at the Susa acropolis have produced some economic texts (Ghirshman 1967: 142–4), which await publication.

From the texts it is clear that Elam was always a political rival of Sumer and Akkad. There were frequent wars, with the Elamites sometimes emerging as victorious, sometimes the Mesopotamians. These wars may be interpreted as efforts on the part of Mesopotamia to gain access to the resources of the Elamite highlands; and on the part of the Elamites, to divert trade routes and capture the stored wealth of the Sumerian and Akkadian cities. But political rivalry did not preclude the existence of strong cultural ties between the two regions, especially in aspects of material culture such as pottery, metallurgy, glyptic, sculpture, script and language.

It has been mentioned that the major motivation for wars between the two lands must have been economic. Alabaster vases from Ur and Nippur bear inscriptions of Rimush describing them as booty from Elam. Rimush also dedicated to Enlil other Elamite booty: copper, gold and slaves. Manishtusu, campaigning in Anshan and Sherihum, defeated lands 'upto the silver mine' and carried stone and timber home to Akkad (Gadd 1971b: 437 ff). Shu-Sin undertook expeditions against the 'people of the mountains' in quest of lead, copper and bronze, which he stored in his temples (Hinz 1971: 657).

There is patchy archaeological evidence[4] for trade at Elamite sites. Large numbers of steatite containers have been found at Susa, and a few at Tal-i Malyan (Sumner 1972: 176). It appears that these containers were 'Elamite' in origin, made probably both at Yahya and in Elam itself (Kohl 1976). (The widespread distribution of these distinctive objects will be discussed in Chapter II). A tablet

[4]The evidence for Elam's 'foreign' connexions given here is assuredly incomplete. This is partly due to lack of adequately published small finds.

of the Ur III period from Susa bears an 'early Persian Gulf' seal impression (Amiet 1974: 109–110, fig. 16). Numerous lapis lazuli objects such as beads and amulets were found at Susa (MDP XXV: 190, 218; MDP XXIX: 15, 114) and at Tal-i Malyan (Sumner 1972: 176). Etched carnelian beads have been found at Susa (MDP XXIX: fig. 84.7). Gulf shells occur at Malyan (Sumner 1972) and copper/bronze hand-mirrors from Susa (MDP XXV: 213, fig. 55) are paralleled at numerous sites, as are copper/bronze pins with lapis heads. At Tepe Sabzabad unworked pieces, a pin, and a spheroid object of ivory were found (MDP XV: 30–1, pl. VIII), together with fragments of steatite vessels and a lid, all with dot-and-circle motifs (MDP XV: 24, pl. VIII). The date of these objects at Sabzabad is, however, not verified.

Rao (1968: 35–7; 1973: 80, 118) mentions the occurrence of a Harappan seal and a cubical chert weight at Susa, as well as copper ingots identical in size and shape to ingots from Lothal. As regards the ingots, the hemispherical shape may simply indicate that round crucibles were commonly used for smelting, and unless laboratory analysis shows the mineral content of ingots from both Lothal and Susa to be similar, it will be premature to ascribe a common origin to them.

ED texts from Lagash (Lambert 1953b: 62–5; Leemans 1960: 128) indicate trade relations with Elam: cattle were purchased in Elam on behalf of the wife of the ruler of Lagash (Nik 214), and in one instance a merchant of the palace brought back 6½ *manas* of pure silver from Elam (Nik 292). Timber, especially valued for boat-building, was imported (DP 423, 486; RTC 21) while exports were usually of barley, wool or tin (Nik 310).

In the Akkadian period barley and oil were sent to Elam in exchange for pure silver (Leemans 1960: 128). Some economic texts were found at level XIV, Susa (Ghirshman 1967: 142–4). One of these records the receipt of 17½ *manas* of silver from Dilmun.

The Gulf

The Gulf assumes importance in any study of trade between western Asia and western India merely by virtue of its situation, and the fact that water transport has considerable advantages over land transport, especially for bulk goods. The heterogeneous ethnic character of the Gulf population today testifies to its important place on one of the key world routes.

The Gulf is a shallow sea, protected on the whole from oceanic current oscillations, and is dotted with a large number of islands and promontories. Thus it is possible to visualize here an early development of short-distance sailing, even in primitive conditions.

At different periods of history the prosperity of several regions of the Gulf is recorded. This prosperity (especially in regions such as Bahrain or Kuwait) was derived mainly from the pearl industry and from onward trade.

Next to fishing, diving in the shallow waters for pearls and mother-of-pearl has been an important industry through the ages. Mother-of-pearl is found at several places along the coast between Muscat and the Red Sea, and boatloads of this commodity are still brought to Muscat for re-export (Miles 1919: 406). The pearl fisheries lie at several points off the coast between Kuwait and Sharjah, with banks near Bahrain, Khor and al-Doha (east Qatar), and the Trucial coast bay. Bahrain and some islands in the Trucial coast bay (southwest of Abu Dhabi) have the best pearls.

The following discussion will make clear that archaeological investigation has concentrated on the Arabian or southwestern shores of the Gulf. The Persian coast is relatively unknown. Is this a matter of accident, or is it true, as suggested by During Caspers (1971a: 22–3), that the Persian coast was by reason of its physiography less important where third- and second-millennium sea routes are concerned?

The narrow strip of the Persian coast, backed by mountains, is an extremely hot region with scanty rainfall, and is on the whole barren and inhospitable except for the Bandar Abbas–Minab area and some fertile regions with good grazing on the Fars or Tangistan coast. There are few rivers on this coast, and these (especially east of Bushire) have either salty or muddy water (Harrison 1942: 122) and are rarely perennial. Northwest of Bushire there are wells, but further southeast wells are rare and rain water has to be collected in tanks (Lorimer 1915: 2218–19; Stein 1937: 193–202).

The nature of the hinterland of this coast is also relevant. All along the southeastward sweep of the coast the Zagros ranges run parallel to the shore, usually within a short distance of the sea, thus effectively cutting off the coastal strip from the interior. Northwest of Bushire, the valley of the river Shahpur leads to Shiraz, this being an old and much frequented route. Between Bushire and Bandar Abbas there are few routes from the coast to the interior, and these are mostly caravan tracks. It is only at the mouth of the Gulf that the trend of the Zagros ridges changes so that they lie almost at right angles to the coast near Lingeh and Bandar Abbas. This makes easy access from the Bandar Abbas coast to the interior possible, and from Minab it is an easy walk to Bam.[5]

For these reasons and because of local resources, it is very likely that a third-millennium site flourished in the vicinity of Minab, although Stein (1937: 177–87) did not find any traces of a third-millennium site here. The Minab region is exceptionally fertile, and was previously a flourishing trade centre (Marco Polo Ch. XVI; Stein 1937: 177–87), the principal port for Kerman, Seistan and Lar, having a sheltered and commodious anchorage (Stiffe 1900; le Strange 1905: 318–19).

The Fars coast is not as attractive, but in Islamic times it had at least four maritime towns: Siraf, Tanwaj (Bushire), Jannabah (Ganaveh), and Shiniz (near Bandar Dilam) with Mahruban at the head of the Gulf (Wilson 1928: 71–5). We may point out the existence of a fourth-millennium site near Siraf (During Caspers 1971a: 22) and the Elamite site of Liyan near Bushire, also. However, Siraf was probably originally founded (in Sassanian times) not so much by virtue of its location on a sea route, but in relation to the inland city of Gur, founded by Ardashir, and as a fort for defence against naval attacks (Whitehouse and Williamson1973).

Further details on the feasibility of a sea route and third-millennium ports on the Persian coast will be discussed at the end of this chapter and in Chapter III.

Turning now to the Arabian coast, it is clear that that also has natural limitations for human settlement. In general it is low, undulating and barren, with large areas covered with marsh or salt flats or reed growths. Much of the Trucial coast is totally uninhabited. Human settlement has, before the days of oil, been confined to areas watered by natural (artesian) springs or wells, which create oasis conditions. Inland, there are three major oases or clusters of springs: al Hofuf in Saudi Arabia, al-Liwa southwest of Abu Dhabi, and the al'Ain group (or Buraimi), east of Abu Dhabi and close to the Western Hajar mountains. The presence of these inland oases

[5] A 5–6 day walk is the estimated distance between the coast and Tepe Yahya (Lamberg-Karlovsky 1970: 1 ff).

has given importance to the corresponding coasts, about which more will be said later. The coastal regions are also blessed by springs: a part of Kuwait, Failaka island, Tarut island, Qatif, and Bahrain. A large part of the east (Batineh) coast of Oman is made fertile by numerous springs running down from the mountains.

Archaeological research has revealed the existence of a number of early cultures in most of these favourably endowed localities, and that the history of the Gulf goes back to a very ancient period is evidenced by the occurrence of Stone Age tools on the Saudi coast, in Qatar, Bahrain and Oman.

Equally interesting is the fact that historical connexions between the Gulf and southern Mesopotamia are manifest as early as the fifth–fourth millennium B.C.: on the Saudi Arabian coast 27 sites with Ubaid pottery and flints have been discovered, and 5 sites with similar assemblages are known inland (Burkholder 1972). Ubaid pottery is also found in very small quantities at two sites in Bahrain, namely Diraz and al-Markh. Four Ubaid sites have been found in Qatar (de Cardi, personal communication), while Ubaid sherds were noticed on Tarut Island (Bibby 1972: 398) and on the Persian coast near Bushire (Whitehouse and Williamson 1973: 35 ff), as well. The relationship of these sites to their Mesopotamian counterparts is unknown. At most sites in the Gulf, especially at al-Markh, the people appear to have been fishermen, but in Mesopotamia as well as Arabia, the sites are in general located by marshy land or *sabkha*. This spread of Ubaid sites points to an early mastery of seafaring.

In the Buraimi oasis and nearby hill-slopes in Oman, graves containing Jamdat Nasr (JN) pottery have been excavated. These are loosely heaped dome-shaped mounds of stone built over oval chambers at ground level, entered by a passage on the south side. The plum-on-cream biconical jars found here represent the same ceramic traditions as in JN levels at Ur, Uqair and Jamdat Nasr. The graves also contained small beads of carnelian, shell and green glaze, the latter being paralleled in shape and material in JN graves at Ur and Jamdat Nasr. Other finds were a few copper/bronze objects and some limestone and diorite containers. A steatite bowl with dotted-circle ornament was found in a grave without pottery; its JN date is highly uncertain (Frifelt 1970: 377–82; 1971).

What the find of a single JN sherd in Temple I at Barbar (Bahrain) (Mortensen 1970: 395, fig. 3) signifies, is hard to tell. The alleged Jamdat Nasr presence on the island of Tarut (Lamberg-Karlovsky and Tosi 1973: 35) is highly suspect as it is indicated only by one biconical jar in grey, chalk-tempered ware.

It is not easy to explain the origins of this JN pottery in Bahrain and especially in Oman. Were the cairns built by a group of metal prospectors or traders from Sumer (Frifelt 1971)? Was the presence of JN artefacts here an accidental by-product of the seaward intercourse between Mesopotamia and Egypt, which is well documented in the JN period? If Sumer–Gulf connexions are also indicated by the presence of pearls at Uruk in level III a (During Caspers 1971a: 31–4), and in any case were preceded, in some form, in the Ubaid period, the Egyptian-trade explanation need not apply.

For the purposes of this study, however, it is the third-millennium cultures, namely the Umm an Nar and the Barbar, which are relevant.

The sites of the Umm an Nar culture occur on the island of Umm an Nar south of Abu Dhabi (Frifelt 1970); at Hili, northeast of the Buraimi oasis; on Qarn Bint Sa'ud north of the oasis; near Muscat; and at Bat about 25 km east of Ibri. There are a few surface indications of Umm an Nar burial cairns in the Wadis Suq and Jizzi, which flow from the vicinity of the Buraimi oasis towards the east coast (Frifelt 1975). The majority of known sites of this culture are burial cairns.

The location of the settlement at Umm an Nar, a small low island south of Abu Dhabi, can be explained by the availability of water and a sheltered anchorage on the island (During Caspers 1970b: 207).[6] As one would expect, the population engaged in fishing, as is indicated by the occurrence of fish hooks and net sinkers (Frifelt 1970: 376). There must, presumably, have been some dependence on domesticated animals as well: sheep, cattle and camels are depicted in relief on stone slabs in the cairns, humped cattle appear on two Umm an Nar pots, and camel bones were found at the Umm an Nar settlement (During Caspers 1970b: 211 ff, n. 11). The cattle, if depicted from life, would indicate the introduction of animals into the area from elsewhere, and also the existence of far better environmental conditions than those of the present. From Umm an Nar it would be a five-day journey to Buraimi for wood, dates and

[6]Although During Caspers mentions a well, according to Bibby (1972: 323) there is no drinking water on the island today.

perhaps other products from the mountains (Bibby 1972: 323). This oasis provides a focus of settlement for the mainland west of the Hajar mountains. The northern part of the Oman peninsula is hilly, with no wells, and is inhabited only in the winter. The desert west of the Hajar mountains is mostly aeolian sand, the sand cover increasing in depth as one goes southward into the Rub al Khali (near the great dunes of al Liwa). The Trucial coast (the coast from the tip of the peninsula to the Sabkha Matti) supports some settled populations due to its fisheries and pearl banks (Lorimer 1915: 378–9; Dostal 1972). The coast is low and mainly *sabkha*. People migrate, therefore, to the oases of Liwa and Buraimi especially at the time of the date harvest. In winter the coastal populations drive their animals inland to graze, or else go fishing (Wilkinson 1964: 337–9).

In this 'waterless, featureless desert fronting the impenetrable Rub al Khali', the oases, especially the group of nine springs known as Buraimi, form a great attraction. Here the subsoil water (flowing down from the al-Jaww plain in the southeast) and the surface run-off from the Hajar mountains to the east support an appreciable amount of agriculture, mainly date-gardens, orchards and lucerne fields (Stevens 1970: 410–18). The oasis has traditionally provided subsistence products exchangeable with meat from the Bedouin or fish from the coastal people (Mann 1964: 15).

On the higher parts of the peninsular plateau, with its higher rainfall, grass and occasional clumps of trees occur. Along the eastern edge of the plateau the three-to-four km wide coast has numerous wadis which are fertile zones where millets, wheat and barley are grown (Miles 1919: 379–80).

Amongst the important produce of Oman can be listed about a dozen varieties of good dates, and the famous ass, cross-bred with the wild ass of the desert. Diorite and dolerite are found in the mountain region.[7] But more important than all these is copper, found in at least a hundred different localities in Oman, as native copper or oxide or sulphidic ores.[8] Several old workings have been sited in the peninsula, and are shown in the back endpaper map which indicates the location of these ancient workings by tonnage of processed slag lying at the surface. Of these, the largest ancient sites appear to be in the vicinity of the Wadi Jizzi, where Lasail has about

[7]Personal communication, R. Jačkli, 14.6.1975
[8]Personal communication, A.J. Russell, 14.8.1975

100,000 tons of slag, and must have been a mine worked over a considerable period of time.

We must also note that the Oman peninsula is a mountain oasis which rises above a barren coast and desert interior, isolated from the rest of the Arabian peninsula. Goods received on its coasts cannot be carried across the desert to the southwest. In the historical period Oman tended to remain isolated from other Gulf countries and practically independent of the authority of the Caliphs and Ottomans (Wilson 1928: 77).

For seaward communications Oman's eastern coast is favourably placed whereas the western (Trucial) coast, due to the barrenness of the land and navigation problems (see pages 71–7), is much more isolated. Thus in culture and commerce Oman has looked more towards Iran, Makran and the southern coast of Arabia than towards the rest of the Gulf or Iraq (Fisher 1971: 461, 464).

There are a few caravan routes across the northern part of the peninsula which connect the Arabian Gulf and Oman Gulf shores. These run between Ras al Khaimeh and Dibba, Umm al Qaiwan and Fujairah, Sharjah and Murair, and Dubai and Shinaz (Lorimer 1915: 1443 ff). Particularly relevant to the Umm an Nar culture is the junction of several east–west and north–south routes at Buraimi.

The cairns of the Umm an Nar culture are circles of closely fitted, dressed stone blocks, internally divided into small chambers, with a vaulted roof (Frifelt 1970). In the Buraimi area, one mound perhaps represents the ruins of a fortified settlement having a circular watchtower and a moat. The pottery here is akin to the coarser pottery from Umm an Nar.

Various ceramic wares were produced in this culture. The main ceramic ware is a fine red slipped ware painted in black. At the Umm an Nar settlement, what is called kitchen ware with large, hard-fired jars decorated with wavy ridges sometimes ending in snakes' heads (Frifelt 1970: 376, fig. 7) are paralleled in shape and decoration at Yahya IV B (Lamberg-Karlovsky 1970: fig. 32 G).

In the funerary deposits a black-on-grey ware occurs, often in the form of canisters bearing geometric designs or friezes of goat or gazelle. The canister shape (with some modifications) is a characteristic of Kulli pottery, and so are the painted motifs. A modified form of the Kulli canisters, found at Bampur IV-V (During Caspers

1970b: 245–50) and at Shahr-i Sokhta IV (Lamberg-Karlovsky and Tosi 1973: fig. 64), are however closer to the Umm an Nar examples.

The humped bull, painted on two jars in red ware (During Caspers 1970b: fig. 6) is also a Kulli connexion (Frifelt 1970: 374–7; Thorvildsen 1962), whereas hard, incised greyware provides further links with Bampur, which will be discussed in Chapter II. Connexions with Mesopotamia are also evident: a large number of suspension jars in orange ware have somewhat similar counterparts in EDI Tell Agrab (Frifelt 1970: 375–6). During Caspers (1970b: 256 ff., figs. 13, 14) has pointed out the close resemblance between a plain steatite vase with slightly flared rim and examples from the Ur Royal cemetery, for example from PG 1503 and PG 800, which are ED III B and ED IIIA respectively in date. Finally, there are a few examples of 'amphora' type pots at Umm an Nar (During Caspers 1970b: fig. 10). Pots of exactly the same shape and size occur in eight graves of the Ubaid cemetery (ED III) and in 35 graves from the Royal Cemetery at Ur, most of which are ED III in date (During Caspers 1970b: fig. 10, fig. 11(1–2); 250–6).

The sites of this culture have produced a few copper/bronze implements. To what extent the people engaged in intensive copper exploitation, however, has yet to be determined. For the present we know that copper/bronze spears and daggers, fish-hooks, chisels, knives and pins, with some metal slag, have been found at the sites (Frifelt 1975: 362–6).

It is therefore difficult to define the economic base of the Umm an Nar culture. The present evidence does not speak for an exploitation on a large scale of the local copper resources. Nevertheless, the external relations of this culture are not confined to southeast Iran, but extend to Mesopotamia as well. If we are to suggest that the Umm an Nar people were active traders, we will be hard put to prove the existence of a subsistence base productive enough to support trading communities, as we have comparatively little data on the habitation sites, or on the relative importance of fish, animal and cereal produce at the sites. Perhaps the fishing activities of these people carried them to the shores of southeast Iran on the opposite coast of the Gulf. Perhaps they had just begun to realize the mineral potential of their hinterlands and occasionally saw the visits of Mesopotamian or Elamite prospectors on their territory. Once we have more information on the later sites of the third millennium in Oman, the problem may be clarified.

The Barbar Culture is represented at several sites from Kuwait to Bahrain: in Bahrain at Ras al Qala'a (Periods I and II), Barbar, numerous burial mounds including Hajar to the north of the island, a pearling site in the southwest, Diraz and the following unexcavated sites: Barbar South II, Barbar Southwest, Bilad al Qadim, Makaba, Khuwais N. ii, and Sar West; in Failaka at the east tell of Sa'ad wa Sa'aid; and on Tarut island at the central tell. Barbar, Tarut and Failaka are clearly the most habitable islands of the south littoral of the Gulf, and some of the few watering points for sea traffic along the Arabian shores.

On Bahrain island rainfall is less than 100 mm per annum. But there are numerous artesian springs around the periphery of the island especially to the north and west (Fisher 1971: 446) rising from a water-bearing stratum beneath the limestones and marls at the surface. Along the coast there is a deep belt of cultivation (cereals and dates). In fact, aerial photographs revealing zones of past field boundaries and water channels indicate that formerly there was a greater area under cultivation than today (Bibby 1954a: 132). The famous pearls of Bahrain have been mentioned before. Many sources attest to the prosperity of Bahrain in the historical period: in certain periods the Bahrain archipelago has been under the political influence of the Arabian peninsula, functioning as a kind of clearing-house for Hasa (the 'Eastern Province'), as its sole means of access to world sea routes.

The Bahrain archipelago offers a few harbours: Muharraq, Manama, and, until modern times, Bilad al Qadim. Manama is one of the very few Gulf harbours sheltered from the northwesterly *shemal* wind.[9]

It appears that one of the major ports of the Barbar culture was Ras al Qala'a on the northern shores of Bahrain island. Here typical Barbar pottery is preceded by, and gradually replaces, a chain-ridge ware. There is no sharp distinction between the two horizons, and the chain-ridge period (I) may be considered Early Barbar (Bibby 1957: 156).

At the northern periphery of this mound, close to the high-tide mark and outside the ancient city wall, is an area which has yielded

[9] See chapter III.

many finds and was undoubtedly the harbour. The city was given a defensive wall only in the later part of the Barbar period. A very small area has as yet been exposed, but the straight streets and accurately aligned houses are said to be reminiscent of Harappan towns (Bibby 1957: 162).

The commercial nature of the site is revealed by a few steatite seals (conventionally known as 'Persian Gulf' seals), about seven stone weights conforming in ratios and value (if not always in the shape of the actual weights) to the Harappan weight system (Bibby 1970), and a sherd from City I with a Sumerian capacity-mark under its rim (Laessoe 1957), indicating that some measured quantities of goods were carried in pots from Bahrain to Sumer. The details of the seals, weights and capacity measure will be discussed in subsequent chapters, but there is no doubt that they are significant pointers to trade both with Mesopotamia and with India. The Harappan weight system in Bahrain must, moreover, indicate some kind of relationship which went further and deeper than only occasional market encounters.

From the 'harbour' area were also found an unworked ivory tusk, many small scraps of copper, and a steatite bowl fragment with dot-and-circle incisions (Bibby 1957: 157–8). This would reflect access to materials originating in India, southeast Iran and perhaps Oman, probably as part of an onward or transit trade.

At the site of Barbar further inland, there are three rebuildings of a temple within an oval enclosure. Ritual fixtures include a well, fire-places with charred remains of sacrificial animals (levels II–III), offering tables (III), altars (III) (Mortensen 1956: 1970), and possible enclosures for sacred date-palm trees (During Caspers 1973a).

Judging from the three Mesopotamian parallels (from Ubaid, al Hiba and Khafaje) to the oval shape of the Barbar temple, there are clear similarities of religious practice or ritual between Early Dynastic Sumer and Barbar.

The oval temple at Ubaid was dedicated to Ninhursag (UE I) and that at al Hiba (Lagash), to Inanna (V.E. Crawford 1974: 29–35). All the Mesopotamian oval temples are ED II–III in date. Why they are confined to this period, and what their particular religious significance was, we do not know. Certainly they were not dedicated to any particular deity (Delougaz 1940: 145). The temples of Khafaje, Ubaid and Barbar all have wells: the 'holy well' in the

Ninhursag temple compound being mentioned in inscriptions (UE VI: 126).

In the foundation deposit of the earliest Barbar temple were found hundreds of conical terracotta goblets of a type occurring also in ED I Sumerian temple foundations (for example at Nippur and Warka) (Mortensen 1970: 395). In the ED I Abu Temple at Asmar it appears that large quantities of these were deliberately smashed and then laid out in rows (OIC 20: 9–10) in a room adjoining the sanctuary.

Among the finds from Barbar were miscellaneous copper/bronze objects, ivory fragments, lapis lazuli objects, a piece of gold, and a few beads (Mortensen 1970).[10]

The burial mounds of Bahrain vary greatly in dimension, and are of different types. A number of them have yielded Barbar ware (Bibby 1954a). Objects found in early excavations include many ivory pieces, ostrich shells, wooden objects, copper/bronze objects and fragments, as well as some basketry (Mackay et al. 1929: 22–4).

On the southwest coast of Bahrain, near an oyster bank named Ras al-Jazayir, is a mound which consists mainly of oyster shells,

[10] Objects with what may be called foreign parallels are:

1. A smaller copper/bronze rattle similar to an example found near the Royal Tombs of Ur (Mortensen 1970: 396, fig. 4).

2. A copper/bronze shaft-hole adze of Deshayes types B1–2a, known also at Ur, Susa, Gawra, Fara, etc., all dated to the middle of the third millennium (Mortensen 1970: fig. 5).

3. Alabaster vases: three complete examples from Temple III and numerous fragments. Some are allegedly of Egyptian type and are known also at Mari, Byblos and Ur (Mortensen 1970: 396).

4. A copper/bronze bull's head from Temple II, probably cast in an open mould. It could have surmounted a wooden column. Some individual features such as the setting of the eyes, the curve of the horns, the curly fringe on the forehead, are characteristically Sumerian (During Caspers 1971 b).

5. A copper/bronze mirror-handle in the shape of a nude male figure with hands clasped at the breast (Glob 1954 b: 152, fig. 6). There is a copper/bronze mirror from Mehi with a handle shaped as a female figure with arms akimbo, the head being provided by the viewer's reflection. According to Nagaraja Rao (1969) the two are strikingly similar. But it should be noted that in the Barbar example the head of the male figure is at the lower end of the handle, the portion at the feet being curved presumably to take the disc of the mirror. Another parallel to this figure comes from the mid-third-millennium temple of Shushinak at Susa (Glob 1954 b: 152).

6. A single sherd of late JN manufacture from Temple I (Mortensen 1970: 395).

7. Umm an Nar type sherds from Temples II and III (Mortensen 1970: 395-6).

8. A linga-shaped gamesman with an identical parallel at Mohenjo-daro (Glob 1954b: 152; Mackay 1938: pl. CXL. 12, CXXXIX. 21, 18).

clearly the remains of a pearling camp. Associated finds were a few Barbar sherds and some fishbones (Nielsen 1958). It appears as if the practice was to collect oysters and bring them to land, there spreading them in the sun until the shells had opened out. Miles (1919: 414–17) testifies to the use of this method even in the twentieth century. Incidentally, towards the beginning of this century, a small hamlet and a well frequented by fishermen existed (Lorimer 1915: sub Bahrain) in this now uninhabited area.

On Tarut Island, not very far to the west of the Bahrain archipelago, an abundant supply of fresh water exists in the form of a spring debouching into a natural rock basin. This spring made possible the ancient and present-day settlements in the centre of the island, where a very high tell is to be found. Excavation of the tell was not possible, but a hurried exploration and scraping showed that the earliest levels were Ubaid, and the latest, Barbar (Bibby 1972: 330 ff). It is an important fact that Tarut island lies opposite the fertile Qatif oasis on the coast, for which it may have functioned as a port. (It is now known that there is Barbar pottery on this part of the Hasa coast, inland from Jubail.) Today Tarut island is difficult to approach by boat, but formerly the sea level was probably higher and dock installations could have been possible.

There are many indications of the ancient occupationof Hasa. Scattered in a large oval around Dammam Dome and Dhahran is a large group of burial tumuli (Cornwall 1946a: 34–8). A smaller moundfield exists near 'Ain Jawan (Bowen 1950). It is possible that culturally there is some relationship between these mounds and the Bahrain tumuli (Cornwall 1946a: 32, 36).

On the coast between Jubail and Ras Tanura, and south of Khobar, is a chain of oyster middens yielding black or red sherds and stone diving-weights and pestles (Cornwall 1946a: 38; Bowen 1951b: 176). A study of the pottery is necessary in order to define the period or culture(s) to which these middens belong.

We cannot therefore rule out the possibility that the Eastern Province of Saudi Arabia was to a greater or lesser extent involved in third- and second-millennium trade movements. Geographical factors and the evidence of later history (for example, the importance of Gerra in classical times) also support this view.

The Saudi Arabian coast from Kuwait to the Trucial states is arid, characterized by large stretches of *sabkha* or salt marsh which isolate different parts of the coast from neighbouring regions. At the same time the exceptional fertility of Qatif and Hofuf oases is important. Economically, the Hofuf oasis, with its forty-odd springs, is the key zone of the province. Here agriculture (mainly date cultivation) flourishes, and the population is relatively dense. The oasis attracts bedouin caravans and there is constant exchange of agricultural goods for animal produce. Because of its superior resources Hofuf has traditionally been the main trader of Saudi Arabia with the outside world, the break-of-bulk centre for imports coming via Bahrain (Vidal 1954: 417–19). It will thus be necessary to bear in mind the possible importance of the mainland in the functioning of third-millennium Gulf trade.

The eastern tell of Sa'ad wa Sa'aid on Failaka island in the bay of Kuwait has Barbar remains (Glob 1958b; Bibby 1972: 349, 269–71), and the site has been extremely prolific in seals, of which about 300 have been found. Why there were so many of these seals here rather than in Bahrain, remains to be explained.

Some steatite fragments have been found here, one of which bears an inscription containing the name 'Dilmun'. Other inscriptions were also discovered on sherds, seals and tablets, two of which refer to the 'temple of the god Inzak'.

The geographical importance of the island of Failaka cannot be exaggerated. It is strategically situated at the entrance to Kuwait bay, and there is a sheltered anchorage for boats near the village of Zor on the northwest coast (Lorimer 1919: II A: 512 ff; Glob 1958b: 170). Subsoil water is to be found in most parts of the island, and agriculture can be successful on patches of clayey soil. In fact it was estimated that besides barley, dates, melons and lucerne, some 3,000 kg of wheat were grown annually on Failaka in the beginning of this century. There was also fishing and pearl-diving.

Failaka was a place of considerable religious importance in the past as well as up to the twentieth century. In classical times a temple was dedicated here to Artemis (Bibby 1972: 256 ff), and today there are several shrines and tombs of saints, including the popular shrine of al-Khidhr, the patron saint of sailors.

The Location of Dilmun

Many factors point to the equation of the Barbar cultural province with the land of Dilmun.

That the Dilmunites were seafarers is indicated by a reference to Dilmun boats in an inscription of Ur-Nanshe of Lagash (Sollberger and Kupper 1971: 44 ff); an ED text (DP 69); inscriptions of Sargon (UM XV, 4; Sollberger and Kupper 1971: II A1 b) and Ur-Nammu (UET 1.50); in HAR.ra=*hubullu*; a vocabulary text (Jaritz 1968: 213); 'Enki and the World Order'; and in a letter from Rim Sin of Larsa to a resident of Ur (UET V 36; Weitemeyer 1964–5: 208).

In the time of Ur-Nanshe of Lagash (ED III A) a Dilmun boat brought cargos of wood from a mountain; in the reign of Lugalanda (ED III B), merchants brought to Lagash copper and other merchandise in large quantities from Dilmun (Lambert 1953b). Sargon of Akkad stated that Dilmun, Magan and Meluhha boats called at the quay of Akkad, while Gudea of Lagash imported wood from Dilmun (Thureau Dangin 1907: 79). The Ur III texts from Ur (UET III) indicate a regular trade between Ur and Dilmun, and we know that tithes were paid to the temple of Ningal by merchants returning from trading expeditions to Dilmun in the Larsa period (Leemans 1960: 18–36).

According to textual evidence the following items came to Ur from Dilmun:

		Textual reference
1.	Carnelian (gug. gi. rin. na)	UET V (various); *malku-šarru* I 219
2.	Unspecified but apparently semi-precious stones	UET III 672; UET V (various); UET I 244
3.	Ivory and ivory objects	UET III (various); UET V (various)
4.	Copper	DP 237, 513, 518; RTC 26; VS XIV: 30, 38, 194; UET V; Hh.
5.	Silver	UET V; Susa text (Ghirshman 1967: 142–4)
6.	Lapis lazuli	UET V
7.	'Fish eyes'	,,
8.	Red gold	,,
9.	White corals	,,
10.	Various woods	Ur-Nanshe (Sollberger and Kupper 1971: IC 3a, d, e): Gudea statue D (Thureau-Dangin 1907: 79); UET V
11.	Dates	'Enki and Ninhursag'

The second millennium Mari letters occasionally refer to Dilmunites in Mesopotamia (ARM I, 17, 21, etc.); and to Mesopotamian expeditions to Dilmun (ARM V 14).

Let us now examine the list of commodities.

Dilmun dates were much prized in Mesopotamia. Today Qatif and Hofuf are famous for their dates. Also from Dilmun were the much valued 'fish-eyes'; it is now generally believed that these were pearls (see Chapter II). The famous pearls of Bahrain have been mentioned before.[11]

For the other items, however, we will have to admit that they could not have been produced in Bahrain or Failaka or the Eastern Province. Thus we must suggest that Dilmun was more a trade entrepôt than a producer, as Bahrain has always been in historical times.

At the Barbar culture sites ivory, lapis lazuli, beads and copper were all found. Copper, the main commodity of Dilmun-Ur and Dilmun-Lagash trade, could have originated in India or Oman or Iran (as indicated elsewhere). There are repeated references to 'Dilmun' copper, but in HAR.ra=*hubullu*, Dilmun is not a land of mines as is Magan. Thus it could have been that the Dilmunites kept the source of their supplies of copper, trade in which was so lucrative, a secret.

There are other aids to the identification of Dilmun. Two letters which had been written in Dilmun, found in Nippur and dating to the Kassite period, mention En-Zag (or Inzak) and Meskilak as the gods of Dilmun (Cornwall 1952). According to a syllabary, Inzak is a name under which the god Nabu was worshipped in Dilmun. Cuneiform inscriptions naming Inzak and Dilmun have been found at Failaka, as mentioned before. Moreover, a stone was found in Bahrain bearing the inscription, 'palace of Rimun, servant of ^{d}Inzak' (Cornwall 1952: 141; Glob 1954: 103).

In Late Assyrian texts Dilmun is said to be located 'in the midst of the sea of the rising sun' (ARAB II 41, 70, 81, etc.), or 'in the midst of the Lower Sea' (ARAB II 970). The 'Lower Sea', has been the traditional Akkadian name for the Gulf just as the 'Upper Sea' always stands for the eastern Mediterranean.

More important evidence lies in the weight system of the Barbar culture. A text (UET V 976) from Ur mentions the Ur equivalent of the weight standard of Dilmun. From this it has been possible to calculate that the Dilmun *mana* was approximately 1370 g. Of the seven weights excavated at Qala'at al Bahrain, the largest weighs

[11]It is clear that these were 'exported' as early as the JN period, judging from finds at Uruk III (During Caspers 1971a: 33).

just this (Bibby 1970). We can thus conclude that this weighing stone from Bahrain is actually the Dilmun *mana*.[12]

Artefactual evidence for trade contacts with the Mesopotamian world is also available: an early Persian Gulf seal impression was found on a tablet of the Ur III period at Susa (Amiet 1974: 109–10, fig. 16) and a 'late Persian Gulf Seal' on a document of the tenth year of Gungunum of Larsa was found at Ur (Buchanan 1967).

The religious importance of Dilmun is brought out in Sumerian myths, where its cleanliness, purity and holiness are emphasized. In the 'Deluge Myth' (ANET: 42 ff) Ziusudra escapes from the flood, and granted eternal life, is allowed by the gods to dwell in Dilmun, the place where the sun rises, the land of the crossing. In 'Enki and Ninhursag' (ANET: 37 ff) we are told about the initial absence of fresh water in Dilmun and the intervention of Enki to turn the bitter water of the wells into sweet water. Grain can then be cultivated in Dilmun, and her city becomes the 'house of the quay of the land'. This text refers repeatedly to the cleanliness and purity of Dilmun. Considering that Failaka, Bahrain and Tarut would all have been uninhabitable without their artesian springs, the meaning of 'Enki and Ninhursag' and the emphasis on purity (probably the purity of water) become clear. Bibby (1972: 272–3, 209) suggests that the same tradition is preserved in the name of Bahrain (literally meaning 'two Seas', perhaps fresh water and salt water).

These religious connexions[13] of Sumer and Dilmun did not preclude trading partnerships, and by the Akkadian period Dilmun was supplying Sumer with valuable merchandise. In the ED period Mesopotamia sent barley, textiles and oils to Dilmun. These were probably much cheaper than the supplies available on these islands with their very limited agricultural production. Gradually, however, silver became the more important export to Dilmun (Leemans 1960: 55 ff).

We are thus on fairly certain ground in identifying the region of Dilmun with several islands and inland oases of the upper Gulf. It is clear from texts as well as from the available archaeological evi-

[12] The Barbar weight system was identical to that of the Harappa culture. See Chapter III.

[13] Other texts also testify to religious connexions: as for example a liturgical hymn mentioning a temple of Dilmun (UM X 4:279); a list of tithes of Zarpanit as goddess of Dilmun (CT XXV) and an Ur III text (UET I: 127) referring to the temple of Inanna at Ur as the é-dilmunna.

dence that the region was heavily influenced by Mesopotamian culture, especially in the realm of religion, ritual and art. That Dilmun plays a fairly important role in Sumerian mythology is thus not surprising. Moreover, the Barbar culture does not comprise a scatter of simple coastal villages: only a fraction of the site of Ras al Qala'a has been excavated, and surface explorations indicate that the early city must have been substantial in size. And given the location of Barbar sites on the sea route along the upper Gulf on islands where resources and harbours are available, it is logical that Dilmun was one of the major trading partners of the southern Mesopotamian cities.

The Kerman Region: Tepe Yahya and Shahdad[14]

Tepe Yahya is situated in the Soghun valley, 30 km northeast of Dolatabad, in the southeast Zagros zone. Most of this area presents a stark and rugged landscape with only a few vegetation-covered mountain slopes where the rainfall is somewhat higher than the average 200 mm per annum. Within the mountain zone are several long intermontane valleys. Surface run-off is rapid, and streams tend to be dry for much of the year. Human settlement is confined to water courses and springs and stretches of cultivable soil, which are scarce, and there is a limited amount of pastoralism. Thus rural and urban settlements have been much more dispersed here than, for example, in Fars. Towns were separated from each other by stretches of uninhabited land (le Strange 1905: 299, 306; Fisher 1971: 270–1; Beckett and Gordon 1966).

Cereal agriculture is possible in the Jiruft, Soghun and Dolatabad plains, but today substantial returns are due only to irrigation (Lamberg-Karlovsky and Tosi 1973: 31). The Halil Rud (Jiruft) valley is one of the most fertile parts of this area.

The Soghun valley is easily approached from Dolatabad on the west, and in turn gives access, via the Tang-i Mordan pass, to the Jiruft valley (Lamberg-Karlovsky and Tosi 1973: 29). The Halil Rud in turn leads to the Jaz Murian depression, into which the Bampur valley opens on the east. Thus communication between Yahya (near Dolatabad) and Bampur is not difficult.

[14]The major sources on Yahya are Lamberg-Karlovsky 1970 and 1973 and Lamberg-Karlovsky and Tosi 1973.

Yahya can also connect, through the Jiruft valley and skirting the Kuh-i Jebel Bariz, with Bam and thence northwestward to Kerman, or southeastward into Baluchistan; or northeastward, skirting the edge of the Dasht-i Lut, towards Seistan.

From Soghun, the River Dozdan flows south into the Gulf of Oman in the vicinity of Minab, a fertile district. It is a five or six days' walk aong this route from Yahya to the coast (Lamberg-Karlovsky 1970: 5).

As regards resources, copper deposits exist near Faryab in the Dozdan valley downstream of Soghun (Hansman 1973: 558–9), and steatite, more properly chlorite, is found in about four localities (Lamberg-Karlovsky and Tosi 1973: 33) including the Ashin mountains 24 kilometres north of Yahya.

Tepe Yahya has a long history of habitation from neolithic to Sassanian times. In the early fourth millennium B.C. it was one of about thirty settlements in the Dolatabad region, but by the time of period IV C at Yahya most of these had been abandoned. (Lamberg-Karlovsky 1973: 22 ff). Period IV, with phases C, B and A, is relevant to this study.[15] Period IV C has been designated 'proto-Elamite' and in periods IV C and B Yahya was very much part of the 'world scene', judging from numerous manifestations of external relations.

In level IV C, only one building complex has been recovered, but it is clear that this building played a significant role in exchange mechanisms: it has small rooms in which were found bevelled rim bowls, biconical jars, tablets written in proto-Elamite script, blank tablets and seals and seal impressions. Thus it appears that in this building goods were stored, accounts or records kept, and consignments both received and dispatched. Lapis lazuli is attested in period IV C. Not only the script, but also the seal impressions are of clear Susa C affiliation, linking Yahya IV C to Susa C, Sialk IV, Tell-i Ghazir and Tal-i Malyan and the general proto-Elamite–Jamdat Nasr tradition in respect of these elements as well as bevelled rim bowls, polychrome biconical jars and solid-foot goblets.[16]

[15]Even before, in period V, there is evidence of increasing utilization of imported materials such as obsidian, turquoise, carnelian, alabaster and mother-of-pearl (Lamberg-Karlovsky and Tosi 1973: 32).

[16]The goblets from Yahya IV C have flat bases unlike the hollow, conical-foot bases of the conical cups from Barbar I.

Period IV B was the most prosperous, judging from its impressive architecture, evidence of specialized crafts, and the use of 'exotic' materials such as turquoise, carnelian, ivory and Gulf shells.

A small round seal with perforated button-back and carved with a bull, ibex and crescent moon, from this level, may be of 'Persian Gulf' manufacture.

The copper used at the site appears to have come from a copper-arsenic ore, and thus could not have originated in the Iblis region (Beale 1973: 137-41): analysis of the Faryab ores might point to the origins of the Yahya copper.

Turquoise probably came from the Kerman region. By period V it was a common material for beads, which were made of a standard shape.

It is quite clear that Yahya was a major steatite manufacturing centre: a very large quantity of steatite (chlorite) pieces—finished objects, unfinished pieces, seal blanks—and tools used probably for steatite carving, were found in level IV B, and the local steatite source has been mentioned. Foremost in the inventory of steatite products are vessels, plain or carved, in styles paralleled in almost all the relevant sites from Mesopotamia to the Indus. Details will be discussed in Chapter II.

Seals of steatite were also made at Yahya. Round, with button perforations on the reverse, they are similar to those found at Bampur and Shahr-i Sokhta (Lamberg-Karlovsky 1970: 39). No details are, however, available.

The prolific use of local chlorite explains why only one fragment of incised greyware occurs, and that as a surface find, at Yahya (Lamberg-Karlovsky 1970: 43).

A steatite shaft-hole axe from IV B is carved with an eagle on both sides. This motif is common at Susa C-D. Some undecorated steatite bowls, flat bottomed and bell-shaped, have exact parallels in ED II-III Ur and at Shahdad. At Ur this shape occurs in no material other than steatite (Lamberg-Karlovsky 1970; Shahdad Catalogue: pl. IX.E).

Alleged Harappan connexions (besides the distribution of steatite vessels) are manifested in stratum IV A by a fragmentary sealing on a potsherd, the seal design recalling the small rectangular 'seals' of Harappa (Lamberg-Karlovsky and Tosi 1973: figs. 137, 138) and two etched carnelian beads (Lamberg-Karlovsky 1976: 172).

Decorative motifs in the form of raised snake heads on large storage pots as at Umm an Nar are also known at Yahya. Moreover, the prevalence of black-on-grey ware from VA to IVB ties Yahya to Bampur V–VI, Shahr-i Sokhta II–III and Umm an Nar (Lamberg-Karlovsky 1970).

We may infer that while at Yahya IVC we find the easternmost-known manifestation of the proto-Elamite cultural horizon, Yahya in IVB was increasingly influenced by the southeast Iranian cultural tradition. So far as available data show, in period IV Yahya did not form part of any cluster of settlements in the Dolatabad-Kerman region. The settlement may have been inducted into a system of interregional contacts originally as an Elamite outpost, but it is in the subsequent period that its production of steatite containers for a wide region is attested. These containers are found over the entire area from the Euphrates to the Indus. The lack of neighbouring sites, the limitations on agricultural productivity in the region and the difficulties of land transport in southern Iran would, however, preclude this community from entering into long-distance exchanges on any wider scale, say as a consumer of merchandise from distant lands, or as an overland entrepôt between India and Sumer. Moreover, considering the marked distance and arid, mountainous terrain between Yahya and its nearest Elamite neighbour (Tal-i Malyan), it is difficult to predict to what extent the steatite production was controlled by Elam, if it was at all. One wonders if the easy accessibility of Yahya to the Minab coast had any part to play in its economic development.

Shahdad (Khabis) lies near Kerman, beween the Kerman ranges and the central (and most arid) part of the Dasht-i Lut. Today orchards flourish at Shahdad as local water resources are available (Shahdad Catalogue: 3), and Shahdad has played an important part in the history of Kerman, especially in medieval times (le Strange 1905: 308), although the bronze age site in its vicinity is now deserted and much eroded by wind.

The importance of Shahdad must partly be due to its position on routes between southeast and central Iran, and between northeast and southern Iran. In the third millennium a major factor in its prosperity must also have been the availability of copper in the Kerman ranges and argentiferous lead in the east of the Lut (Shahdad Catalogue: 10, 15).

The bronze age site contains a necropolis with graves of several periods covering an area of several square kilometres (Hakemi 1973 a). The grave goods occurring in some burials show unmistakable links with Yahya IV in pottery[17], plain bell-shaped steatite bowls (Shahdad Catalogue: pl. IX E), potters' marks, a seal impression with the foot motif, and a proto-Elamite inscription on a vase (Hakemi 1973 a; Lamberg-Karlovsky 1970: 43; Amiet 1974).

The site is rich in objects: stone vessels, beads, metal jewellery, metal vessels, axes, woven materials and sculpture. Metallurgy was particularly advanced, with a wide range of vessel forms, mirrors, axes, and other objects. Copper from the Kerman ranges must have been utilized as there are remains of furnaces at the site, and a locally-available lead–silver natural alloy was used for making ornaments (Hakemi 1973 a, 1973 b).

Fine quality marble from the Kerman ranges was utilized for vases and jars (ibid.), some of which have parallels at ED III Susa (Amiet 1974).

Beads were made of agate and lapis lazuli, and steatite was profusely used for cups, bowls, vases, compartmented boxes and containers of elaborate shape.

The lack of detailed information regarding the stratification and chronology of the site renders difficult an evaluation of its role in third millennium trade. But at a preliminary guess it would appear that Shahdad was contemporary with periods IVC to IVA at Yahya, and was more prosperous than the community of the latter site in terms of exploitation of regional mineral resources.

Shahr-i Sokhta and the Helmand Civilization

When the river Helmand descends from the Hindu Kush highlands, it flows through generally barren territory, and then enters the Hamun-i Helmand in Seistan. It is joined by a number of tributaries including the Arghandab, which flows through Ghazni and Kandahar districts to meet the Helmand some distance west of Kandahar city.

It is to this river system that the relevant third millennium cultures of Afghanistan belong.

It is by now clear that the 'Helmand civilization' (Tosi 1973) was in its early stages under strong cultural influence from southern

[17]In turn paralleled at Bampur IV, Damin and Khurab.

Turkmenia. In the Tedzen delta and the foothills of the Kopet Dag, the 'Namazga III' period was marked by the appearance of 'Geoksjur ware'. This distinctive pottery style is manifest in the earliest occupation of Shahr-i Sokhta on the eastern margins of the Hamun-i Helmand (on the former delta of the river), and to an appreciably lesser extent, on the pottery of period III at Mundigak on a tributary of the Arghandab, about 50 km northwest of Kandahar.[18]

Shahr-i Sokhta and Mundigak, from the period of the 'Quetta' horizon onwards, shared markedly similar pottery, art styles, and seal types (Tosi 1973). Mundigak, however, though situated near the junction of many routes from the northwest, northeast and south-east, including that which leads to the Quetta Valley and the Bolan pass and into the Indus plains, does not appear to play any part in third millennium interregional trade, as does Shahr-i Sokhta. This requires explanation. One factor might be the great contrast in the environmental potentials of the two sites. The Kandahar province is dry, with a very limited range of resources, and is surrounded by desert (Dupree 1963: 65 ff). The only relieving features are caused by the occurrence of rivers. Shahr-i Sokhta, on the other hand, is much more favourably situated, as will be shown below. It could thus support a much higher population, and not surprisingly is immensely greater in extent (151 hectares) (Piperno and Tosi 1975: 196 ff), than Mundigak which is 150 metres in diameter (Casal 1961: 24) or approximately 4.30 acres.

The Hamun-i Helmand is an inland lake containing fresh water brought by three large rivers, each of which drains an area of the Hindu Kush, and is both rain and snow fed. These rivers are the Helmand, Khash and Farah. Each forms a delta as it flows into the Hamun. There are also a number of small deltas formed by wadis which sometimes carry water into the Hamun. Almost all the water courses flow into the eastern margins of the Hamun, only a few feeding it from the west.

The Hamun is the largest expanse of fresh water in Iran, affording vast potentialities for irrigation agriculture. Its dimensions, however, change from year to year, according to the volume of water brought down by the rivers and the rate of evaporation.

[18]This pottery also occurs at Deh Morasi Ghundai and Said Qala Tepe in the Kandahar region.

The rivers carry much silt, and as they flood, fertilize large areas of their banks. Seistan depends on the Helmand more than any other river for its fertility. The soils of Seistan vary but the agricultural potential, given sufficient water, is high (Tate 1910: 112).

Rainfall, mainly precipitated in winter, is about 150–200 mm p.a. The climate on the whole is not attractive. The notorious 'wind of a hundred and twenty days' (May–October) wreaks unimaginable havoc on soil and vegetation, carrying sand particles which act as an abrasive, eroding soil and stripping plants of their leaves (CHI: 76–81).

In the Hamun and delta region, however, there is great environmental diversity. The Hamun, a swampy lake, supports a dense belt of flora and fauna. Reeds and cane brakes growing in the lake afford pasture to cattle, and when dry are used for housebuilding, baskets and mats. Plentiful fish attract people from the surrounding region, while small game can be hunted in the reed beds and along the eastern lake margins (Tate 1910: 124–5).

Further up the river valleys, there is little vegetation besides tamarisk and small shrubs and occasional groves of poplar. Much of the land along the steep river banks is now barren and it has always been the deltas with their supplies of fresh water and extensive arable soils which have attracted settlements. Seistan has been the major population centre of eastern Iran in historical times (Tate 1910: 122, 126) and even in prehistoric times the region must have offered a great potential for sustaining substantial populations (Lamberg-Karlovsky and Tosi 1973: 22–3).

The economy is diverse: not only are considerable quantities of wheat and other crops grown [Seistan was once a wheat-exporting area (CHI: 80)], but the herding of sheep, goat and cattle is an important occupation; even today, tribal people drive their animals into the reed beds in summer for pasture; and Seistani cattle are considered valuable (Tate 1910: 303–5). The making of mats, and the weaving of cotton and wool are important occupations also (Adamec 1973: 45–54).

To the west, quartz, alabaster and flint are available in the mountains (Lamberg-Karlovsky and Tosi 1973: 45–6). To the south at Saindak, and in the Rud-i Biyaban or fossil delta of the Helmand, copper minerals and old workings have been found, the latter unfortunately not yet dated (Dales and Flam 1969). In the western part of the Kuh-i Taftan massif are abandoned lead workings, and to the north of these, are some old copper mines (Skrine 1931: 335–6). Tucci et al. (1978: 60–4) point out that the minerals used in the ancient city of Shahr-i Sokhta were all available within a radius of 150 to 400 km, that is, a maximum of twenty days' journey away. They refer especially to copper, lead, lapis, turquoise, sea shells, and jasper-chalcedony.

It would not, however, be correct to exaggerate the productive capacity of Seistan. In reality, the crucial factor is the availability of water: denied water, the economy can collapse. And the water supply of Seistan has always been unreliable, so that Seistan has had a long history of both floods and drought (Piperno and Tosi 1975: 186; Tate 1910: 115).

Communications-wise, Shahr-i Sokhta is not so favourably placed. Tate (1910: 107–10) has emphasised the relative isolation of Seistan. While eastward the Helmand valley leads towards Kandahar,[19] to the west, the Dasht-i Lut is a barrier. Routes to the south (Bam or Makran) are difficult, involving the crossing of desert and semi-desert tracts and the skirting of the Kuh-i Taftan range. For Bam, the route skirts the Kuh-i Taftan and swings westward to cross the wide Kerman desert. From Bam one could then turn southwestward, and avoiding the Kuh-i Jebel Bariz, descend to Minab on the coast. Yahya would lie some distance off this route to the west. Alternatively, a northwesterly route from Bam across the Kerman mountains feeds Kerman and Shahdad. The Bampur valley could be reached from Shahr-i Sokhta by skirting the Kuh-i Taftan from the east, down to Khash, and then via the Hamun-i Chah Gheybi to the Damin Valley, which in turn meets the Bampur valley near Iranshahr (Tosi 1970: 9).

Thus it is clear that any external connexions of Shahr-i Sokhta would be with lands either to the east and northeast, or to the south and southwest.

In southern Seistan, besides Shahr-i Sokhta there are about twenty-five prehistoric settlements in period III. Shahr-i Sokhta is immensely large, 151 hectares in total extent (including a cemetery on the lowest periphery of the mound) thus a larger city than contemporary Ur (Tucci et al. 1974: 104). But the other sites are all small villages, never more than two hectares, and there are no

[19]The Helmand river is not, however, navigable in any part (Adamec 1973: 108–27).

medium-sized sites (Tosi 1973: 439). This speaks for great economic and political centralization.

There are four major periods at Shahr-i Sokhta, ranging approximately from the end of the fourth millennium B.C. to the beginning of the second. Period I, marked by the Geoksjur-related horizon, is paralleled at Mundigak III, and as at the latter site, precedes the establishment of a fully urban society. The peak of material development is seen in periods II and III, when the city achieved its maximum size. This period at Shahr-i Sokhta is correlated in pottery, seals, figurines and building techniques, with Mundigak IV 1-2. Period IV does not mark any cultural break. To it belongs an imposing mudbrick structure built around a central courtyard, which must have suffered a violent end, judging from evidence of burning (Lamberg-Karlovsky and Tosi 1973: 28). This event appears to mark the end of the prehistoric occupation of Seistan.

The extensive graveyard, about 20 hectares in area, contains about 22,000 pit burials, catacombs and brick-built graves (Tosi and Piperno 1973; Piperno 1977). These contained pottery, large quantities of beads, calcite vases, and occasional copper/bronze and wooden objects. Three graves contain minute quantities of gold (Tosi and Piperno 1974). One grave contains a large quantity of lapis lazuli beads in addition to three blocks of unworked lapis and a lapidary's stone and metal tool set (Piperno and Tosi 1975: 197).

There is evidence for the use of a wide range of materials: wood, reeds, flax, stone, shells and bone. The making of pottery and copper/bronze objects is attested in the city and at neighbouring sites (Biscione et al. 1974).

In the city, large quantities of alabaster vases were produced (Tosi 1969–71). There is, moreover, evidence for a flourishing bead and seal-making industry in the city, the principal stones used being lapis lazuli, carnelian, turquoise and alabaster, for which a possible workshop has been located. Thousands of pieces of lapis lazuli have been found, about ninety per cent of them being waste flakes. Thus it appears that either the majority of finished objects were exported, or the original blocks of impurity-filled lapis lazuli were flaked and 'cleaned' before transportation to other centres. A highly specialized and standardized range of lapidaries' stone tools has been found at the site (Piperno and Tosi 1975). This stone-cutting industry flourished in periods II and III, and there are virtually no beads in period IV (Piperno 1973: 120).

Carnelian was available in the river valleys of Seistan and the Hindu Kush, alabaster in the western hills, and lapis lazuli in Badakhshan (Lamberg-Karlovsky and Tosi 1973: 45–6). Turquoise could have come from Nishapur in the Kuh-i Binalud or from the Kerman region.

The importance of Shahr-i Sokhta's long-distance trade lies in the lapis lazuli industry. Badakhshan is identified as the source of this stone on the analysis of quartz and pyrite inclusions in the stone. We have shown that the products of the stone cutters' workshops were intended mainly for export, but there is no striking similarity of bead typologies between Shahr-i Sokhta and any other sites, and this has led to the conclusion that at Shahr-i Sokhta rough blocks of stone were pared and all impurities removed, to reduce the cost of transport (Tosi and Piperno 1973).

In all other ways, the external connexions of Shahr-i Sokhta (except with Mundigak) are limited. Harappan connexions are indicated by the occurrence as surface finds of shankh shells, available only in Indian waters (Tucci et al. 1978: 223–8). Three sealings of JN style from period I (Lamberg-Karlovsky and Tosi 1973: 26) and the probability of lapis exports in periods II–III are the only pointers to direct connexions with Sumer. Two Nal vases have been found in a group of graves (Piperno 1977).

The majority of external links are confined to Iran and Oman. Black-on-grey pottery is found all over southeast Iran and Baluchistan: at Shahr-i Sokhta II–III, Yahya IVC-B, Bampur, Damin, Khurab, Shahi Tump, and also in the Umm an Nar culture. Lamberg-Karlovsky and Tosi (1973: 39–42) have interpreted this phenomenon as a horizon style within a distinct interaction sphere. A distinctive canister with an animal frieze from Shahr-i Sokhta IV is similar to examples from Bampur IV–V, Umm an Nar and Kulli. A few sherds of hard incised greyware from period IV, are also paralleled at Bampur and Umm an Nar (Lamberg-Karlovsky and Tosi 1973: 43).

In the earliest building phase of period I a single proto-Elamite tablet has been found (Tosi 1976: 168).

Marine shells including mother-of-pearl have been identified in Period IV (Tosi 1974b: 164).

Although Shahr-i Sokhta was an extensive and prosperous urban centre with natural advantages for subsistence production and a wide range of craft activities, and a large-scale 'producer' of lapis lazuli obtained at great distances, there is no evidence for long-distance imports, and most of its cultural connexions are limited to the southeast-Iran-and-Oman sphere. This somewhat paradoxical situation will be discussed in subsequent chapters.

Iranian Baluchistan: The Bampur Valley

Iranian Baluchistan, with its mountain ranges, plateaux, winding river basins and low troughs, is a desolate zone where bare rock and sandy dunes prevail, and areas of human settlement are limited in size and number (Fisher 1971: 271–2). In the lower altitudes, rainfall is about 150 mm p.a., irregular and torrential, subjecting the water courses to flash floods which cause the growth of pasturage. Vegetation in the lower altitudes consists mainly of steppe and desert species.

Agriculture is practised in the vicinity of streams or with the use of qanats, wheat and dates being the main crops. The Bampur river being perennial, its valley offers one of the highest potentials for settled occupation in Persian Baluchistan, but Iranshahr, Khash and Chahbahar are also fertile zones. Fish form a regular item of diet, but pastoralism is the major subsistence activity, animals being seasonally taken to high pastures on the Makran range and Sarawan plateau. Spooner (1964) has emphasised the exceptional simplicity of life here. There are few surpluses, except in wool and ghee. Household equipment is minimal. People rely on palm leaves for making huts, tents, mats, and other items. Given such self-sufficiency, trade is unimportant.

A number of sites have been found in the Bampur valley (Stein 1937; de Cardi 1970). The fertile valley, about 3 km in width, opens in the north towards the valley of the Damin, its tributary. Near Iranshahr, there is much cultivation. Damin is an ancient site in the northern part of this tributary valley, and Katukan lies on its eastern margins (Stein 1937; Tosi 1970, 1974a).

Draining from the mountains of the Kerman area and flowing towards Makran, the Halil Rud empties into the Hamun-i Jaz Murian, a low trough at the centre of which is a salt lake; the Bampur river empties into this trough from the easterly direction. Thus between Kerman and Makran, the Halil Rud and Bampur provide a natural route of communication. The mountains enclosing these valleys are not very high and routes in other directions are also possible.

In the southeastern direction, the Halil Rud–Bampur route continues over the upper Bampur and its watershed into the Sarbaz valley and thence southeastward into the Kej valley, or else northeastward along the Nihing river into the Rakhshan and Mashkel valleys. An old route connects Bampur to Chahbahar, an important settlement on the Makran coast, via Maskutan, Fannuj and Bint (Harrison 1942: 120). North, via the Damin valley, a route leads to Seistan.

In the Halil Rud valley, there are intermittent patches of cultivation and some prehistoric sites are known (Stein 1937: 132–47; Lamberg-Karlovsky and Tosi 1973: 29). In the Hamun, water is brackish and there are no sites, past or present (Stein 1937: 135; Fisher 1971: 271–2).

Mineral resources are reported from the highlands of the region: to the west of the Halil Rud, near Faryab, copper is found (CHI: 501 ff); lead occurs in the Kuh-i Jebel Bariz (Hansman 1973: 558); and the slopes of the Kuh-i Taftan contain copper and lead deposits (Skrine 1931: 335–6).

The archaeology of the Bampur and Damin valleys has been described by Stein (1937), de Cardi (1970), and Tosi (1970 and 1974 a), and the details need not be repeated here. But it should be pointed out that in spite of the many sites (settlements and burials) known, the excavation of Bampur itself was very limited in extent, and the material culture known so far consists almost wholly of ceramics. The correlations and chronologies worked out for the valley thus rest on the criteria of ceramic styles.

The sequence at the site of Bampur can be divided into two main periods, I–IV, and V–VI. The earlier period is represented also at Damin, Katukan, Gwargusht, Khurab and other sites. A terracotta mousetrap and a bronze compartmented seal link Bampur III–IV with Mundigak IV, but otherwise there are no direct connexions between the two sites. The mousetrap provides a tenuous link with Mohenjo-daro also (de Cardi 1970).

The transition to periods V–VI is not abrupt although it involves major changes in pottery. There are links with Seistan in the form of Bampur VI-type sherds in the Burnt Building of Shahr-i Sokhta IV (Tosi 1974a: 33). Carved steatite vessels come from Bampur IV to VI, Khurab, and Damin. The characteristic relief decoration on them gives links with ED Sumer, Mohenjo-daro, Yahya IV B, the Kulli culture, and other regions (see Chapter II). Incised greyware occurs in Bampur IV–VI, Damin and Katukan, as well as Umm an Nar, Yahya, Shahr-i Sokhta and Mehi (de Cardi 1970: 320 ff).

The occurrence of black-on-greyware pottery at Bampur, Yahya, Shahr-i Sokhta and Umm an Nar has been mentioned before, as also the canisters in this ware, with strips of running caprid decoration, which link Bampur V–VI (de Cardi 1970: 268 ff) and Damin (Tosi 1974a: 33, fig. 364) with these sites.

Some pottery types of Bampur IV–V have been noticed at the Shahi Tump settlement, and Khurab (Bampur V) type conical cups and copper/bronze disks have been found at a Mehi burial (de Cardi 1970: 267–8).

It thus appears that Bampur's links were mainly with Yahya, Shahr-i Sokhta and Oman, and also to some extent with the Kulli sites. But there appear to have been few contacts with the Makran coast. The coast in this region is mostly sandy waste with very few patches of cultivation and mostly without wells, and thus one does not expect sites on the Iranian Makran coast, except perhaps near Tiz in Chahbahar (Hansman 1973: 572–4).

Tosi (1974a) does not believe that Bampur actively participated in third millennium trade, as it was not well endowed with exploitable resources, or with easy outwaro routes of communication. However, de Cardi (1970) does not believe that it was really isolated and points out that a very small portion indeed of the large mound has been excavated (personal communication).

The Location of Magan

It is generally believed (Leemans 1960; Gelb 1970; Hansman 1973) that the land of Magan mentioned in Sumerian and Akkadian texts was the region of the mouth of the Gulf, namely Oman and south-east Iran and including, possibly, Makran. It is now possible to examine this theory in the light of evidence from the Yahya, Bampur and Umm an Nar cultures and their geographic setting.

Let us first summarise the Mesopotamian descriptions of Magan.

Boats of Magan are mentioned in the following texts:

1. An inscription of Sargon (UM XV: 4; Sollberger and Kupper 1971: IIA 1b)
2. Clay cones of Ur-Nammu from Diqdiqqeh[20] (U. 2520) (Sollberger and Kupper 1971: III A1 F)
3. The law 'code' of Ur-Nammu ('the Magan boat of ^{d}Nanna), 85–6 (Finkelstein 1968)
4. HAR.ra=*hubullu* IV
5. A vocabulary text 4338a, Col. V (Jaritz 1968: 213)
6. 'Enki and the World Order'
7. 'Gilgamesh and the Land of the Living' (Kramer 1970: 277)

Sargon claimed to have conquered Dilmun, Magan and Meluhha (CT. 13, 44). Naram Sin defeated Mani (um)[21] of Magan, as claimed on his statue A. Several stone vase fragments bear Naram Sin's inscription and are described as 'booty from Magan' (Thureau–Dangin 1907: 164–7; Weidner 1952: 17; MDP IV: 1).

The following materials are said to have come from Magan:

	Source
1. Timber	Gudea Cylinder A and statue D (Thureau–Dangin 1907: 104–7; 76–9)
2. ^{giš}há-lu-úb =*haluppu* wood	Hh III 216; Hh IV 112
3. ^{giš}miš.má kan. na =*musukannu* or *mesu* wood	Hh III
4. ^{giš}gišimmar =*makkanu*	Hh III
5. 'Magan reed'	UET III 859, 233, 1498, etc.
6. sum.sar.ma.gan^{ki} = 'Magan onion'?	UET III 751, etc.
7. Diorite NA$_4$.esi=*ušu*	Gudea statues (Statue A 3-Thureau–Dangin 1907: 66–77; 'Enki and Ninhursag' (ANET: 37 ff)
8. Stone vases	Inscriptions on them (Weidner 1952: 17)
9. Carnelian, semi-precious stones, often beads	'Enki and Ninhursag' (ANET: 37 ff)
10. Red ochre	UET III 951

[20] 'For ^{d}Nanna ... Ur-Nammu ... has re-established the former state of affairs: along the coast ... he rendered safe the maritime commerce. He reinstated for ^{d}Nanna the boats of Magan.'

[21] A variant reading of this name is given by Poebel (AS 14) as 'Mannu'.

11. Copper	ITT 2864 (Akkadian period) (de Genouillac 1910); UET III various; Hh XXII 23: 'the land of the yield of the mine'; KAV 183, Akkadian period geographical list: 'the land of mines' (Weidner 1952); *lipšur* (Reiner 1956)
12. Wooden objects	Hh. IV.
13. Ivory	UET III 751
14. Gold dust	Ur III text: brought by king of Magan (Legrain 1933: 119).
15. Goats	Two Ur III texts (Kang 1972: nos. 91, 94).

At least one Akkad period text refers to copper imports from Magan. The Ur III (UET III) commercial texts concerning consignments handed out by the temple to merchants for exchange in Magan indicate a brisk trade between Ur and Magan.

This and the numerous references to Magan boats indicate that Magan was a land of sailors and merchants. But none of the third millennium cultures of Iran known to us have a maritime distribution. Nor is it possible to say that the Umm an Nar culture is manifestly mercantile: it has no seals or weights, no beads or ivory. The only possible imports are ceramics from Mesopotamia or from southeast Iran. It may, however, be that we have yet to discover trading stations in the region of the mouth of the Gulf.

Let us briefly survey the products said to have come from Magan. Copper was the main export from Magan to Sumer. Magan is called a land of mines (as indicated above), which would mean that it was a producer and not a mere trans-shipper of copper. We may refer to the abundant copper mines in Oman and to the sources in southeast Iran, specified in previous sections.

The varieties of wood are problematic. The typical trees of Oman, the date palm, tamarisk and acacia, do not yield particularly fine wood. Wood is today imported by Oman for purposes such as ship building.

There is much controversy over the identification of *'haluppu'* wood. Economic texs (UET III 1498, etc.) indicate that its main use was for furniture (tables, chairs) and chariots, and Gudea used it in his buildings (ANET: 268–9).[22] But in the texts it is never a wood used for ship-building. It is not mentioned after the Larsa period and until the first millennium B.C. In connexion with the CAD

[22] Translated here as 'willow logs'.

identification (sub *haluppu*) with a species of oak we may point out that oak and juniper are to be found in southeast Iran and in parts of Oman today.

Mesu wood was used in Mesopotamia for making vehicles and furniture. A trilingual inscription of Darius mentions this wood, giving its old persian equivalent as *yakā*, and the Elamite as $^{\text{giš}}$*še-iš-ša-bu-ut*. Darius says this wood came from 'Gandara and Karmana'. In Kerman, the tree *Dalbergia sissoo* Roxb. is called *yax* or *jag*. If this name is a survival of the old Persian *yakā*, then yakā (=*mesu* wood), was *Dalbergia sissoo* (Gershevitch 1957).

'Magan reed' has been identified as bamboo, which grows in Makran.[23] The sum.sar.ma.gan^{ki} has been variously identified as 'onion' (Gelb 1970), 'garlic' and 'asafoetida'. The latter grows in the Kerman region and has for centuries been traded between India and the Gulf (Hansman 1973: 581–2).

The stone vases claimed as booty by Naram Sin are mainly of alabaster. There is no alabaster in Oman, but alabaster vases were manufactured at Shahr-i Sokhta. It is a pity that the inscribed vases are fragmentary, as a comparative typology would have provided clues to their source. Red ochre is plentiful on the island of Hormuz (Stein 1937: 188–92). The translation of na$_4$.esi as 'diorite' appears to be fairly certain (Leemans 1960:11 n. 5): this stone is available in Oman and in the mountain zone of Makran.

The acceptance by many scholars (Hansman 1973) of the etymological connexion between *Magan*, Old Persian *Maka*, and *Makran*, is further reason to believe in the possibility of parts of southern Iran and Makran having been designated as Magan.

It is also known that foodstuffs, mainly barley, were shipped in Ur III times from Ur to Magan (ITT II, 776, de Genouillac 1910: 1.25).[24] It is not hard to visualize the import of low-priced food into ancient Oman and Makran, considering their low potential for agriculture. Oman has even in recent times imported foodstuffs from overseas.

At least two of the items occurring as imports from Magan, namely carnelian and ivory, could not have originated in Iran or Oman. The explanation of their occurrence in the texts would then be that Magan only trans-shipped these materials, which originated further east, that is in India. Archaeological evidence, however, for

[23]Charred pieces of bamboo were found at Harappa (Vats 1940: 467–8).

[24]Wool and textiles were also sent to Magan (UET III: 1511, 1666, 1689).

links between India and the Iranian and Omani sites is so scanty that even this cannot be proved.

Despite the weaknesses in our identification of Magan, we may make a final point regarding the common stylistic horizon in ceramic production covering a wide region: the Umm an Nar, Yahya, Bampur and Shahr-i Sokhta cultures. It does appear that this whole region can be included in one cultural-geographic unit, however vague, which was known to the Sumerians and Babylonians by the name of Magan. To what exent Shahr-i Sokhta was part of Magan, however, we cannot say. Shahr-i Sokhta was an exporter of lapis lazuli, as we have shown. Yet textual references mention lapis from Dilmun, Meluhha and Aratta, but never from Magan.

Finally, we may mention occasional references to individuals in Ur III texts as lu.ma.gan, which may be translated 'Mr Magan'[25] or 'the man of Magan' (Fish 1938: 173; Hackman 1937: no. 340).

Thus Magan appears to have covered the Oman, southeast Iran and Makran regions, and to have been a trade partner of Sumer.

The Kulli Culture

Of all the cultures discussed in this study, the Kulli is perhaps the most enigmatic, mainly because of the lack of large-scale excavations at the sites.

Geographically, the Kulli people were the nearest westerly neighbours of the Harappans. The distribution of the Kulli culture is as follows: in the Kej Valley (Makran) are the sites Shahi Tump and Fort Miri. In Kolwa (Jhalawan) are Kulli, Siah Damb of Jhau, Siah Damb of Nundwara and Adasta Damb. In the southern Mashkai valley are Mehi and Mazena Damb. In northern Las Bela the sites of Niai Buthi and Edith Shahr occur, with Nindowari further north in the Ornach Valley in Jhalawan. In the Rakshan Valley in northern Makran have been located Surain Damb, Ander Damb, Zayak and a cluster of sites around the Panjgur oasis. In Kharan are Zayak and Toji, the northernmost Kulli site (Stein 1931; *Pak. Arch.* 1964: 32–3; Casal 1966; Field 1959: 184 ff).

Excluding the last-mentioned site, all the Kulli settlements are distributed along the major avenues of communication of Makran. In Makran, which has been called a 'land of passage', physiography

[25] Similar to present-day names like 'Mr French' or 'Mr Holland'.

dictates that the routes lie east–west or southwest–northeast. In coastal Makran environmental conditions are so harsh that sustained caravan traffic is not feasible (Stein 1943: 201–7)[26], but conditions are somewhat better in the Kej-Dasht and Rakhshan Valleys.

The Kej Valley is the main east–west route, a continuation of the Bampur Valley route and linked to it by the Sarbaz Valley. The Kolwa basin forms the natural eastward extension of the Kej Valley and in turn leads either to the Mashkai Valley in the northeast, and thus to the hills of Kalat, or to northern Las Bela in the east over the fertile Nal Valley and the Jhau pass, a two-day caravan journey (Stein 1931: 9–10; 1943: 207–12; Fairservis 1971: 188). Bela has traditionally seen much caravan traffic between Makran and Kalat.

From Bela it is about 160 km east to the Indus. The route follows the river Hab to Lake Manchhar or goes south from Las Bela towards Sonmiani bay and then follows the Indus upstream.

Routes between Kulli territory and the Makran coast follow the Dasht river to Gwadar (Stein 1931: 7–11), or the Hingol river to Ormara or Hinglaj (Stein 1943: 207–12), or else the Shadi Kaur from the Kej Valley to Pasni (Dales 1962: 86).

All the Kulli terrain is lower than 700 m in altitude (Dales 1964: 270–2). Rainfall here is scarce, torrential and unreliable. Population densities today are extremely low: under ten persons per square mile in Makran, Kharan and Chagai (Kureshy 1977: 74). The presence of the Kej and Panjgur oases makes possible the establishment of permanent villages based on irrigation agriculture, with emphasis on date cultivation, and the Kej valley is the 'economic backbone' of Makran (Stein 1931: 7–10). But everywhere in Makran it is pastoralism which is the chief subsistence activity, giving rise to nomadism and transhumance (Field 1959: 68; *Gaz. Makran:* 184–6). In less-favoured areas of Makran small hamlets and semi-nomadic groups subsist on limited cultivation of sorghum and wheat, for which bunds are built to capture rain water (Pastner and Pastner 1972: 128–9). In Kolwa dry farming is possible and barley is exported in good years, but because of the unreliable rainfall there are few permanent settlements (Stein 1931: 9). Northern Las Bela or Welpat is exceptionally fertile terrain and has the greatest agricultural production and incidence of permanent sedentism in Baluchistan.

[26]The difficulties encountered here by Alexander's army are well known.

In all Kulli territory except Las Bela we can assume that pastoralism was the preponderant activity. Even until recently about half the Makrani population has been 'nomadic'. In addition to pastoralism, the Makranis have been traditionally 'engaged in the transport business to supplement their means of livelihood, which is otherwise scanty and precarious.' The herdsmen travel to the Kej and Panjgur oases in summer, and to the pastures springing up after rains in winter in areas such as Kolwa.

In size, Kulli sites vary considerably. The average site would be about 350 yards square (Piggott 1950: 99) or 25 acres. But Nindowari is 1200 x 600 yards (Casal 1966: 12) or approximately 140 acres, and the stone complexes at Edith Shahr extend to about twelve kilometres along the Porali (*Pak. Arch.* 1964: 33). Stone architecture characterizes all the known Kulli sites, at some of which (for example, Kulli) stone boulders are not locally available (Stein 1931: 118 ff). At the two largest sites, Edith Shahr and Nindowari, there is evidence for stone terraces and platforms (Casal 1966: 12 ff; Fairservis 1971: 195 ff) and at Kulli and Nindowari it is possible that there were granaries (Casal 1966: 15–16; Fairservis 1971: 207–8). Moreover, Nindowari (Casal 1966: 16), Toji and Mazena Damb (Stein 1931: 21–5, 148) and probably Edith Shahr (Fairservis 1971: 199, pl. 18) were fortified.

This stone architecture with fortifications and presumably public buildings, is hard to explain if, on a present-day analogy, we consider the Kulli to have been simple pastoralists, constantly on the move.[27] Today in Makran and southern Baluchistan mud, mud-brick and matting are the house-building materials, not stone, even in the case of forts built at the oases. Moreover, especially in cases where the stone was not available locally, such architecture speaks for a certain amount of mobilization of labour. How such conditions arose in a region where human life is strictly circumscribed by natural conditions, is hard to explain. And finally, even more enigmatic is the fact that certain Kulli sites do not appear to have been ordinary habitation sites at all (Meadow 1973: 200).

It therefore appears that the Kulli people were not only simple pastoralists, but enjoyed a certain degree of economic complexity and prosperity. According to Dales (1968: 17), the Kullis were merchant middlemen: 'There are some tantalising indications that

[27] As, indeed, the profusion of clay bull and female figurines as the main non-ceramic artefacts at all Kulli sites seem to indicate.

middlemen were involved between the Mesopotamians and the Harappans. They may have been enterprising merchants of the so-called Kulli Culture.'

In order to examine this statement it is first necessary to survey the evidence for external contacts of the Kulli culture. In the first place, we should note the great similarity of pottery forms between the Harappan and Kulli cultures.[28] These parallels include painted designs as well as shapes, and Harappan pottery is often intrusive at the Kulli sites. The clay figurines of the Kulli culture also have Harappan parallels as regards ornaments and hair-style. 'The cummulative effect of these parallels . . . is impressive; it at least must mean that the Harappan folk had mercantile relations with the Kulli people to a degree unshared by any other of the provincial cultures . . . ' (Piggott 1946: 16).

Terracotta wheel and cart models have been found at Mehi and Shahi Tump, and terracotta bird whistles of Harappan type have been reported by Piggott from Mehi. A cubical chert weight occurs at Mehi as well, and two Harappan seals have been found in the granary (B) area of Nindowari (Casal 1966: 15–16).

Among miscellaneous 'exotic' elements at Kulli sites the more important are lapis lazuli beads at Kulli and Mehi, and steatite vessels or greyware imitations at Mehi (Stein 1931: pl. XXVIII 1.6.4) and Shahi Tump (Fairservis 1971: 193). Details regarding the latter will be discussed in Chapter II, where it is suggested that some steatite vessel manufacture may have taken place at Kulli sites. A copper mirror from the Mehi cemetery has a handle in the shape of a human figure as at Barbar (Nagaraja Rao 1969), but in the Mehi example the figure is female and the head lies at the upper end of the handle. Copper pins with lapis bead heads at Mehi are paralleled by examples from the Kish 'A' cemetery (Mackay 1925b: 77) and graves at Khafaje (OIC 13: 111).

Squat canisters painted with animal designs often including caprid motifs (Piggott 1950: 103 fig. 6) recall those of Umm an Nar (Bibby 1970; Frifelt 1975: fig. 11), Shahr-i Sokhta IV (Lamberg-Karlovsky 1973: fig. 64) and Bampur V–VI (de Cardi 1970: 268, fig. 43). But the profiles of the canisters are somewhat different, the Kulli examples being concave-sided below the shoulder, the others convex. de Cardi believes that at Umm an Nar and Bampur the

[28] The details which follow are based on Piggott (1950: 99–120); 1946: 13–25) except where other references are given.

canisters are, initially at least, imports (de Cardi 1970: 268).

The elongated humped bull motif on a large jar from Cairn V, Umm an Nar (Thorvildsen 1962: 218–9), may be considered a Kulli parallel. de Cardi (1970: 268) notes that 'the resemblance, however, ends with the animal itself as the ancillary design has no parallels in Kulli ware.'

It is possible to explain these external contacts in one of four different ways. The first, following Dales, that the Kullis were merchant middlemen; the second, that they were instrumental in the transport of goods because of their nomadic/transhumant way of life; third, that the Kulli territory merely happened to lie astride a major land route between the Indus valley and southeast Iran; and fourth, that the Kulli area was periodically visited by 'foreigners' seeking raw materials or merchandise.

The first explanation, namely, that the Kullis were merchants, seems implausible, because so far we have found no Kulli seals or weighing system, and because objects of Kulli origin found elsewhere are few and confined to ceramics. The Harappan pottery, bird whistles and cart models could hardly have been objects of trade, much less the seals and weights, which are objects used in the business of trade rather than traded objects. Moreover, if the Kulli people were middlemen, to whom did they carry the Harappan merchandise? There is little evidence for Harappan contacts at Bampur or Yahya or Shahr-i Sokhta.

Another factor which makes the 'merchant middlemen' hypothesis unlikely is the environment of Makran. Although the Kulli sites appear to be dispersed over the major routes of Makran which in general lie in the east–west direction, we have ample evidence of long-ranging east–west communications by sea. Can we say that the Makran land route offered a viable alternative to the sea route? This would not be likely where long-distance transport (such as between the Mesopotamian plains and Sind) is concerned. We have shown that water and food resources are scarce in Makran and that the climate is extremely taxing. As the terrain is rugged, cart transport is out of the question and merchandise would have had, as today, to be transported on donkeys or camels (Field 1959: 40). Fodder for animal caravans would be difficult to obtain in Makran. In this case, therefore, it appears that sea transport would have been quicker and cheaper than overland transport.

We cannot, however, rule out land communications altogether. Of all the extraneous elements manifest at Kulli sites it is the Harappan which are the most numerous. It is thus possible that to a certain extent goods and people moved westward from the Indus over Kulli teritory to the ports of Makran (rather than towards southeast Iran). It is also interesting that the Harappan Makran ports were fortified. They would have been fortified against dangers from the sea or from the hinterland. If we rule out the possibility of the dangers of sea piracy, then it would appear that the people of Makran or Iranian Baluchistan afforded some kind of mercantile competition to the Harappans on the coast.[29]

If, on the basis of the nature of external contacts and Makran geography, we rule out the possibility of major mercantile involvement by Kullis or crisscrossing of Makran by overland merchant caravans from elsewhere, we have to ask whether the pastoral activities of the Kullis gave them a degree of mobility which afforded them the opportunity to engage in some kind of transport work between Sutkagen-dor or Sotka-koh in the west and Sind in the east. If so, we can understand how Harappan pot designs, cart models and toys found their way to Kulli sites; how the Kullis were able to procure lapis lazuli (from Sind?) or steatite containers (from the Makran ports or from Bampur); and also how their pottery found its way (probably again via the Makran ports) to Umm an Nar.

Finally, it is not impossible that Harappan merchants made repeated journeys westward to procure valuable metals. In Las Bela, for example, 'in the hills between Liari and Bela copper is found in large quantities' (*Gaz. Las Bela*: 118–19). Copper is found in the Ras Koh mountains also (Brown and Dey 1955: 146–54). This would explain the Harappan trinkets as well as the weight and seals at Kulli sites: 'The connexions with Harappa are no more than could be provided by the visits of caravans and the occasional sojourn of merchants (in the town of Mehi)' (Piggott 1950: 116). This hypothesis is further strengthened when we consider that certain categories of Harappan–Mesopotamian trade items—for example ivory, carnelian beads, and silver—did not touch the Kulli sites.

For the time being it is therefore suggested that the major long-distance routes for the greater part avoided the Kulli region, but

[29]It is not impossible, however, that the fortifications were erected simply against periodic raids carried out by the Kullis during times of hardship.

that a certain amount of Kulli–Harappan interaction could have been caused by geographical proximity, the availability of certain raw materials in Kulli territory, or the occasional land transport undertaken by Kulli or Harappan caravans between the Makran coast and Sind.

The Harappan Ports of Pakistani Makran

A few sites of typical Harappan character have been found on the generally barren Makran coast. The most westerly of these, Sutkagen-dor, is about 650 kilometres west of the lower Indus as the crow flies, and yet is almost totally Harappan in material culture, with few Bampur or Kulli traits.

The Makran waters are clear of many dangers which prevail in the Indian seas. The coast, being indented with bays and peninsulae, offers many sheltered anchorages for boats: Sonmiani bay, Hinglaj, Ormara, Astola Island, Pasni and Gwadar bays, and Tiz. Of the rivers which debouch into the sea along this coast, the majority carry sufficient water for boats directly after the rains, though not at other times (Pilot: 7–8; 157–74).

Coastal Makran itself is 'chiefly an uninhabited desert, presenting a wilderness of hills and cliffs, with either swampy or arid clay plains. Water is everywhere bad and difficult to get and but few supplies are obtainable at the villages' (Pilot: 157). Rainfall is less than 170 mm per annum. Thus agriculture is possible only in a few places: the Dashtiari plains and the Kulanch and Pasni regions. Dates are the main subsistence item, followed by wheat and barley. There are no perennial wells, only a few springs, and agriculture depends on the rains which fail every three or four years. Fishing is an important subsistence activity, the fish being not only consumed on the coast but also fed to livestock and traded inland for dates, whereas bread is a luxury (*Gaz. Makran* 1907; Stein 1931: 7–10; Lorimer 1915: II B: 1130 ff; Harrison 1941: 3–4).

Throughout history Makran has seen a fair amount of east–west land movement, fish, dates, palm leaves, cotton and animal products being carried on pack animals (*Gaz. Makran* 1907: 224–8). But north–south movement from the coast to the hinterland is restricted, by the east–west alignment of hill ranges and river valleys, to a few routes: (1) Starting in Persian Makran, Minab and Bandar Abbas have easy means of communication with the interior as mentioned before. (2) From Tiz in Chahbahar bay it is an easy five-day journey to the Kej valley (Holdich 1910: 298 ff) or from Tiz one can go to Qasrqand and thence Bampur. A shorter route goes straight up to Bampur via Nikshahr (Stein 1937: 70–103). Tiz was the major port and commercial centre of medieval Makran, feeding the capital at Fannazbur (Panjgur). Today only a small village of palm huts, it had formerly a large heterogeneous population, great warehouses and a fine harbour (le Strange 1905: 329–30). This importance Tiz owed to its good natural harbour and its situation away from the reach of monsoon winds. Thus Hansman (1973: 572–4) suggests that a third-millennium site may one day be found in the vicinity of Tiz. (3) Further east, the Dasht river provides easy access to the important Kej valley. In the Dasht valley lies the site of Sutkagen-dor (Stein 1931: 61 ff; Dales 1962). There are numerous harbours and fishing villages on this part of the coast (Pilot: 170–4). About a kilometre to the west of Sutkagen-dor lies a smaller Harappan site (*Pak Arch*. 1964: 36–7). (4) From Pasni one can follow the Shadi Kaur to the Kej, and near Pasni is the Harappan site of Sotka-koh (Dales 1962: 86–7). (5) From Ormara a route follows the Hingol to Jhau, whence one can, in three or four marches, reach Bela. This route sees regular caravan traffic (Stein 1943: 207–12). (6) Finally, from Sonmiani bay routes lead into the Las Bela plain. On the eastern shores of this bay, on an old course of the Windar and twelve km inland, is a small Harappan site, Balakot, situated in an area which is today intensively cultivated with the aid of irrigation water from deep wells (Dales 1974). Khaira Kot is also a possible Harappan site in the Sonmiani region, some twenty-five kilometres inland (Snead 1967: 560).

While it is thus clear that the Harappan sites of Makran are located in the vicinity of anchorages and routes into the interior, their exact function is still elusive. The settlement at Sutkagen-dor (Stein 1931: 61 ff; Dales 1962) appears to have been typically Harappan, with a fortified citadel and adjacent residential area, and typical Harappan pottery. In the earliest level a micaceous ware occurs which is not to be found in later levels. Dales believes that this and the Harappan ware could have been actual imports from Sind. (It is interesting that a few sherds of micaceous Harappan ware have recently been found at a third millennium site in eastern Oman).

Sotka-koh (Dales 1962: 91), like Sutkagen-dor, is situated on top of a natural rocky elevation. Here Baluchi type pottery (namely basket-marked ware) occurs.

Balakot (Dales 1974) is a much smaller site, but with the twin-mound settlement. The lowest levels here are pre-Harappan, followed by a period of abandonment, after which the Harappans occupied the site. In the early levels ceramic links with the Nal culture are evident.

The Harappan sites are situated not on the actual present-day sea shore, but at substantial distances inland: Sutkagen-dor at a distance of forty-eight kilometres, Sotka-koh twelve, and Balakot nine kilometres. But geological studies have proved that in their day Sutkagen-dor and Balakot were likely to have been situated much closer to the sea, as the coastline ran further north. Mockler (1877: 126) quotes a local tradition that the sea once lay close to Sutkagen-dor, which had a *bundur* and a fleet of boats. Ullah (1954: 28–37) has pointed out the existence of five distinct levels of raised gravel platforms, and the abrupt rise of the coastal plain from the sea bed between Pasni and Jiwani. Snead (1967: 550–7) has reported oyster shells and unweathered barnacles in places nine to twelve metres above the present sea level in the southern Haro hills.

It is now accepted that tectonic uplift, sea level recession and river sedimentation have all contributed to very rapid and extensive morphological changes on this coast in recent times.

The problem concerning the fortifications of Sutkagen-dor and Sotka-koh and their possible relationship with settlements in the hinterland has been discussed before. Although appreciable Kulli–Indus valley contacts are evident, the Makrani Harappan sites have produced no Kulli elements. There are, however, a few Bampur contacts which may indicate the occurrence of sporadic encounters between the Bampur people and the Harappans of Makran. Bampur V type dark burnished-grey sherds and two black-on-grey sherds were found by Stein in a stone structure to the southwest of the citadel at Sutkagen-dor (de Cardi 1970: 267). It may then be, judging from the paucity of interaction with the hinterland, that the Harappan ports were fortified because they were established in alien—perhaps politically hostile—territory.

While it is clear that it must be the ocean trade-route which explains the existence of the Makrani Harappan sites, we have no evidence here for trade mechanisms (seals, weights) or traded goods. Neither do we have any explanation for the location of fortified ports at such a great distance from the Harappan heartland. We would suggest that they were established here so as to be away from the reach of the treacherous southwest monsoon winds and currents (this idea is taken up in Chapter IV). Here it may be pointed out that even today the principal ports of Makran are Pasni, Gwadar, and Jiwanri (all situated on large sheltered bays) and it is in the close vicinity of these that the Harappan sites are located.

The Harappa Civilization

The northwestern corner of the Indian subcontinent, comprising the Northwest Frontier Province, Western Punjab, Sind, Baluchistan and Rajasthan up to the Aravallis, forms the eastern limits of the arid and semi-arid belt which stretches across southwest Asia. It therefore shares certain geographical characteristics with western Asia, whereas in other aspects it is a zone transitional to, and on the western borders of, monsoon India.

The major factor involved in this categorization is the incidence and nature of rainfall. In western Asia, we have shown, rainfall is restricted to the winter months (November to April). During these months a high-pressure jet stream enters northwestern India from western Asia, one branch of it following the southern flank of the northern mountain ranges. Beneath this jet stream are low-pressure troughs or waves which bring a small amount of winter rainfall. This winter low-pressure belt does not persist eastward beyond the upper Ganga valley. In the summer months northwestern India is relatively dry because of the thinness of the flow of the monsoon belt on its western flanks, and the presence of an overlayer or 'lid' of warm anticyclonic air which limits the uplift of surface air and thus minimises precipitation (Johnson 1969: 1–19).

Thus in the northwestern part of the subcontinent there is both winter rainfall as well as a weak summer monsoon with some overlap. In general it may be said that Kashmir, northern Punjab and the Kirthars and Suleimans have an appreciable proportion of winter rainfall whereas Sind and Rajasthan belong to the 'weak monsoon' zone. Lahore and southern Punjab may be said to fall within the transitional area where monsoon and winter rainfall are both appreciable. Significantly, the Harappan nuclear zone (defined subsequently) appears to lie in the weak monsoon and transitional areas, all within the 200 mm isohyet. Variability of rainfall is on the whole higher in the latter areas than it is in those which receive more than half their annual precipitation in winter (Kureshy 1977: 39).

Like the lower Tigris–Euphrates valley, the lower Indus valley is also part of an arid zone receiving low and erratically distributed rainfall, but owing its agricultural potential to large rivers which receive their major water supply from wetter, more distant, regions. Like the ancient Mesopotamians, the Harappans appear to have based their agriculture on winter crops, namely wheat and barley[30], although on the whole they did not enjoy the benefits of plentiful winter rainfall. Thus there were necessarily significant differences in the agricultural techniques of the two civilizations.

Wheat and barley are generally sown in the months of October and November, and harvested in March–April. In Mesopotamia this means that the growing months coincide with the rainfall months. Moreover, rainfall and the melting of Armenian snows cause the rivers to begin to rise in December and reach their peak in April and May. This means that whilst crops are standing in the fields, there is danger of their becoming flooded. Thus, in very simplistic terms, irrigation in Mesopotamia would involve the supplementing of meagre rainfall with river water and the containing of river floods to protect the crops (Fisher 1971: 362 etc.).

In the Indus valley (especially Sind), on the other hand, wheat and barley are sown after the monsoon rains (July–August) are over, and harvested before the rivers begin to rise in April (reaching their peak in August and September). In fact the river waters are at their lowest from January to March, that is, during a large part of the growing season.

The problems of irrigation for rabi crops here would appear to concern the distribution of water from rivers when they are at their lowest, in order to supplement the meagre rainfall. This means, for one thing, that only fields closest to the river banks could be assured of irrigation water [and sometimes in winter it is difficult to maintain the flow of even the lowest channels (Johnson 1971: 94)], unless a system of permanent headworks were maintained, a very costly business in the Indus valley (Leshnik 1973: 79). Thus seasonal irrigation appears to have been the only possible recourse for Harappan agriculture (Johnson 1971: 94–5; Leshnik 1973: 72–80).

[30]Cotton and sesame, kharif crops, were also grown.

The implications of this are many. From present-day practices it is seen that areas submerged by floods can be sown once the waters have receded. The new alluvium of such areas is exceedingly fertile. It is also possible that small natural branches, leading off the river during inundations, can be cut off from the main stream when the waters subside, to form oxbow lakes. This water can then be lifted (perhaps by means of the *shaduf* which according to Marshall [1931: 389] is depicted on a Mohenjo-daro seal [see also Srinivasan 1970: 384–5]) to irrigate adjoining tracts. Furthermore, small artificial channels could be created to carry flood waters to selected areas, irrigation again involving the lifting of water (Leshnik 1973: 73–4). This inundation, however, has to be supplemented by well irrigation: the Indus alluvium lies over a vast aquifer which absorbs water from numerous sources and lies remarkably close to ground level (Spate 1972: fig. 17.5 B). In fact 'we must always conceive the land–water relationships in the Indus Basin in the vertical as well as in the horizontal dimension' (Michel 1967: 31).

This technique of irrigation, of course, can only be used for tracts which lie close to the river, on or near the meander flood-plains. This is significant in any consideration of the extent and distribution of Harappan settlements in the Indus valley. It is also clear that agriculture in this zone would be extensive rather than intensive; in most parts of Sind, before the days of the irrigation projects, with the small incidence of ploughing or manuring, usually no more than one crop could be produced annually and land had to be left fallow periodically (T. Postans 1843: 87–90). Canal irrigation, if any, was severely limited in Harappan times (Possehl 1967: 32–3; Leshnik 1973)—thus there were no demands for vigilance in the clearing and cleaning of canals and the maintenance of bunds here, as in Mesopotamia. Leshnik (1973: 80) has pointed out the implications of this for the availability of a labour force during the summer months in Harappan society.[31] It should also be noted that in contrast to the lower Mesopotamian plains where a large number of minor streams and channels bifurcate from the two rivers, in the greater Indus valley the new alluvium is confined to the banks of the major rivers. What this means in terms of the comparative productive capacities, settlement patterns, trading potential, and growth of the two bronze age civilizations, has yet to be explored in detail.

[31]It has generally been accepted that there is no evidence that in the 3rd millennium B.C. the lower Indus plains received more rainfall than they do today. In brief,

The Location of Harappan Sites

What follows is not a comprehensive analysis of Harappan settlement patterns, but a general survey of the relation of sites to the landscape. Let us first consider the 'Greater Indus valley': Harappan settlements have been found along the lower Indus, on the minor rivers of Sind west of the Indus, near Lake Manchhar, in the Kachhi plain, in southwestern Punjab, in Bahawalpur and the middle and upper reaches of the Sarasvati valley. A few settlements have also been found in the regions peripheral to this zone. Without going into the question of the Harappan genesis, it would appear that the known concentrations of Harappan sites point to Sind and Bahawalpur as the nuclear regions.

Mohenjo-daro is located in Larkhana, the richest agricultural district of Sind before the days of modern irrigation. According to Wheeler (1968: 26) its ruins exceed three miles in circuit, which would make Mohenjo-daro almost 500 acres in area. Except for Harappa and a couple of explored sites in Bahawalpur, the other settlements in the greater Indus valley are very much smaller.

The Harappan sites of lower Sind are mainly located on the west bank of the Indus, whereas today it is the doab between the Indus and the Eastern Nara which sees more agriculture (Spate and Learmonth 1972: 504–13). Only a few Harappan sites are known in this doab: Naru Waro Dharo, apparently not a permanent habitation, Kot Diji, Chanhu-daro and Garho Bhiro, the latter being

even today there are sufficient supplies of low-grade firewood to bake 'billions of bricks' (Lambrick 1964: 72–5), so that the use of baked bricks is no indication of wetter conditions. The drains and channels of the cities were built to carry away sewage, not rain water (Raikes and Dyson 1961: 265–81). Many animal species depicted on the seals are admittedly not to be seen today in Sind and Punjab. But this surely is an almost universal occurrence, and the culprit is man alone. Deforestation, unrestricted grazing, unlimited hunting, can indeed cause great deterioration, as is only too well known in these days of environmental consciousness. In any case tigers and jackals have been reported in Sind in British times, and the rhinoceros as late as 1933 A.D. (The only problematic species is the elephant). Recently however, the problem of climatic change has been re-opened and G. Singh (1971) has found evidence from pollen analysis to suggest wet conditions in western Rajasthan between *c.* 3000 and 1800 B.C., after which 'a small-scale oscillation to drier conditions between *c.* 1800 B.C. and 1500 B.C. followed.' The rainfall may in the peak period have exceeded the present by as much as 50 cm. p.a. However, much more extensive studies and datings yet require to be done before such a hypothesis becomes acceptable for Sind or southwestern Punjab.

almost equidistant between Desalpar in the south and Chanhu-daro in the north (Mughal 1972: 134).

If Mackay's interpretation of Chanhu-daro as a manufacturing town populated chiefly by artisans is correct (Mackay 1943: 38 ff), then its location is of interest. The chief industries here were bead-making, copper/bronze working, and seal and weights manufacture. The materials for these industries comprised chiefly copper, steatite, and agate and carnelian. The heating of carnelian nodules[32], the glazing of steatite, copper casting, and the 'etching' of carnelian beads would all require heat processes and large fuel inputs. Thus these industries were mainly of the 'weight-losing' type where the final product was of less weight and volume than the raw material and fuel inputs. It is significant then that Chanhu-daro is equidistant from Mohenjo-daro (perhaps the final destination of the manufactured articles), the Kirthar mountains (whence convenient passes led to the sources of copper and perhaps wood), the Hab valley (a source of carnelian), and Garho Bhiro on the edge of the sand desert (perhaps a caravan halt on the route to Kutch, and thence to the sources of copper, steatite and carnelian).

At the latitude of Amri lie the southern limits of the cultivated alluvium. Amri lies at a very low elevation and is today subject to frequent river floods. In fact agriculture here is heavily dependent on the capture of flood waters, and is unreliable. Pastoralism is thus an important subsistence activity (Casal 1964: 15–16). This, then, is a transitional area to southernmost Sind where cultivation depends on the *kach* system. On minor rivers such as the Malir and the perennial Hab west of the Indus, are a number of small Harappan sites and in the west of the Las Bela valley is Khaira Kot (Snead 1967: 500).

Many Harappan and pre-Harappan sites are located in the vicinity of Lake Manchhar and the Western Nara, Baran and Bandhni rivers. The lake received flood streams from the right bank of the Indus as well as rivers from the western hills, thus expanding greatly in season, and then affording much soil for rabi cultivation when flood waters receded (Lambrick 1964: 82). Moreover, marshes and dense vegetation in the lake area offer many opportunities for

[32]Mackay (1943: 214) notes that unworked carnelian pieces were of a yellowish colour whereas finished beads were all of a deep red. This indicates that the carnelian was heated at the site to derive a satisfactory colour.

hunting and fishing (N. Majumdar 1934: 60–5; Spate and Learmonth 1972: 507).

To the northwest of Sind, the Kachhi plain, built up by alluvium brought down from the Kirthars and Suleimans, is less attractive territory and sparsely populated. The torrential water courses are the only source of water, which has to be carefully harnessed for agriculture by means of stone dams and diversions. The soil, especially in the Pat around Sibi, supports little vegetation. On this plain there are at least two fairly large Harappan sites: Judeirjo-daro on the Indus–Jacobabad–Bolan pass route (*Pak. Arch.* 1964: 11–12), and Pathiani Kot further west, at the foot of the Mula pass (Fairservis 1971: 172). Perhaps the *raison d'être* for these sites was not suitability for agriculture or husbandry, but the maintenance of communications with Baluchistan.

Our knowledge of the Harappan settlement of southwestern Punjab is very limited. So far, only three mature Harappan sites are known on the lower Ravi–Sutlej doab: Harappa, Chak Purbane Syal (ARASI 1930–4: 106 ff) and Vainiwal (*Pak Arch.* 1967: 6). We would expect many more settlements to have existed in this locality to justify a centre as large as Harappa, but they have not yet been found. In the concluding chapter we shall discuss this peculiar phenomenon suggesting tentatively that Harappa was less a 'central place' surrounded by a developing agrarian hinterland than a 'gateway city'. Except for the Gomal valley settlements, there are no known sites in the Sind Sagar doab–Derajat (Sulaimans piedmont) region. This is not surprising considering the greater aridity and hard soils of the region. The doabs of the Five Rivers in south Punjab contain a great mass of alluvium and are environmentally similar to Sind in many respects. However, southwest Punjab represents the intermediary stage in the cycle of the rivers, when they are still downcutting, unlike the aggrading Indus in Sind. The repercussions on ancient irrigation practices would have been significant. Moreover, the actual meander valleys are separated by tongues of high land, which unwatered are suitable only for grazing, and have no sedentary village communities (Bharadwaj 1961: 157). This zone of southern Punjab can be very productive, but only with the highest human effort and community organization. In discussing the location of Harappa we must also take into account the navigability (downstream and upstream) of the rivers; the importance of routes from Afghanistan to Dera Ismail Khan (a caravan stage where traders have traditionally deposited their baggage and families before proceeding further into India); and the commercial and religious importance of Multan especially in medieval times as a break-of-bulk centre for goods from Afghanistan, the commercial key to the middle Indus, and a centre of pilgrimage for Sindhis (Andrew 1857: 147–60).

The Cholistan desert of Bahawalpur, on the westerly margins of the Thar desert, is an arid strip of land about eighty kilometres wide and four hundred and fifty kilometres long, stretching southwest to northeast, and formerly watered by the lowest reaches of the Ghaggar. With the river bed now being dry and the subsoil water brackish, human settlement is dispersed and pastoralism is the chief occupation. Agriculture is possible in very limited areas along the dry river beds (Field 1959: 144–9, 175–7; Mughal 1978). South of the Sutlej and along the dry Ghaggar in Pakistan, Mughal (1978) reports the remains of more than a hundred Harappan sites.

Further up the Ghaggar, and in fact along the entire Ghaggar system (comprising the Sarasvati, Ghaggar and Drsadvati) and eastward upto the former bed of the Jumna, Harappan dominance was established at about nine sites over a pre-existing local culture, known as the 'Siswal' or Sothi culture. At Kalibangan, Mitathal, Banawali and Rakhi Garhi, Harappan settlements took the characteristic citadel-and-lower-city form (Bhan 1973; Lal and Thapar 1966: 78–88; IAR 1968–9: 8–9). Rakhi Garhi (Bhan 1975: 95–101), more or less centrally located in the divide, is perhaps the largest Harappan site in India.

The Ghaggar valley forms the southern part of the Indo-Gangetic divide, and in its lower course the northern limits of the Thar desert. Rainfall is 70 to 250 mm a year. The rivers of the Ghaggar system are solely rain fed and run dry each year. The water table is usually too deep to make well irrigation possible, and the inhabitants are mainly pastoralists (Spate and Learmonth 1972: 534–41; Pithawala 1952: 144–5). How, then, do we explain the dense prehistoric population? The soil of the valley is loamy and water-retentive, so that only a little water is required to make agriculture highly successful (Pithawala 1952: 144–5; Spate and Learmonth 1972: 616; Mughal 1970: 30–1). Moreover, the old Ghaggar bed below Hanumangarh is very wide, and some of the larger sites are located in this zone. This means that the rivers must have carried more water in Harappan times than they do today. The contrast between present and past densities of population in the valley may, therefore, be explained as caused by a major reduction in water supplies. This in turn may have been caused by the extensive deforestation which has been observed in the Siwaliks and by the diversion to the Yamuna system of certain snow-fed rivers which had fed the Ghaggar system in the third millennium (Spate and Learmonth 1972: 534 ff). The diversion of streams from the Indus to the Ganga system and vice versa is no unusual occurrence as the drainage divide between the two systems is of very low elevation, almost imperceptible (Michel 1967: 27–8). Another factor contributing to the increasing aridity of the Ghaggar valley may be the northward expansion of the Thar desert (Spate and Learmonth 1972: 538).

Surveys have shown that the Harappan civilization had spread upto the Ganga–Yamuna plains. The upper portions of these two doabs (where the Harappan sites are located) form a region not really distinct from the Indus valley, but transitional to the Ganga valley. Climatically the region stands midway between the aridity of the former and the moist conditions of the latter. Eastward from Sind there is a general gradual increase in monsoon rainfall, from less than 250 mm in Sind to about 750 mm in parts of the doab.

In the upper Indus valley the incidence of winter rainfall is appreciable, in the middle Ganga plain it is almost nil, whereas in the upper reaches of the two doabs it is still useful for agriculture: in Saharanpur and Meerut districts winter crops form sixty per cent of the annual produce (R. Singh 1971: 124, 131 ff). Meerut, the easternmost district for winter farming, is also the known eastern limit of the Harappa culture. The sites on these doabs are found in districts Jullundur, Ludhiana, Ambala, Saharanpur, Meerut and Bulandshahr. They are on the whole late in date, perhaps following on after the end of Mohenjo-daro and Harappa, and except for Rupar are comparatively unimportant in the matter of overseas trade.

The entire area so far described, with its lack of sharp physiographic or climatic divisions, may be termed the Greater Indus valley. On the whole it lacks mineral resources except for copper at Motaka on the Sarasvati (Gordon 1950: 62), limestone at Sukkur and Rohri, and carnelian in the gravels of the River Hab. In immediately neighbouring localities, however, the situation was different. In northeastern Punjab, there are many forests and timber resources. Before deforestation excellent forests flourished on the Siwaliks and their foothills, comprising fir, deodar and pine as well as sal, oak, shisham, maple and walnut. *Cedrus deodora* has been the principally used timber in the Punjab, and large quantities of timber have been transported down the Ravi, Chenab and Jhelum rivers. It is not yet known whether the scattered deposits of lead, copper and antimony on the Siwaliks were utilized by the Harappans, but it is surely significant that their settlements at Manda and Rupar are located on those points of the Chenab and Sutlej respectively where these rivers become navigable.

To the west, the Kirthars have a very thin vegetation cover and we cannot suggest this region as a source of fine timber, although it is of course possible that formerly thicker forests existed. Copper and lead are available in appreciable quantities in the Baluchi hills, as for example in the Khwaja Amran and Ras Koh ranges, in Zhob district, and in Las Bela. Limestone is available in Loralai, and in Chagai district occur vast flat marble terraces.

Several routes into Baluchistan are well attested. Routes can leave Sind from Lake Manchhar either southward along the Baran or Hab rivers or directly westward along the various Kirthar passes, for example the Phusi pass. The use of the latter route in Harappan times is more likely, given the location of Lohri, Ali Murad, and Pandi Wahi.

From the Larkhana area a major historic route to the west goes from Jacobabad and Sibi through the Bolan Pass to the Quetta valley and the Khojak pass. Today the route is used seasonally by the Brahui pastoralists and nomads (Fairservis 1956: 183–93). Judeirjo-daro and Therri Bahadur Shah lie near Jacobabad, and Kirta on the Bolan plateau has strong Harappan links (Enault and Jarrige 1973: 190–5). Further into Baluchi territory, and accessible from Sibi or the Bolan plateau, are the mature Harappan sites of Dabarkot and Kaonri. These sites are on the river Beji on the route to Loralai, giving access to the Zhob valley with Periano Ghundai, and thence to the vicinity of the Gomal pass. Dabarkot is a large site with surface indications of a Harappan presence (Stein 1929: 56) whereas at Kaonri the Harappan occupation was apparently restricted to a small area.

Pathiani Kot lies at the foot of the Mula pass which leads to Kalat and thence either to Las Bela or the Mashkai valley. The area represented by Harappan occupation of the site appears to indicate the Pathiani Kot was little more than a small Harappan outpost (Mughal 1972: 140–1).

The Gomal valley route, like the Bolan, is seasonally used by pastoralists (Fairservis 1956: 183–93). The Harappan sites here, such as Gumla, Rahman Dheri and Hisham Dheri (Dani 1970–1), are all on the route between Dera Ismail Khan and Tank. Rahman Dheri is an especially large site. At Gumla the Harappan occupation (period IV) is preceded by a destruction level, and there is a conspicuous absence of standard Harappan pottery forms such as beakers and pointed goblets, whereas elements from the previous period (III) continue to manifest themselves. At the same time, etched carnelian beads and chert weights were in use. All this speaks for the function of Gumla either as a military or as a merchant outpost. Perhaps it was situated on an important trade route of the times, which led towards Kabul for the procurement of lapis lazuli and metals, or towards the Zhob valley for copper.

Another means of access to the western hills is a relatively easy route from Harappa via Multan, Dera Ghazi Khan, Fort Munro and Loralai to the Quetta valley.

Six mature Harappan sites on the left bank of the Oxus, near its confluence with the Kokcha river, perhaps represent the earliest colonization of an area from which lapis lazuli and placer gold could be obtained.

The Harappan presence in what is now Gujarat can be explained as either a 'natural expansion' to the limits of one large ecological zone, a seeking out of familiar environmental conditions (Joshi 1972a: 32–5; Leshnik 1973: 82; Fairservis 1971: 311) or as the result of total displacement from Sind (Rao 1973: 54 ff, 181–2) or as a search for raw materials and/or ports for overseas trade. (It needs, however, to be emphasised that any division of Harappan territory into a 'central and 'southern' province is tentative.)

From Sind down to Kutch, Kathiawar, the Cambay region and coastal south Gujarat (the southernmost limit of Harappan territory), the climate and landscape change appreciably. There are significant contrasts in man-land relationships between the Cambay and the Larkhana districts, for example, and it becomes clear that we cannot explain the southern expansion in simple environmental terms.

Kutch is for the most part a salt marsh only slightly above sea level, flooded into a shallow swamp for part of the year, and an unbearably hot, dry plain of mud flats for the rest of the year. For the remainder Kutch is an arid zone, very sparsely populated. Isolated belts of irrigated alluvium are cultivated for wheat and barley, but pastoralism is the chief occupation, sheep and goats being taken to graze in the valleys which sprout scrub vegetation after the rains. The Banni also offers much pasturage. Kutch is noted for its asses and camels. Harappan sites are located especially over the north and east of the peninsula, but two coastal sites, Navinal and Todio, are also known.

Some of the sites have substantial dimensions. Kotada Dholavira on Khadir island, for example, has two mounds of which one is the 'citadel', and its remains cover an area some two and a half kilometres in circumference. This site, perhaps located on the sea shore in Harappan times, is thus very much larger than Lothal. Surkotada is considerably smaller than Kotada Dholavira, and Desalpar even less. A few sites, such as Pirwada Khetar, appear to have been mere camping places with no evidence of a period of sustained occupation. At the same time, several sites have substantial fortifications: Surkotada, Desalpar, Dholavira and Kotada.

Most of the Kutch sites are mature Harappan fading into late or decadent Harappan (Joshi 1966: 62–9). It appears that Kutch was settled in the heyday of Mohenjo-daro and Harappa: Kotadi and Surkotada show pottery parallels with early Kalibangan (Joshi 1972 a: 26 ff), and at Desalpar thin walled grey pottery with painted designs has analogues from the earliest levels at Mohenjo-daro (IAR 1963–4: 10–12). Thus the Harappans could have settled in Kutch earlier than they did in Kathiawar.

The full range of Harappan artefacts and materials is not found at the Kutch sites, but there are surface indications of shell manufacture at Dholavira, a fair amount of copper/bronze at most excavated sites, and also a little ivory, carnelian and lapis lazuli. At Desalpar and Surkotada a few seals have been found (Joshi 1972 b: 126, pl. VII c; IAR 1963–4: 10–12) and at Desalpar, one bulla-type sealing. Evidence for the prevalence of the standardized weight system occurs at Desalpar and Surkotada and at Pabumath (Joshi 1972 b; IAR 1963–4: 10–12; Joshi 1966: 65).

The settlement of Kutch today is sparse and consists of hamlets rather than villages, and the more favourable zones for settlement are near the south coast (R.L. Singh 890–1; 903) and the Anjar area with its fertile soils (Postans 1839: 77 ff). In the vicinity of Anjar are located some Harappan sites, but substantial fortified settlements of the Harappan period occur in northern Kutch as well. This is hard to explain, even granted that Dholavira was a sea port. The protective walls of the other settlements could hardly have been built to guard stocks of surplus foodgrains. Alternatively the northern sites may mark posts along important routes connecting lower Sind to the Aravalli copper belt (which stretches from Jhunjhunu and Mahendragarh to Udaipur and Palanpur). These could have connected Chanhu-daro (a metallurgical centre according to Mackay) with Desalpar via the lower Indus, Ali Bandar, the Rann and Lakhpat, or else linked Garho Bhiro with Dholavira and then Surkotada via Nagar Parkar and the Rann.[33] From Surkotada it would be possible to cross the arm linking the Little Rann with the Great Rann, to Amasri, a Harappan site near Santalpur (Joshi 1972 b: 143, n. 27) and then go up the Sarasvati or Banas to Sujnipur near Patan, and thence to the southern extremity of the copper belt. The existence of white painted black-on-red ware at Surkotada IC appears to point to some kind of connexion with the Banas valley (Joshi 1972 b: 139). Moreover, much copper has been found at Surkotada, especially in later levels (Joshi 1972 b: 138–9). All this, together with the signs of 'state' authority in the form of seals and weights, makes it reasonable to suggest that one of the functions of the settlements of northern Kutch was the supply of copper to Sind.

The environmental conditions of Kathiawar are less harsh than those of Kutch, and there is greater ecological diversity. Rainfall is higher, and soils can be more fertile. The south coast offers good potential for agriculture near the mouths of rivers. The central hills bear dry deciduous forests, and elsewhere small trees or open scrub dot the landscape.

In Kathiawar the Harappa culture is not so homogeneous as it appears to be in Kutch. Harappan sites have been found along the south and west coasts, in the Jamnagar area, in the central region around Rajkot, and in the east on the Bhadar and Sabarmati rivers (including the Cambay region). Occasional sites also occur in the

[33]Del 'Hoste (1841a) defines a Sind–Kutch route via Hyderabad, Mirpur, across the Rann to Lakhpat in northwestern Kutch. Other routes, mainly caravan tracks, went from Ali Bandar along the western edge of the Banni to north Kutch, or from Nagar Parkar to Bela (*Gazetteer Cutch* 1880: 14–15).

southeast hills and on hills in the northwest (Rao 1973: 44–8). Lothal, Rangpur and Rojdi were some of the prosperous settlements. There is no evidence of fortifications except perhaps at Lothal which has a surrounding wall whose purpose is not yet known (Rao 1973: 61)

There is a wide range of archaeological assemblages, of which that at Lothal is perhaps the earliest (Rao 1973: 54 ff). It appears to have been a prosperous manufacturing town, and a wide range of materials have been found here.

Rangpur II A (mature Harappa) also appears to have been under Harappan administration: there is evidence of civic controls in the planning of the settlement, and weights of the Harappan standard have been found. That the community was prosperous we infer from the carnelian, agate, copper/bronze and gold found at the site (Rao 1962–3: 45 ff).

Whether settlement at Rojdi on the Bhadar south of Rajkot began in mature or in late Harappa times, is a matter of controversy. In the level I there are copper/bronze tools and ornaments, shells, gold ornaments, steatite, carnelian (including etched beads) and cubical chert weights IAR 1958–9: 19–21; IAR 1962–3: 8; IAR 1964–5: 12; Rao 1973: 47).

It is worthy of note that so far Harappan seals have not occurred at any of the Kathiawar sites except Lothal.

None of the later sites have yielded very impressive remains. Rao excavated two sites of the Jamnagar cluster, but found no seals, script, weights or exotic materials (Rao 1962–3: 183–4). Rangpur II B-C also lacks these features, and only a little lapis lazuli has been reported from Somnath. In short, Rangpur II B-C and III related sites must have had little to do with the Harappan 'state' mechanism.

The coastal region of Gujarat from Cambay to the Tapti is rich in soils, water resources and timber. The Harappan sites here were located in favourable zones at the mouths of the Narbada, Kim and Tapti. Here also, few 'state' artefacts were found. Although it appears that these southern sites did have close contacts with Saurashtra and although Bhagatrav IA is considered mature Harappan by Rao (1962–3: 190) on the whole they appear to have been relatively late, if not post-Harappa, in date (Allchin and Joshi 1970: 21–8).

It has been confidently asserted by scholars (see for example Fairservis 1971: 294) that the expansion of the Harappa culture was not merely a case of imitation or diffusion of cultural traits, for this would not account for the uniformity and remarkable standardization of artefacts found throughout Sind, lower Punjab, Kutch and Kathiawar. This question of alleged uniformity has not been explored in detail, but in any case identity of authorship of material culture throughout this area need not necessarily imply large-scale movements or migrations of people.

In the case of Gujarat several scholars assume that there was some kind of mass displacement from Sind, folk travelling southward bag and baggage, refugees forced to leave their homeland, or prosperous adventurers seeking virgin territory for colonization. The causes of this mass displacement are believed to have been natural calamities occurring in Sind, such as gigantic floods destroying several settlements. Such theories are not supportable by the archaeological data available. There is no unequivocal evidence for large-scale flooding at any Harappan site. And if the Harappans fled calamity-stricken areas, it would have been as refugees: in which case one does not expect them to have brought about the extension of the state system, much less to have built their new settlements on carefully regulated plans.

What is important is that the occurrence of typically Harappan arts and crafts, pottery, weights, seals, script and town planning in Gujarat speaks for the incorporation of this area into the Harappan state system. The evidence speaks not for ethnic movements but for political and economic control of Kutch and Kathiawar by Harappan rulers.[34]

[34]Although their very size marks out Mohenjo-daro and Harappa as centres of economic and political conrol, we need not infer that the entire area from Harappa to Lothal was administered as one homogeneous political entity. Local communities may have enjoyed varying degrees of cultural and economic autonomy. Local ceramics occur in association with Harappan pottery at most sites in Gujarat. At Rangpur, besides the Harappan red ware there are coarse grey, coarse red and buff ware (Rao 1962–3: 20 ff); at Rojdi white-painted black-and-red, corrugated grey, and other wares (*IAR* 1957–8: 21); at Somnath red-slipped, black-and-red and coarse red and grey wares (*IAR* 1971–2: 12–13), and so on. At the earliest levels at Surkotada non-Harappan wares form 7% of the total pottery, but in IB a distinct coarse red ware forms 70% of the total, and non-Harappan pottery predominates in level IC as well (Joshi 1972b: 126; 129; 130).

It is also significant that the Harappans were not the first settlers at Lothal or Rangpur (Rao 1973: 54; 1962–3: 13–19), whereas at Surkotada there are hints of an antecedent culture showing links with early Kalibangan (Joshi 1973: 175).

The Harappan system may have expanded into Gujarat in quest of raw materials and ports, but this need not have been through military conquest or large-scale movements of people. There is abundant anthropological evidence that chiefdoms or early states can extend their authority and economic networks by widening their range of marital exchanges, so that dominant groups induct peripheral or subordinate groups as their allies or affines (see Malik 1968: 114 ff).

The raw materials of importance to the Harappans would have been copper from the southern Aravalli region, agate and carnelian from Rajpipla, wood from the Western Ghats and from Kathiawar [Mt. Girnar was, for example, heavily forested in ancient times judging from the testimony of Hieun Tsang (Beal 1906: vol. II 269)], red ochre, shell and ivory. All these materials, as we will show, were used not only in the Harappan towns and cities, but were also items of long-distance trade.

It has been asserted that the coastal distribution of the Kathiawar sites indicates a marked maritime orientation of Harappan Gujarat (Rao 1965). But it should be noted that even today the south coast of Kathiawar is an area of primary population density (R. Singh 1971: 904), especially at river mouths. If the coastal sites Kanjetar, Somnath, Kindarkhera, Amra, Navinal and Todio were intermediary stations along a sea route to Makran and the Gulf, we would expect them to yield materials known to have been traded (for example ivory, etched beads and metals), as well as some indications of trading activities such as foreign and local seals or weights or sealings. Or else it is possible that the sites were limited purpose settlements, perhaps 'refuelling' stations on a sea route.

It is also necessary to know the time required for an ordinary sailing boat to cover the distance between two consecutive Harappan 'ports', and finally to know how these sites compare chronologically and in material culture with those of Makran.

The coastal sites of the Narbada, Kim and Tapti estuaries have suffered much erosion. Perhaps here, as in Kathiawar, the Harappan sites appear unspectacular not for their late date but because of their function. They could have been merchant outposts for the procurement of timber from the Western Ghats, and for its dispatch by sea to other areas. There is abundant evidence in the historical period for the export of fine timbers from Broach and Surat districts to the Gulf and the Red Sea. It is possible that Harappan agents did not reside permanently at these sites, but stayed there for short periods, buying wood from local people at periodic markets or fairs on the coastal plain, as is done in recent times.

We have also to bear in mind the feasibility of a route into central India along the Tapti valley (though not the Narbada). The possibilities of Harappan connexions with central India are, however, as yet remote.

The factor on which any discussion on trade should focus, however, is the nature of the settlement at Lothal. Was it a port? The excavator (Rao 1973) firmly believes so, but there are opinions to the contrary. It has been held that the 'dock' was not really a mooring place for boats, but a tank for water storage, though it is unlikely that a water tank would be constructed of baked brick and with a platform along one side (Shah 1959–60; Leshnik 1968).

On the other hand there are numerous pitfalls in Rao's theory. First, it is said that his 'anchor stones' are suspect: anchors are unnecessary within a small enclosed basin: boats could easily be tied to rings or stakes on the sides. Second, Rao maintains that the port was located a short way off the Sabarmati–Bhogava estuary, and formerly was only eight kilometres from the sea; today the sea is more than sixteen kilometres away. Admitting that the rivers are depositing rapidly, it will nevertheless have to be proved that since *c.* 1800 B.C. the sea coast here, as in Makran, has been built up to such an extent. It should be emphasised that the 'dock' could not have been built on the main river or any ancient predecessor of it. The only evidence for water courses in the vicinity is a depression along the western margins of the city, not on the eastern side, where the 'dock' is located. Rao thinks that the dock was built away from the main stream as a protection against silting or floods. Nevertheless its location is unconvincing. Also, Shah and Leshnik have both argued that it is unnecessary for a riverine dock to be enclosed on four sides. At Gogha, for example, two retaining walls suffice. But the enclosure enabled the retention of water at required depths in the dock, which was not strictly riverine, and it may be pointed out that the riverine dock at Ur was also trapezoidal in plan. Incidentally it may be useful to compare the roughly contemporary structures of Lothal and Ur (UE VI: 63–4; pl. 61). Their locations *vis-à-vis* their respective settlements are similar, except that at Ur the western wall of the western harbour is incorporated in the defence wall of the settlement. The inlet at Ur is nine metres wide and that at Lothal is twelve. Both structures are irregular trapezoids on plan but the harbour at Ur is less narrow and almost one and a half times larger in area. The inner walls of the structure at Ur slope inwards and downwards whereas at Lothal they are vertical. The walls are essentially of baked brick in both cases, but it should be noted that the walls of the Ur harbour appear to be several times wider than those at Lothal which have a maximum width of 1.78 metres.

No interpretation of the function of Lothal, however, should rest only on the question of the 'dockyard'. If Lothal were a port, its situation at the head of the Gulf of Cambay should be justified by the existence of a viable hinterland as well as by the factors of comparative difficulties and costs of ocean transport as against land transport of bulk goods.

Was the hinterland of Lothal the Sabarmati valley, connecting to the Sarasvati valley of Gujarat and the copper-bearing region around Udaipur (Muhly 1973: 237)? This hypothesis is not supported by the distribution of the known Harappan sites in the lowest reaches of the Sabarmati and on the Sarasvati near Patan (Rao 1962–3: 189; 1973: 45–6; Momin 1971–2; 1973–4). In fact it apears that the Sabarmati route feeding the Cambay region was not in use before the medieval period, judging from the history of Anhilwada (Patan), Siddhapura (about 25 kilometres up the Sarasvati from Patan), Asapalli and Karnavati (Ahmedabad) (Altekar 1926; Janaki 1969: 37–40).

If the main merchandise handled by Lothal were local produce from Kathiawar and the Western Ghats, Lothal was ideally situated as a collection and trans-shipment centre. Land transportation costs therefore would have been minimised at the expense of encountering appreciable dangers to sailing in the Gulf of Cambay, which is exposed to monsoon winds and currents from the south, and where the effect of tides is particularly intensified.

On the whole, however, it should be admitted that given our interpretation of the external trade orientation of the Harappa civilization, we are still in the dark concerning its major ports. Considering the indications (discussed subsequently) that

Mohenjo-daro was directly involved in external trade processes, a logical location for its major port—in terms of hinterlands and comparative costs of sea and land transport—would be at or near the mouths of the Indus. Such a site would in all probability be lost to posterity either due to erosion or to silting over. However, it appears that the hundred and fifty kilometre stretch of coast between the Sir, an eastern affluent of the Indus, and Karachi, is at least today, a low, swampy and featureless coast, not discernible more than a couple of kilometres offshore, and very difficult to navigate by. On the other hand the use of the ports of Makran, considerably reducing the length of the sea route and the seasonal dangers of sailing, would have entailed serious difficulties in carrying merchandise a long distance over particularly unproductive and difficult territory.

The problems of port location therefore require our urgent attention for a true understanding of the nature and extent of Harappan overseas trade. Perhaps future excavations at Dholavira will throw more light on the subject.

To conclude, we again emphasise that the area encompassed by the Harappan culture style is exceptionally wide. The extension of this culture need not have had much to do with folk migrations. Occasionally, as at Gumla or Kot Diji, Harappan movement into a settlement may have been by conquest. In other instances the Harappans may have founded new colonies at strategic places like the Oxus, upper Sutlej and Chenab valleys. In the majority of cases, however, the 'expansion' may have taken the form of an expanding network of kinship alliances and marriage exchanges, which brought a number of disparate communities into a system of mutual economic and social dependence. This will be discussed in detail in the final chapter.

The Location of Meluhha

It finally remains to describe Mesopotamian commercial connexions with the land called Meluhha in texts, and to examine the evidence for the identification of Meluhha with a part of the Indian subcontinent, as is generally accepted.

Like Dilmun and Magan, Meluhha also was a land of sea-farers: its boats are mentioned by Sargon (UM XV: 4, Hirsh 1963: 37; Sollberger and Kupper 1971: IIA 1b); an Akkad period text (BIN 8,

238) referring to 'a . . . man of the Meluhha ship' (Leemans 1968: 220–1); in HAR.ra = *hubullu* IV; and in a vocabulary text (Jaritz 1968: 213). In 'Enki and Ninhursag' the boats of Meluhha are 'large' and in 'Enki and the World Order' the '*magilum*-boat of Meluhha' is mentioned (Kramer 1970: 297 ff).

In some lexical texts (Hh VIII.320, XVIII.20), the *dar*-bird of Meluhha is mentioned (Landsberger 1962: 148; Salonen 1973: 156). The Akkadian for dar.mušen is known to be *ittidu*, and other synonyms for the same bird are *burrumtu* (multicoloured bird), and *darru/tarru* (Salonen 1973: 139). This bird has been identified as the black partridge, more accurately *Francolinus francolinus* L. (CAD: sub *ittidu*).

Now the Akkadian for the *dar* bird of Meluhha (dar.me.luh.ha. mus̆hen) is *ṣulamu* (Salonen 1973: 155). The root *s l m* means 'dark' or 'black' (CAD: sub *ṣallāmu* b).

It is thus reasonable to assume that the dar.meluhha is a dark or black variety of partridge or hen. Bones of the black partridge, *Francolinus francolinus* L. have been identified at Harappan levels at Rupar (Nath 1968: 5). But we cannot be certain that some other black variety of bird was not intended.

In 'Enki and the World Order' (line 219, Falkenstein 1964: 104), Enki, blessing Meluhha, calls it a 'black land'. Parallel to this is a passage in TCL XVI 64 (ibid: 74): 'The inhabitants of Meluhha, the people of the black foreign land.'

Thus Landsberger (1962:148): 'Meluhha does not mean simple provenance but also covers the concept of "negro"...', and Falkenstein (1964:75) 'Die Hühner von Meluhha sind Negerhühner ebenso wie die Menschen von Meluhha Neger sind.' ('Meluhha chickens are as black as the people there.')

In 'Enki and the World Order', the *dar* bird of the foreign land or mountain (kur.ra) is said to wear a carnelian beard. It thus appears that sometimes it was sculptured images rather than actual birds which were imported (Falkenstein 1963: 252–3; Falkenstein 1964:105).

Another bird associated with Meluhha is the *haja*-bird. In the same myth (lines 226–8), Enki says of Meluhha, 'May your bird be the *haja*-bird, may its call be heard in the royal palace' (Falkenstein 1964:105, 75). According to Falkenstein, this bird, with its 'royal' asssociations, is the peacock.[35] Clay models of peacocks are known at Mohenjo-daro (Marshall 1931: 350) and Harappa (Vats 1940: pl. LXXVIII. 40).

A text describing the extent of Sargon's empire (KAV 92) says that the land of Meluhha is 120 *beru ištu mihir nar Puratti,* incorrectly translated by Allbright as '120 beru from the mouths of the Euphrates' (Jaritz 1968: 212–13). Several calculations have been made for this distance, but the historiographic orientations of the text indicate that such 'data' need not necessarily be accurate.

For purposes of identification it is best to analyse the products said to have come from Meluhha:[36]

Meluhha Product	*Textual source*
1. Timber	Gudea: various inscriptions (Thureau-Dangin 1907: 66–7; 76–9; 104 ff.)
2. *mesu*-wood,= mes. Meluhha	UET III 818, 1498, 1241, etc. (Leemans 1960: 18–23).
3. $^{\text{giš}}$a. ab. ba= *kušabku*='sea wood'[37]	UET III 660, 430, 752, (ibid.); Hh III 155; a year formula of Eshnunna: a throne of *kušabku* wood inlaid with gold (OIP 43: 194 No. 121); 'Enki and Ninhursag' (Kramer 1970: 179); lexical text from Elam (MDP XVIII 54) (Landsberger 1964–6: 261–2).
4. meš. šagan wood	'Enki and Ninuhursag'
5. $^{\text{giš}}$esi =*ušû* wood	Gudea, statue B (Thureau-Dangin 1907: 70–1)
6. $^{\text{giš}}$mes.Meluhha= *sulum Meluhhi* ='black wood'	Hh III
7. $^{\text{giš.giš.}}$ immar =date palm	Hh III

[35]We may recall the narrative in the Baveru Jataka (E.B. Cowell, *Jataka,* 1957: III: 83 ff) in which Indian merchants sail to Baveru (Babylonia) with a peacock trained to scream and dance.

[36]Various theories exist as to the etymology of this name. Many scholars believe in a derivative link between 'Meluhha' and 'Mlechchha', a Sanskrit (but originally non Indo-Aryan) term for a non-Sanskrit speaking group, occurring first in the Satapatha Brahmana (Hansman 1973: 584–7; Parpola et al. 1969: 38–9 and 1970: 37–9).

According to Bayley (see Hansman, 1973: 584–7), 'Meluhha' is connected with Assyrian 'Baluhhu', which in turn was replaced by the Islamic name 'Baluch'.

Perpola et al. (1970: 37–9) bring to notice the existence of a clan known as the Me-lah-ha, part of a great seafaring tribe (the Mohanas) of Sind today. These are a non-Indo-European group.

[37]See discussion in Chapter II.

8. copper	Hh XI; UET III 368 (Leemans 1968: 223). Gudea cylinder B (Thureau-Dangin 1907: 134–5)
9. gold dust	Gudea Statue B (Thureau-Dangin 1907: 70–1)
10. lapis lazuli	hymn to Ninurta (Kramer 1970: 279); Gudea Cylinder B (Thureau-Dangin 1907: 134–5)
11. carnelian	hymn to Ninurta; 'Enki and Ninhursag' (Kramer 1970: 179); *lipšur* (Reiner 1956); 'vocabulary of stones' (*RA* 15: 118); Gudea Cylinder B (Thureau-Dangin 1907: 134)
12. wooden furniture	Hh IV 99, 195
13. *dar* birds	See previous discussion
14. *haja* bird=peacock	,,
15. multicoloured ivory birds of Meluhha (GUN. mušen Meluhha).	UET III 757, 761, etc. (Leemans 1960: 160–2)
16. carnelian monkey	UET V 295 (Leemans 1960: 160–2)
17. red dog	votive inscription of Ibbi-Sin; dedication to Nanna of a red dog of Meluhha, brought from Marhaši, as tribute. Image probably had an apotropaic function. (Sollberger and Kupper 1971: III A 5 d, p. 159)

Timber, gold, ivory and carnelian are all known to have been prized products of India in the historical period. All these materials, as well as lapis lazuli, were utilized by the Harappans. It thus appears that the most favourable identification of 'Meluhha' is western India.[38]

Further Remarks on Gulf Geography and the Pattern of Cultural Contacts

We now attempt to produce a more thorough geographic description of the Gulf so as to highlight the areas of maximum attraction for settlement on its coasts, and to indicate the most likely sailing routes in the third millennium. We may then be able to explain why

[38]In late second and first millenium Akkadian texts, 'Meluhha' was the name for Nubia or Ethiopia. It thus appears that this place name was in course of time transferred to a different region, perhaps because the latter had begun to supply some of the same materials (for example ivory and gold) as had been obtained from the original Meluhha.

the Barbar culture is mercantile and manifests Mesopotamian and Harappan connexions, and why the Umm an Nar culture, in contrast, is not obviously mercantile.

Gazetteers and sailing manuals[39] indicate the availability of sheltered harbours and resources in the Gulf. These features, together with coastal areas which are especially barren or fertile, and those islands with resources which attract boats other than local pearling craft, are shown in the map on pages xxii–iii.

The waters off the eastern coast of Oman are free of danger but the coast north of Mutrah offers few harbours except for the smallest boats. The northern tip of the Oman peninsula is mountainous and barren, and currents and changing winds off the coasts preclude shipping. 'The larger Arab vessels never visit [this coast], nor any native vessel not propelled by oars' (Pilot: 60).

Ships sailing up into the Gulf from Muscat and Mutrah are obliged to keep close to the Persian coast. Ships coming from India would follow the Makran coast. Thus we cannot expect third millennium halting places between Mesopotamia and India on the east coast of Oman.

In contrast, the west coast of Oman below Shu'aim is generally barren, with 'sweltering beaches and yellow sands, a desolate windswept shore, and a tangle of narrow creeks and shallow lagoons' (Wilson 1927: 245). Water and food are scarce, and areas of sand desert or dunes or swamp occur in several places, making large tracts of coast uninhabitable (Pilot: 68–88; Lorimer 1915: 1425–40). The Dubai region has wells and a rare deep-water creek (Fisher 1971: 469; Mann 1964: 9–10). But below Abu Dhabi the coast is especially barren and unknown (Pilot: 89). Its sparse population is heavily dependent on marine resources, mainly fish and pearls (Lorimer 1915: 1439). It is in this region that the great pearl bank of the Gulf commences. Many villages in western Oman own boats which are sent off to the pearl banks in the summer, and for the rest of the year catch fish, occasionally visiting Abu Nu'air and Abu Musa islands in the course of their activities.

In the embayment between Dubai and east Qatar the Gulf waters are extremely shallow and the reefs and islands make navigation difficult. There are dozens of low islands in this bay, but none except five or six have any resources (Palgrave 1866: Vol. II, 246–7). The

[39]Information given here is derived mainly from *The Persian Gulf Pilot*, 1915; Lorimer 1915; Wilson 1925; and Stiffe 1896–1900.

corresponding mainland from Abu Dhabi to Wakra is 'entirely barren and desolate' and 'there are neither villages, houses nor permanent inhabitants ... even the Arabs rarely land here' (Pilot: 89; also Horsburgh 1852: 391 ff).

This coast and its waters must, therefore, have been avoided by trading seamen other than local sailors who knew the waters well enough to navigate them. Thus Pliny emphasised the dangers of navigation here and stated that the coast east of Bahrain was not favourable for sailing.

The islands of Abu Nu'air (some seventy kilometres north of Abu Dhabi) and Abu Musa (equidistant between Lingeh and Dubai), can both provide shelter as well as fresh water to visiting sailors. The people of Oman are known to take their animals by boat to Abu Musa to graze (Lorimer 1915: 1275–6; Palgrave 1866: Vol. II, 297–9, Pilot: 86–8).

Further to the west, near the northern periphery of the Pearl Bank, is Halul Island, about one day's sailing distance from Doha on the east Qatar coast (Palgrave 1866: Vol. II: 246–7). It has fresh-water springs and is visited by boats.

Qatar is a desolate and inhospitable peninsula and its people live off the sea rather than the land. It is, however, noteworthy that stone age and Ubaid period sites are known here. The seas off Qatar are shallow and there are no sheltering places except at Doha and Wakra, and on the whole, Qatar appears not to have been important for sailors and traders.

Perhaps the most important region of the Gulf is the embayment between Ras Tanura and Ras Rakkan; with the Bahrain archipelago in the middle of the bay and the most fertile area of the Eastern Province of Arabia on the mainland opposite. The fresh-water springs of Bahrain Island enabled cultivation of much of the northern and western coast, Bahrain being one of the regions with the highest agricultural potential on the Gulf littoral (Fisher 1971: 446). In the province of Hasa, a short distance away on the mainland, the oases of Hofuf and Qatif are large fertile districts. Tarut island also has fresh water and has attracted settlements in the past, as was indicated before.

The important harbours of the Bahrain archipelago are Manama and Muharraq. In medieval times the port of Bahrain was Bilad al-Qadim,[40] about two kilometres southwest of Manama. Bahrain

[40]A Barbar site is reported to be in its vicinity but this has not been confirmed.

has through the ages been a leading port and trade emporium of the Gulf. Qatif was also an important port (Horsburgh 1852: 381 ff; Cornwall 1946a: 41) and so probably was Tarut island. Today beach sand and shallow waters make these almost unusable. An anchorage exists at Ras Tanura. Further northwest, Jubail is a caravan halt and has a fair-sized harbour (Cornwall 1946a: 47).

Continuing further up the Arabian coast we find that the land beyond Qatif is desert and populated chiefly by the Bedouin. The shallow sea covered by extensive reefs and low islands is a dangerous stretch to navigate. Jannna and Abu Ali islands offer shelter and water, and appear to be permanently occupied. The islands in deeper waters north of Abu Ali are apparenly of no use to sailors. Further up the Saudi coast is a trading centre at Dowhat Bulbul, visited periodically by sailors and by Bedouin from the interior. Finally, there is an anchorage offering shelter for small boats from the *shemal* at Bandar Misha'ab.

We thus come to Kuwait where an excellent natural harbour is afforded by a large bay; shelter is also available at Failaka island at the entrance to the bay. The resources of Failaka and its religious importance have been discussed before.

Turning now to the Persian coast of the Gulf, we see that on the whole the coastal waters are deeper and not shoal- and reef-infested.

At the entrance to the Gulf, Minab, Bandar Abbas or Hormuz Island offer the first available shelter and resources for ships. At Minab (Old Hormuz) a salt-water creek can be used by small craft and there are well-travelled and busy routes to the interior, as well as fertile land for cultivation. Bandar Abbas has a good harbour. Hormuz Island was for three centuries, until Portuguese domination, the leading trade centre of the Gulf (Wilson 1928: 100 ff). It has two harbours and occupies a strategic position at the narrow entrance of the Gulf. Although it appears that water is scarce on the island, some parts of it are carefully cultivated. Red ochre and salt are its mineral resources (Stein 1937: 188–92).

Westward from Hormuz, numerous islands are situated at a short distance from the coast and are important stops on the sea route. Larak, mainly barren, has an indifferent anchorage, whereas Qishm is a large island with sweet water and tracts of cultivated land, although fishing is the chief occupation. Qishm sees much boat traffic. The small islands of Henjam and Tunb can also be utilized as halting places for boats.

West of Bandar Abbas there are anchorages at Kung[41] and at Lingeh. Lingeh has no springs or wells, being situated on a great salt marsh.

Two islands at an appreciable distance south of Lingeh in the open sea are Forur, where boats can shelter, and Siri, where water is plentiful but the anchorage indifferent.

Closer to the mainland and beyond Lingeh there are the islands of Qais, Hindarabi and Shaikh Shu'aib, which may be visited by boats. Of these Qais with its water and cultivation is the most important.

Between Ras Bistaneh and Bushire on the Persian coast boats can stop at Charak, Chiru, Shiwu, Naiband bay, Tahiri, Kangun, Dayyir and Rishahr. On the whole this coast is unproductive land devoid of water and other resources except at a few places near Tahiri (Stein 1937: 193–202).

The peninsula of Bushire appears to have been occupied as early as the Ubaid period (Whitehouse and Williamson 1973: 35–40). There is no perennial river here and farming must require much labour.

Kharag island has water supplies and some of it is cultivated. There are many shrines on Kharag: like Failaka it too is a place of pilgrimage.

Ganaveh on the coast today has a trading fleet, and water is available. It has several ancient mounds in its vicinity, awaiting exploration.

As regards sailing routes, British mariners' directories recommend only the Persian coast as the acceptable route in the Gulf (Pilot: 29, Horsburgh 1852: 425–6). Their directions were intended for large boats (often steamers), for which the shallow waters of the Arabian coast would be dangerous. But in the third and second millennia B.C. the boats in use would have been very small, and with experience navigators would be able to negotiate the shoals and islands, as do pearling craft today.[42]

[41]There are several mounds and ruins at Kung.

[42]See Villiers 1940: 267 ff. A large boom of about 150 tons, anxious to make the journey from Bahrain to Kuwait in the least possible time, and captained by an experienced sailor native to the region, was able to make the journey in 48 hours (sailing by night as well as day) directly over the reefs near the coast. These waters are usually frequented only by pearling craft.

Moreover, the Gulf sea level has been receding and the coastal seas may not have been as shallow in the third millennium as they are now.

The availability of sheltered anchorages when the *shemal* and *qaus* winds rage across the Gulf, and of drinking water, if not food supplies, would certainly influence the location of sea routes. On the whole the high mountain-backed Persian coast offers more shelter during the northwesterly *shemal* than does the Arabian coast. Local resources appear to be concentrated in the following areas of the Gulf: the Bandar Abbas–Minab bay; the Lingeh coast; and the Ras Tanura–Ras Rakkan bay.

These factors as well as the early (Ubaid period) settlement of Bushire and Siraf, and the important land routes from Minab to the interior of Iran (including Yahya and Shahr-i Sokhta), speak against the theory of During Caspers (1971 a: 22–3) that trade along the Persian coast in the third millennium was unlikely.[43] The regions around Ganaveh, Bushire and Minab all merit extensive investigation.

Even if we are likely to find substantial third millennium sites in these three areas, it is not at all impossible that there were minor sailing stations in other parts of the Gulf including the islands. Prins (1965–6: 13) has pointed out that in spite of its barrenness and sparse population, there are hardly any villages, however small, on the Persian coast which do not own boats. In this context we may recall his distinction between present-day trade stations with home fleets exporting local surpluses and importing for the home market, and stations having fleets which 'cross-trade' over the Gulf, buying and selling as, when and where they can for maximum profit.

We may also be mistaken in inferring that ancient sailing routes must have coasted all the way up the Gulf. The prevalent winds in the Gulf are the *shemal* and the *qaus*, blowing from the northwest and southeast directions respectively. These winds could have been utilized to cross the Gulf in places where it is relatively narrow, for example from Naiband to Qatar/Bahrain or from Lingeh/Hormuz to the Pirate coast. In this connexion we may refer to records of sea voyages made in the Gulf before the days of engines.

Pliny has stated that sailing was not possible off the coast east of Bahrain. According to Idrisi, the seas east of Qatar were not

[43]It is likely that Arrian's account of the difficulties experienced by Nearchus off this coast has been given undue importance by modern scholars.

frequented or known to sailors (Wilkinson 1964: 339–40). While identification of place-names in the accounts of Barbosa, N. Conti and Benjamin of Tudela is very difficult, other accounts of seafaring in this area are available: in the sixteenth century A.D. the Turkish admiral Sidi Ali Reis (Sidi Ali Reis 1899) was able to sail with a fleet of galleys from Bushire to Qatif, then to Bahrain, and finally to Minab; Palgrave, in 1860 (Palgrave 1866: Vol. III) sailed from Qatif to Bahrain and Qatar. From Doha in east Qatar the intention was to sail for Sharjah but instead the winds blew the ship to the Persian coast via Halul island. It was only from Lingeh that Palgrave was able to reach Sharjah, with a short halt at Abu Musa. In the late 1930's Villiers (1940: 242 ff) sailed in an Arab boom of about 150 tons carrying cargo from northeast Africa for Bahrain and Kuwait. After entering the Gulf the boat passed Henjam, Charak, Qais and Hindarabi and reached Naiband. Off this cape the boat turned towards Bahrain, and from Bahrain to Kuwait kept to the Arabian coast.

One may therefore conclude that a boat going up the Gulf to Bushire would sail entirely along the Persian coast, but that if a boat intended to reach Bahrain or Kuwait it would keep to the Persian coast up to the vicinity of Qais, Shu'aib, Naiband or Bushire, whence it would await favourable winds for Bahrain. Today engine-powered dhows frequently make the Bushire-Bahrain run, but for sailing boats this may have been a long trip as there are no convenient island halts on the way. Failaka was probably reached from Bahrain or Bushire.

Sea trade between Mesopotamia and India may therefore have bypassed the Abu Dhabi and Umm an Nar region. It has been indicated that the shallow seas west and southwest of Abu Dhabi do not preclude the movement of small boats, but it is important to note the barren nature of this coast and its hinterland. Settlements here would have had few surpluses other than copper from the mountains to exchange in long-distance trade. It is possible that the Umm an Nar people carried copper to trading stations on the India–Mesopotamia sea route, or that they engaged in 'cross-trade', merely shipping merchandise between ports, and in the course of these activities came into contact with Mesopotamians and the people of southeast Iran.

CHAPTER II

Individual Items of Trade

This chapter presents archaeological and textual evidence concerning individual items traded over the region between Sumer and western India. There are several such items. In the first place we have bulk goods, utilitarian items which travelled from Mesopotamia eastward (foodstuffs and textiles) and those which were traded westward (copper, timber, various stones and pigments). Major evidence for the trade in these items which are either perishables or raw materials not immediately discernible in the archaeological record, lies in the Mesopotamian texts.

There was also a group of non-utilitarian goods, probably valued for prestige or 'luxury' purposes, such as gold, ivory, steatite and imitation pottery containers, etched carnelian beads, lapis lazuli and pearls. For steatite containers and etched beads the evidence is solely archaeological, but for the others there is written documentation as well. On the whole these products moved westward, ultimately towards Mesopotamia.

As we shall show, silver appears to have been a special case, falling neither in the bulk goods nor luxury category, but important because of its exchange value.

Finally, there is archaeological evidence of a few categories of objects at Mesopotamian sites that were probably Indian in origin (dice, bird figurines, conch shells and monkey figurines). These on the whole occur sporadically and are not mentioned in the texts, and may be considered distinct from the other categories, being exchanged in incidental encounters rather than in scheduled trade.

Textiles

Given the high productive potential of agriculture and pastoralism and the lack of mineral resources in southern Mesopotamia, it is not surprising that produce from agriculture and livestock became the major items against which Mesopotamian imports were acquired.

Textiles, more particularly wool and woollen garments made from sheep and goat hair, were through the ages the supreme produce of Sumer and Akkad. Several economic texts concerning the activities of the temple workshops reveal that very large quantities of garments were manufactured, and that single transactions could involve the procurement of as much as 6,400 tons of wool (Leemans 1960: 128; Adams 1974: 247).

Texts from Lagash reveal that, as early as ED times, garments (along with other produce) were being traded for Dilmun copper (Lambert 1953 b: 60–3). Ur III texts record that 'merchandise for buying copper from Magan' comprised wool, garments and oil (UET III 1689, 1511, 1666; Leemans 1960: 19–22). In one case wool was 'put in a boat for Dilmun'.

In a text of the early Larsa period (UET V 558, Leemans 1960: 30–1) wool appears to have been the commodity against which ivory, wooden objects, 'fish-eyes', stones and copper were bought, presumably in Dilmun. Texts from the later part of this period (UET V 367, 848, Leemans 1960: 36, 47) record that garments and other items were loaned to merchants intending to set out for Dilmun 'to buy copper there'.

It must be assumed that these textiles were quality goods sold at low equivalencies, for sheep- and goat-hair weaving must have been known in the Gulf, Iran and India as well. Flax seeds as well as cloth woven from a mixture of goat and camel hair have been found at Shahr-i Sokhta (Tosi 1974b: 162).

Did the wool and garment exports of Ur reach the Harappan towns, or were they accepted by intermediaries such as the Dilmunites and Maganians in exchange for merchandise they had procured in northwest India? We cannot tell.

There is well-established evidence for cotton spinning and weaving at the Harappan sites, but there is no indication in the Mesopotamian texts that cotton or cotton cloth came to Ur by sea.

Foodstuffs

Food, when traded by sea in our period, comprised staple items such as barley and oil, and not exotic or special commodities; these were sent from Ur and Lagash to Dilmun, Magan and Elam. Food exports from Lagash to Elam and Dilmun took place in the ED period (Lambert 1953b: 60–5) in the Ur III period barley and oil (í. giš=linseed/sesame oil) were handed out by the Nanna temple to merchants as 'merchandise for buying copper from Magan'. As much as 2,380 *kur* of barley could be exported at a time (UET III 1511, 1666, ITT II 776, Leemans 1960: 19–22). For the Larsa period textual references to food exports to Dilmun are rare. In UET V 367 (Leemans 1960: 36–7) capital for a trading venture to Dilmun comprises silver, garments and 5 *kur* of oil.

What is the explanation for this trade in staple food items? In the first place it is quite clear that the food consignments were not provisions for the sailors and traders on their voyages. The stated quantities of foodstuffs are often specified as 'merchandise for delivery' or 'merchandise for buying copper' abroad. We had pointed out before that Mesopotamia produced food on a very large scale, and that the settlements in the Gulf and southeast Iran had comparatively low agricultural potential. It is also possible that at various stations in the Gulf local production was insufficient to maintain communities of foreign merchants for long periods without bulk imports of grain.[1]

Dates are not mentioned as traded items in the texts. Some date stones have been found at Mohenjo-daro (Marshall 1931: 27, 587) but it is not clear whether these were local produce or imports. In favour of the former possibility we may point out that the date-palm of Meluhha is mentioned in Hh III-IV (Leemans 1960: 160) and that the wild date palm is known in Gujarat, especially in Surat district. However, it is not impossible that dates came to Sind from either Dilmun (famous in the texts for its high quality dates) or Magan. Makran dates have been highly prized, and although tradition asserts that the date was introduced here by the first Arabs, Alexander's chroniclers recorded that the Ichthyophagi ate fish and dates. It is not impossible that the Harappans obtained dates from Kej and Panjgur by trade with the Kulli people, or directly from their own stations in Makran.

Copper and Bronze

Discussion on the trade in copper and bronze is comparatively long

[1]Today also much foodgrain is transported by sea across the Gulf (Prins 1966: 13–14).

and involved, for several reasons. For one thing there are innumerable (though minor) sources of copper scattered over different parts of western and southern Asia, and it is likely that in antiquity several of these were utilized simultaneously.[2] For this reason alone the copper–bronze trade can never be as simple a problem as, for example, the lapis trade. Further, of all metals utilized in the bronze age, copper and tin have special importance. They were utilized for making tools and weapons whereas silver and gold were valued for ornamental reasons or amassed as wealth. In other words, bronze age technologies were dependent, to a greater or lesser extent, on the procurement, often over long distances, of copper and/or tin. Thus in connexion with the Harappa civilization it is essential to know what part copper and bronze played in the technology. Were copper/bronze tools an essential part of the production processes which made possible the formation of an urban, stratified, structure? If so, to what extent were the Harappans dependent either on foreign raw materials or finished products for their metallurgy? Answers to these questions will help in an assessment of the role of foreign trade in the Harappan economy.

We must bear in mind that copper and bronze were both in use, often simultaneously, during the third and second millennia B.C. Although bronze is the more efficient material, copper continued to be used after the discovery of bronze, perhaps because of the scarcity of tin.

Copper–Bronze Technology

A comprehensive and comparative study of the copper and bronze technology of Sumer, Elam, Yahya, Shahr-i Sokhta, the Gulf and the Indus region would be useful in enabling us to discern patterns in the diffusion of technology or the dispersal of manufactured artefacts between cultures, or to point to areas where independent development had taken place. To date, however, we have no such comprehensive or in-depth data. Information on Mesopotamia and the Indus valley is incomplete, and there is only scattered informa-

[2]The Mesopotamian texts mention a very large number of varieties of copper (Limet 1960: 32–40).

tion regarding the copper–bronze objects in the other culture areas.[3]

In the present state of knowledge we can only survey Harappan metallurgy to see how it compares with contemporary traditions.

Copper was known in the Early Indus cultures before the period of sea-borne trade. Nevertheless Harappan metallurgy was generally of a low standard compared to the Sumerian or Elamite. The tool types are usually simple and unspecialized. There are several instances of unsatisfactory casting, while daggers and spearheads lack strengthening midribs. It is only the vessels and statuary which represent highly-advanced techniques and a variety of forms.

The few western Asiatic parallels available for Harappan tool-types are of early date in western Asia. This also attests to the relatively retarded standards of Harappan metal technology. The flat axes so common at Harappan sites have parallels as early as fourth millennium Susa (Susa I). Collared hoes and axes, commonly used in Mesopotamia and Elam, were apparently unknown to the Harappans. Another characteristic of Harappan metallurgy is the apparent absence of technological development from the beginning to the end of the Harappan period (Lamberg-Karlovsky 1967: 51).

In the Early Indus period a few copper and bronze objects have been found. The Amri culture has produced little more than fragments, a coiled bangle and a knife blade; from Kot Diji some bangles and a ring have been reported; in early levels at Kalibangan copper bangles, a bead, and an axe were found (Mughal 1970: 140–1). In other words there is as yet little evidence for earlier forerunners, or for any real affinities in technique between the Harappan objects and those from pre-Harappan levels or from Nal, Mughal Ghundai, or Mundigak. All that can be said concerning early techniques is that cold-hammering, raising and open-mould casting were known (Lamberg-Karlovsky 1967: 149).

[3]Eg. all we know about Shahr-i Sokhta is that copper-lead and copper-tin alloys were used for mirrors, knives, a beater, pins and lapidiaries' tools. These tools were often shaped by hammering (Piperno and Tosi 1975: 196) and there is no evidence of mould casting. At Shahdad there are remains of furnaces (Hakemi 1973a; 1973b) and the range of objects used was very wide (Shahdad Catalogue 1972: 10–11). At Yahya IV B both tin and arsenic bronze were used (Lamberg-Karlovsky 1973: 35). At Umm an Nar there is evidence for lead and zinc alloying (Frifelt 1975: 362–6).

Let us now consider the use of tin bronze in the Harappa culture. To begin with it mus. be appreciated that even in Elam and Mesopotamia copper continued to be used after the invention of bronze. The superiority of bronze over unalloyed copper is well known and this continued use must be ascribed to the scarcity of tin even in this area. Thus the Harappan use of crude copper, refined copper, tin-bronze as well as arsenic-copper alloys (Marshall 1931: 485) is not unusual.

In Sumer and Elam the general use of copper–tin alloys is testified from *c.* 2700–2500 B.C. Even earlier, an archaic text from Ur (UET II 373) differentiates copper from bronze (Moorey 1969: 134–5). In Syria and Anatolia bronze appears a few centuries later, and in Luristan, bronzes with 3.6 to 13 per cent tin were made by 2000 B.C. In the absence of analyses of Early Indus copper/bronze objects all we can say is that bronze was known by the Harappa period. Whereas only six per cent of the tools in the lower levels at Mohenjo-daro were true bronze, for the upper levels the figure is 23 per cent (Agrawal 1971: 168; see also Marshall 1931: 30–1; Vats 1940: 381–2). In Sumer too, at least up to the Akkadian period, copper was more common than bronze (Jones 1961: 115; Limet 1972: 9–10) but no percentages are available.

It appears that a distinction was made by early metallurgists between copper and bronze, depending on the kind of tool required. In Mesopotamian texts bronze is mainly used for the making of cutting instruments and armour (CAD: sub *èru*). At Ur transverse-hole axes are mostly of bronze whereas folded-blade axes are made of copper. According to Deshayes the distinction is not chronological but typological and technological, the bronzes having been cast and the copper tools hammered into shape (Deshayes 1960: 10). It has been alleged (Bhowmik 1972: 200) that this distinction also existed with the Harappan metallurgists. But it appears that bronze was not particularly valued for specific tool-types in the Harappa culture. More acceptable is Mackay's suggestion that the Harappans had to use their copper/bronze as it came to them and could exercise no control over its content (Mackay 1943: 175).

Of the analysed tools, 8 per cent from Mohenjo-daro and Harappa consist of arsenic-bronze (Agrawal 1971: 168)—that is, a deliberate alloy of arsenic with copper. It is now generally believed that tools with more than 1–2 per cent arsenic are deliberate alloys

(Charles 1967: 21–6). Up to 8 per cent arsenic content makes copper tools hard and tough (Moorey 1969: 133) and prevents blistering and porosity during the casting process (Charles 1967: 21–6). Arsenic alloys, in fact, seem to have preceded tin alloys in western Asia, being known as early as 3500 B.C. in Palestine and the JN period in Sumer–Elam. At Ur JN levels have yielded arsenic-bronzes whereas there are very few in the Royal Cemetery (Moorey 1969: 133–4). Arsenic-bronze continued to be used until the Akkadian period (Moorey and Schweizer 1972: 180–95). Tin bronze is not really superior but must have replaced arsenic-bronze solely because of the toxic nature of arsenic fumes (Charles 1967: 26).

Agrawal (1971: 168) has suggested that the reason so few Harappan bronzes were arsenic-alloys is partly the scarcity of arsenic. Its use is apparently restricted to the making of closed castings when the tendency of copper to absorb gases and become porous and blistered, is the greatest. In any case the paucity of Harappan arsenic bronzes corresponds with the gradual disuse of these during the Akkadian period in Sumer-Akkad.

Arsenic is found either as an impurity in copper sulphide ores or as realgar and orpiment, brightly coloured minerals which were also valued as pigments. Realgar is found in Armenia (Karajian 1920: 186) and in south Kurdistan near the Takht-i-Suleiman. Orpiment is found here and in Cappadocia, near Shiraz, and near Kerman (Thompson 1936: 45–57). A piece of yellow orpiment was found at Harappa (Vats 1940: 80, 468), but it is reasonable to suppose that arsenic was added to copper at the smelting place and was not traded as a separate commodity between the various civilizations. It is not known from where the Harappan arsenic-bronze came.

The highly developed standards of West Asian—especially Sumero-Elamite—metallurgy by *c.* 2300 B.C. are well known. In contrast, the Harappan copper–bronze objects testify to the use of mainly open and closed-mould casting and hammering (including raising, hollowing and sinking), with a certain amount of cire perdue. This is not a very impressive inventory. The greatest variety of techniques is seen in the vessels, which was invariably done in cold work. Unfortunately no detailed study has as yet been made of these techniques.[4]

[4]Direct evidence for Harappan metal working is scattered at a few sites. At Harappa a small area was crowded with sixteen furnaces, presumably used for copper smelting. Cow dung was apparently part of the fuel used. The furnaces varied

Typology

Copper/bronze typology could provide valuable clues to the sources and inspiration of Harappan metallurgy, and to the extent of Harappan external contacts in general. The list of copper/bronze tool types from the Harappa culture is fairly long, but there are no striking foreign comparisons. Certain analogies between Harappan and Namazga V tool types have been cited (Gupta 1970: 243), but these parallels occur in forms which are relatively simple or else fairly widespread in distribution across Asia. It is therefore difficult to interpret the significance of these analogies until a comparison of the total tool types of Harappa and Turkmenia is completed. Similarly, the parallels noted by During Caspers (1970b) in daggers or spears from Umm an Nar and the Indus region do not appear to be significantly close. On the whole it cannot be said that the Harappan tool repertory was acquired by stimulus diffusion or by trade from other regions.[5]

The paucity of bronze tools used in agriculture is a striking feature of the Harappan artefactual range (Deshayes 1960: 403).

in shape and size. The presence of copper ore and copper melts indicates the possibility of copper smelting at Mohenjo-daro (Mackay 1938: 41), where two pieces of a coppersmith's blowpipe, about 2.5 cm in diameter, were also found (Marshall 1931: 198, pl. CXLIV 10).

Unfinished castings and hoards of small objects indicate the manufacture of copper/bronze tools at Chanhu-daro (Mackay 1943: 175–6).

In the northern area of Lothal was excavated a metal workshop with furnaces associated with slag, a large copper sheet, a clay crucible, and some finished tools (Rao 1962: 23–4). This is the only Harappan site which has produced crucibles or moulds. The mould in question was used for casting needles (Rao 1973: 105).

[5]The Harappans used copper/bronze for the following kinds of tools: vessels (the best made, and with a great variation of forms, yet to be compared with western Asiatic types); flat axes (of very elementary form so that if paralleled elsewhere the significance would be tenuous); spear/lance heads; arrow heads; knives/daggers; razors (of a shape peculiar to the Indus valley); saws; fish-hooks; chisels; awls; beads, rings, earrings and bracelets; adzes-axes; scale-pans; mirrors [apparently cast, circular in outline with the periphery sometimes recessed, the extant handles being mere stubs, which indicates that bone or wooden handles may have been affixed around the stubs (Mackay 1938: 477–8). This is an elementary form and its occurrence also at Kish Cemetery Y (Watelin 1934: 28–9, pl. XIX 1–3), Early Dynastic Ur (UE IV: 43), and Susa (le Breton 1957: 119; fig. 41 11c; de Mecquenem 1931: 335–59), may not be of particular significance]; gouges; tubular drills; shovels; pins (animal-headed pins resemble in style the pins produced by the steppe cultures of northern Iran and the Caucasus, but spiral-headed examples are a common type throughout western Asia (Piggott 1947–8: 26–33); amulets; nails; pipes; statuary.

On the whole agricultural technologies tend to be conservative, yet many bronze age cultures have produced a fair range of agricultural tools. In Mesopotamia, agricultural implements were of primary importance in the copper/bronze inventory (Deshayes 1960: 399–400). It is possible that the Harappans had a successful agricultural technology based on hoes, ploughshares, sickles and other implements made of stone or hard wood.[6] A survey of pre-industrial agricultural methods in Sind and Kathiawar shows that agriculture (especially in Sind) is possible with a very simple tool inventory, the tools being usually of fine quality wood tipped with iron, or even of wood alone (Memon 1955).

It is hard to explain how the Harappans felled trees. Jungle clearance for agricultural land may have been done by burning trees, but as timber was also used for buildings and boats and was exported, the flat copper axes in use could hardly have served to cut trees for this purpose, and stone axes were perhaps still in use. Yet there are many copper/bronze tools for other wood-working processes in the Harappa culture: saws, chisels, gouges, etc. (Deshayes 1960: 403).

For stone-working and ivory cutting, a variety of copper-bronze tools were used. Borers, gouges and punches were specialized implements for various tasks (ibid.). Drills would have been used for perforating stone beads and seals. For textiles and hide working there were numerous awls, and punches would also have been used.

To what extent, then, did the Harappans depend on a copper–bronze technology for the pursuit of their various activities? Mesopotamian metallurgy was highly developed and specialized and copper tools were necessary for most economic pursuits. For Mesopotamia, bronze tools were essential because while there are no metal ores, the plains offer no stone or hard wood either. But in regions where stone and good timber were available—as in north-west India—we need not expect metal to have been used for all tools. In fact at Shahr-i Sokhta, for example, we have a flourishing bead industry where almost all the bead-making tools were themselves made of stone. Shahr-i Sokhta clearly represents a highly successful urban development, and yet the metal technology here is insignificant in comparison with the wide range of bone, stone and wooden tools (Tosi 1969: 378–9).

[6]There are two possible copper/bronze sickle fragments at Mohenjo-daro (Marshall 1931: 501, pl. CXXXVIII.10; Mackay 1938: 471).

It is possible therefore that the theory of necessary and significant connexions between the development of metallurgy and bronze age urbanization, as evinced by early writers such as Childe, may eventually have to be discarded.[7]

Before considering the trade in copper and bronze one must establish the various sources which could possibly have been exploited in ancient times, bearing in mind that several of these may not have been known to the early miners, and, conversely, that many native copper or ore deposits may have been utilized in the past, but since been depleted and forgotten.

Known Sources of Copper

Cyprus was an important supplier of copper to West Asian regions at least as far east as Mesopotamia. There are references in the Mari texts (Dossin 1939: 111) to copper and bronze from Alašiya, which is generally identified as Cyprus. According to some writers, the region around Byblos was an important source of both copper and tin, the ores being available on the slopes of the Lebanon and washed down to the coast by the Fedar and Ibrahim rivers (Wainwright 1934: 29–32). Recently, however, geologists have been unable to locate any ores near Byblos (Seyrig 1953: 48). Copper has also been reported in the Aleppo region (Muhly 1973: 209–10).

The excavations at Çayönü Tepesi have revealed that the Ergani region was one of the earliest centres of copper mining. The Ergani mine is the largest in Anatolia, and the deposits are largely chalcopyrites (sulphides) (Muhly 1973: 199–200). Tin is also to be found in this area. Of the several other deposits of copper in Anatolia we may mention the mines south of Kayseri, perhaps worked in antiquity (see Garelli 1963: 294), in the Trabzon area, and in Caucasian Armenia (Karajian 1920: 161–8).

In the Wadi Araba in Palestine, copper mines were worked in antiquity as they are today (Rothenburg 1971). Near the Upper Zab valley in the Zagros, Layard (1849: I: 221–4; II: 418) reported copper ores in bright blue veins and the remains of disused mines.

In Iran there are several copper-bearing localities. The major ones lie around Abbasabad (west of Meshed); near Torud (south-

[7]Renfrew (1972: 319–320) points out that initially copper-bronze tools were modelled on stone, bone or wood prototypes, and rarely surpassed these in efficiency. It is only with the invention of the dagger that metallurgy came into its own.

east of Damghan) and south of Birjand in southern Khorasan; around Ahar and Sangun northeast of Tabriz (the Qareh Dagh region); in the Zanjan region; in the area between Kashan, Isfahan and Anarak; and in southeast Iran (Khadem 1964a; GSI No. 2: 55 ff). For us the last region is the most important. Copper deposits occur in a belt between Yazd and Bam, including Baft and Rafsanjan. At Rafsanjan is located one of the world's largest copper deposits (Wertime 1968: 927–35) and at Chahar Gonbad, 110 km west-southwest of Kerman are chalcopyrites, malachite and azurite (GSI No. 16: 4–5). Further south, there are copper ores near Faryab (Hansman 1973: 558–9) and in the Kuh-i Jebel Bariz (Muhly 1973: 229). At the site of Tall-i Iblis copper working in the fourth millennium B.C. is in evidence (Caldwell 1967). To the east, near the border with Pakistan, copper minerals are reported in the Kuh-i Taftan (Skrine 1931: 335–6).

In Seistan copper is available near the Malik-i-Siah Koh (Vredenburg n.d. 291). In south Seistan, near Saindak, a desert region with few settlements today, occur several veins containing chalcopyrite, malachite and cuprite, sometimes associated with galena outcrops. These mineral veins are small but numerous, and occur at the surface, the malachites being especially noticeable (Khan et al. 1964; Vredenburg n.d.: 291–4). Prehistoric pottery and copper slag are here strewn over a vast area, but the date of the copper workings is not known (Fairservis 1961a: 74, 98; Dales and Flam 1969: 18).

In Pakistan copper deposits occur in the Khwaja–Amran and the Ras Koh (Brown and Dey 1955: 146–54). In the Ras Koh the ores are copper silicates available in conspicuous bright green pebbles and easy to smelt (Vredenburg n.d.: 291–2). Copper deposits are also reported from Zhob district (Mughal 1970: 194). In Las Bela district, copper slag has been found near Shah Billawal (Hansman 1973: 561) and at Luz copper is apparently abundant and easy to mine (*Gaz. Las Bela*: 118–19). A report dated to the middle of the previous century states that 1½ maunds of excellent copper were obtained from 3 maunds of the Luz ore at the cost merely of the wood required to light a simple mud furnace (Del'Hoste 1841–44b).

In Afghanistan northeast of Seistan, are other copper-ore localities. The mines in the Shah Maksud mountains near Kandahar (that is near Mundigak) were worked by Nadir Shah (Lamberg-Karlovsky 1967: 149). There is also copper in the Safed Kuh between Kabul and Kurram and on the mountains between Kabul and Ghazni (Gordon 1950: 56).

Oman has in the past been an important producer. At least one hundred showings of copper mineralization (native copper and oxidic and sulphidic ores) are reported from the Sultanate of Oman today. Several old mining sites are also marked by the occurrence of slag and other debris at the surface.[8] The most important of them appear to be sites in the vicinity of the Wadi al Jizzi (Lasail has produced an estimated 100,000 tons of slag.) Old workings also occur on the west and east slopes of the northwestern outliers of the Jebel Akhdhar, on the southeastern slopes of the latter range, and in the vicinity of the Wadi 'Andan. Archaeologists have begun work on a systematic exploration of these old mining sites and have been able to identify those of the prehistoric era. To date there is evidence for about four third-millennium mining sites (Goettler et al. 1976: 45–6).

We now turn to northwest India. There is copper in Rajasthan and Gujarat. The northernmost source is district Jhunjhunu where the Khetri, Babal and Singhana mines are worked today. In Alwar are the mines of Dariba. In the Udaipur area copper ores exist at Zari, Kalikui, Delwara-Kerovli, Debari and Bansda; and at Dhariawad–Lassadi old workings have been found (Sethi 1956: 20–4; IAR 1961–2: 44–5).

No details are available regarding copper deposits in the Simla, Kangra and Riasi regions.[9]

An old copper mine at Motaka on the upper Saraswati in southern Patiala is reported by Gordon (1950: 62, map I).

In Banaskantha, copper is available near Abu, Kambaria, Ambamata and Danta (Chatterjee 1963: 130; Agrawal 1977). Copper is practically unknown in Kathiawar (Roy 1953).

Ore–Artefact Analysis

It is difficult to ascertain which of these sources were utilized in the third and second millennia B.C. Today laboratory tests such as spectography, wherein both ores and artefacts are analysed for

[8] Personal communication, A.J. Russell of Prospection Ltd. (14.8.1975). These are plotted in the map facing p. (000), kindly provided by the Prospection Limited Company, Toronto.

[9] See *Wealth of India, Raw Materials:* II: 319 (Delhi, 1950).

impurity percentages, are useful to a certain extent, but do not yield straightforward answers.

Coghlan has pointed out that even today native copper is far more abundantly available than is generally supposed, and that in prehistoric times it must have been widely utilized. Native copper and oxidic ores usually lie in the upper strata of deposits, and sulphidic ores usually occur at greater depths. Since oxide ores are easy to smelt and contain a high proportion of copper, it is assumed that in antiquity native copper and oxide ores were mainly used, and that sulphidic ores were exploited to a lesser extent (1951: 12–13; SAT IX: 6–7; Deshayes 1960 I: 12). The chemical composition of an ore body can vary with depth and should the oxides have been depleted in antiquity, analyses of the impurities in the lower sulphidic ores will not establish whether the oxidic ores had been exploited in the past. Also, impurities analyses are invalid for those artefacts which have been made from re-melted metals.

A more serious limitation is the fact that the impurities in an artefact *can* differ from those in the parent ore body, depending on the chemical composition and nature (oxidic/sulphidic) of the ores, and sometimes on the conditions of roasting or smelting. For example, arsenic is not always carried over into the finished copper/bronze tool. If the ore is an oxide and smelted under reducing conditions arsenic can be recovered almost totally in the smelted end product. But should there be roasting under oxidizing conditions, as is necessary for sulphidic ores, a large percentage of arsenic, which is highly volatile, will be lost. An ore with 9 per cent arsenic has been known to produce metal with only 0.2 per cent arsenic. Thus arsenic content is no pointer to the source of copper. Early analyses of copper and bronze tools had concentrated on nickel content. But now it is known that nickel can enter the copper during smelting with the flux (Agrawal 1971: 135) and is not a distinguishing element. Moreover both bismuth and lead tend to segregate in copper castings so that a single sample from an object may not reveal its true or average bismuth/lead content.

It is thus clear that there is no simple statistical method for identifying the sources of excavated copper objects.

At best the method of Friedman et al. (1966) can be used to determine the kind of parent body (native, oxide or sulphide) from which the material of a particular copper artefact came. This method advocates the analyses of ore samples and subsequently a production of metal from these in the simplest, most primitive conditions possible. Another approach would be to classify artefacts statistically into groups according to metallurgical composition (Coles 1970; Slater and Charles 1970).

Neither of these methods has been applied to any appreciable extent to analyse the copper of Mesopotamia, Iran or India in the third millennium. To date bronzes of Sumer and Harappa alone have been analysed in appreciable numbers. Analyses of ore-bodies are conspicuously few. In any event it is clear that if we are to acquire statistically viable samples of the impurities content of ores and artefacts from all the culture areas, a major international project involving continuous work over several years is required.

A preliminary foray into the problem of the sources of Harappan copper has been made by Agrawal. He has analysed a certain number of Harappan objects as well as some samples from the Khetri mines. Agrawal's general conclusions are that in both the Indus valley and in Kathiawar, native copper and oxides[10] were used, although at Mohenjo-daro there are a few objects made from sulphidic ores (Agrawal 1971: 172–5). But the analysed deposits from Khetri are chalcopyrites (sulphides), and thus no final correlation appears to be feasible. Thus Agrawal's suggestion that the Harappans obtained copper from Khetri may yet be premature. Radiocarbon dating of wood remains in the ancient mines of Dariba, Kambaria and Ambamata in the Udaipur–Banaskanha region indicate, however, that these sources were exploited after the Harappan period (Agrawal 1977).

Ingots

The size and shape of copper and bronze ingots have been utilized as indicators of provenance in so far as a similarity of types can indicate common sources.

'Bun-shaped' (plano-convex) ingots occur at Mohenjo-daro (Mackay 1938: 451, pl. CXXI. 34, pl. CXXXII. 37, 38), Chanhudaro (Mackay 1943: 188) and Lothal[11] (Rao 1973: 80–1, pl. XVIII A). One example was also found at Ras al Qala'a city II (No. 517, FH, unpublished), and one at Susa (Rao 1973: 80–1). These generally have a puckered top surface and smooth base. On the Mohenjo-

[10]Some of the ore from Mohenjo-daro proved on analysis to be oxide ore (Agrawal 1971: 172).

[11]This ingot was of pure (99.81%) copper.

daro and Bahrain examples, vestigial lugs can be discerned. In size, however, these ingots differ greatly and it is doubtful whether the bun shape signifies anything other than the general use of shallow round crucibles or containers into which smelted metal was poured.

Rod-shaped ingots have been found at Mohenjo-daro (Mackay 1938: 452) and Chanhu-daro (Mackay 1943: 187). These appear to be bronze and could be hammered into shape for use as chisels or punches. This shape is probably the result of pouring metal into a vertical hole in the ground, and thus need not be significant either.

Tin

No discussion of the trade in bronze would be complete without a survey of the sources of tin.

Tin occurs in the form of ore in veins or lodes, as well as in alluvial sands or gravels when it is known as stream tin. The metal can be extracted from its ores by simple reduction processes, but is difficult to mine. Dr K.T. Hegde (personal communication) believes that in the bronze age stream tin was used more widely than that obtained from ores.

On the whole tin is a rare metal at bronze-age sites. This may be ascribed to two factors. In the first place, tin is a relatively scarce metal, occurring far less frequently in nature than copper. Secondly, tin tends to disintegrate rapidly when buried in the soil, being reduced to mixed stannous and stannic oxides, or into a powdery substance (Landsberger 1965). Thus for example there is very little actual tin in evidence at Kültepe, in spite of the large-scale trade in it evidenced in the cuneiform texts excavated there.[12]

Even today stream tin is a more important source than ore veins, and many ancient tin-mining centres are therefore probably not known to us. It appears that Anatolia and Iran were the major suppliers of tin in the third and second millennia in western Asia.

In Anatolia ore veins occur near Ergani, in the Tunceli region, in central Anatolia, in the west near Uşak (in the Murat Dag), and in the northwest near Balikesir, whereas stream tin is found near Sivas

[12]Here *annakum* is interpreted as tin. For this there is every justification (Landsberger 1965; Laessoe 1959; Garelli 1963: 269–84; *CAD*: sub *annakum*). It is well known that lead is *abarum* in Akkadian. Numerous Akkadian texts refer to the alloying of copper with *annakum*, and it is tin-bronzes rather than lead-bronzes which are preponderant in Mesopotamia (Limet 1960: 64 ff). The case for *annakum*=lead, thus, no longer holds.

(in the Ak Dağ) and near Erzincan and Erzurum (SAT IX: 130–3; Muhly 1973: 257). Tin ores are also to be found in several localities in the Caucasus (SAT IX: 130–3). In Iran alluvial tin is found in the streams of Mt Sahend near Tabriz (Karajian 1920: 186; Muhly 1973: 261), and on the southern slopes of the Elburz near Damghan (O.G.S. Crawford 1938: 80–1). Both alluvial tin and tin ores in small quantities are available near the Shah Kuh in the Central Lut (GSI No. 22:58).

It appears that the Mt Sahend source and the sources in eastern Anatolia between the upper Euphrates and Van were the most important in the third and second millennia B.C., at least till the end of the Assyrian colony period (*c.* 1750 B.C.). Up to *c.* 1750 B.C. the Assyrian merchants were profitably carrying tin westward into Cappadocia, and Assur and Shemshara appear to have been important marts for tin (Laessoe 1959; Larsen 1967: 4). Muhly points out the existence of cultural ties between Old Babylonian Rimah and Hasanlu VI which produced Habur ware, and suggests that Hasanlu, Yanik Tepe and Dinka Tepe were associated in the tin trade. Hasanlu lies close to one of the principal routes from the Zagros into the north Mesopotamian plains, viz. the Rowanduz route. Several Middle Assyrian texts from sites in these plains, such as Assur, Nuzi and Billa, deal with tin (ibid: 290). Even in Late Assyrian times the 'Nairi lands' (lying between the upper Euphrates and Lake Van) were an important source of tin (Muhly 1973: 302–3, 290, 291).

Stream ores were reported near Byblos but apparently the availability of tin here is doubtful (Muhly 1973:258). Some ores are to be found near Aleppo (SAT IX: 130–3). Important tin mines in the Meshed area were worked until recently (Gowland 1912: 252; O.G.S. Crawford 1938: 79–80), while Strabo has mentioned the tin of Drangiana. Near Bukhara a rich source of alluvial tin was exploited at least as early as the middle bronze age (*c.* 2000–1600 B.C.) H. Crawford (1974) suggests that this tin could have been traded south towards Shahr-i Sokhta to join the lapis route.

Trade in copper, tin and bronze

It is not impossible that tin came to Seistan or to Afghanistan and India from the Meshed area (Vats 1940: 380). This is because vein ores are practically unknown in northwest India today, except for very sporadic occurrences in Banaskantha and Bhilwara (Agrawal

1971: 149–50). It needs to be ascertained whether the Harappans obtained tin from alluvial deposits, since depleted, in the Punjab or Aravalli regions.

Muhly believes that tin came into Mesopotamia from two different sources and routes. The first was an overland route bringing tin into northern Mesopotamia from northwest Iran, and the second the sea route from Meluhha. Whereas the first is well documented, as shown above, Muhly's arguments in support of the second are hard to accept. Gudea (Cylinder B XIV), refers to copper, tin, lapis lazuli and carnelian coming from Meluhha. This might indicate that the Harappans handled a transit trade in tin as they are known to have done with lapis lazuli. But it is important to note that there is no other evidence in trade or literary texts to tin from either Meluhha or Dilmun or Magan. Muhly has laid too much emphasis on the solitary Gudea reference[13] as he has on the idea that the trade in lapis lazuli and carnelian were necessarily associated with that of tin. Further, if we are to believe in a transit trade in tin being handled by the Harappans, it is necessary to locate the ultimate source of this tin. Muhly makes no suggestions in this regard. As indicated above, the nearest *known* major source would lie in the Meshed area. Muhly himself admits that in Afghanistan, where lapis lazuli originated, there are no confirmed sources of tin except perhaps in Kafiristan. It is, however, hard to believe that either the Damghan or Meshed tin sources were exploited in our period. Tin was *not* utilized by the Gurgan or Turkmenian settlements until the late second millennium B.C. (Muhly 1973: 261, 304).[14] In the urban period in Turkmenia the use of lead and arsenic bronzes seems to have been prevalent.

Muhly also cites as evidence for Mesopotamian tin imports from the Gulf, an argument that in the time of Rim Sin, Larsa was exporting tin to cities further north. Now the movement of tin between several cities of north and south Mesopotamia, though amply attested in Larsa period and OB texts (Leemans 1968; Dossin 1970; Sasson 1966a) is no simple matter for interpretation. There is considerable controversy regarding the directions in which the

[13]Muhly's interpretation of passages in 'Enki and the World Order' as referring to tin coming from Meluhha (Muhly 1973: 309) is unacceptable: the lines read 'May *your silver* be gold, may *your copper* be tin and bronze' (emphasis mine).

[14]Tin bronze is, however, attested at Shahr-i Sokhta (Piperno and Tosi 1975: 196).

metal was traded. Leemans in fact believes that tin came to Larsa from the north.

It is thus clear that Muhly's argument for tin being shipped from the Indian subcontinent to Mesopotamia is not supported by the present evidence. This is not to say that it is a total impossibility, especially if the Harappans had been exploiting local sources of alluvial tin.

In the ED period Lagash imported 'quality copper' from Dilmun (Lambert 1953b: 60–5).

In later periods copper was a major import from Dilmun, Magan and Meluhha. Magan is the land of copper mines[15] in Hh XXII and in the '*lipšur*' litanies (Reiner 1956: 147). An Akkadian period text from Adab mentions a bronze object from Magan (Limet 1972: 14–17).

But it is the 'trade' texts from Ur which reveal the singular importance of copper as an import from overseas. In the Ur III period the Nanna temple handed out quantities of merchandise from its storehouse to merchants 'for buying copper from Magan'. Tithes paid to the Ningal temple by merchants returning from Dilmun in the Larsa period included copper among other items. Sometimes this copper took the form of ingots, and sometimes, 'oblong pieces of bronze'. Large quantities are usually indicated, for example 18,000 kg in one case (Leemans 1960: 19 ff). Occasionally copper objects such as large kettles were also imported (Oppenheim 1954: 10–11)

Although Meluhha is nowhere described as a land of mines, copper from Meluhha was obtained by Gudea (Cylinder B XIV. 13–15)[16] and is also mentioned in Hh XI and in an Ur III text (UET III 368, Leemans 1960: 160, 161) which specifies different varieties of copper.

It appears that some of the copper from the Gulf reached Babylonia as well. There is evidence of trade in Dilmun copper between Mari and Tell ed Der in the late Larsa period (Leemans 1968: 215–16), and the Adab reference to Magan copper has been mentioned.

It is clear that Mesopotamia also imported copper from other regions. Gudea of Lagash mentions 'Kimash' as a source (Cylinder

[15]Literally, 'the land of the yield of the mine'.

[16]As translated by Falkenstein (Muhly 1973: 306–7, n. 542).

A XVI 15, Thureau-Dangin 1907: 107). According to Falkenstein, Kimash is to be located near Kirkuk, between the Jebel Hamrin and the Lower Zab (Muhly 1973: 232). Perhaps this region extended further northwest to cover the copper ore region of the Tiyari mountains reported by Layard.

Mari imported appreciable quantities of copper from Alašiya (Cyprus) along the Euphrates route (Dossin 1939: 11). In the Larsa period copper came to Uruk from the north, via Babylon (Leemans 1968: 215–16)

According to Leemans (1960: 121–2) copper was more expensive (in terms of silver) in Babylonia and northern Mesopotamia than in the southern cities during the Ur III and OB periods. This points to the importance of the Gulf route as a supplier of copper.

We cannot, however, conclude that all the copper trade moved in a westerly direction towards Mesopotamia. The evident trade patterns are decidedly more complex, and the subject of some controversy.

To recapitulate, neither the ore–artefact analyses available, nor ingot forms can point to the origins of copper and the directions in which it was traded. In the Harappa civilization, copper and bronze metallurgy was neither of fundamental importance nor developed to a high standard.

It does appear, however, that substantial quantities of copper were shipped via Dilmun to Sumer, mostly from Magan. The large copper resources of Oman and southeast Iran have been described. The few textual references to copper of Meluhha may refer to Harappan copper exports. As we had shown, copper is available in Baluchistan and Rajasthan. A west–east series of fortified Harappan settlements in northern Kutch (Chapter I), leading to Surkotada on the western edge of the Rann, and then to Amasri on the eastern edge and Sujnipur near Patan on the Sarasvati, might possibly mark the existence of an overland route skirting the Rajasthan desert from lower Sind to the southern extremity of the Aravalli copper belt.[17] It is thus not unreasonable to suggest that a certain amount of copper was exported westward from Harappan ports.

[17]In this connexion it is significant that the pre-Ahar culture of the Chambal system, viz. the Kayatha culture (Ansari and Dhavalikar 1975), dated c. 2000–1800 B.C., has produced two cast axes and a large quantity of bangles of presumably pure copper. The axes are thick and heavy examples of high-quality casting, unlike the

At the same time, as indicated earlier, there is no evidence that the Harappans exploited local resources of tin (there is no unalloyed tin at any Harappan site). The theory that the Harappans engaged in an onward trade in tin does not carry much conviction either. The Harappan use of tin (or, for that matter, arsenic) bronze thus requires explanation. In this connexion we may point out that post-Harappan copper-using cultures of northern India do not give any evidence for the use of tin or arsenic bronzes. It is known that the artefacts of the 'copper hoards' were made of either unalloyed copper, or lead alloys, and that at Ahar copper if alloyed at all was alloyed with lead (Sankalia et al. 1969: 199–203, 225–8; Agrawal 1971: 171).[18] Moreover, in the first century A.D. Barygaza was importing tin (Periplus § 21, 24, 29). Tin is not mentioned in the Rgveda (Macdonell and Keith 1912: sub *trapu*). It therefore appears that the tin-bronze of the Harappa culture was not a local product but was probably imported from regions further west. Although no texts mention the eastward movement from Mesopotamia of any metal other than silver, it may be pointed out that tin bronze is known at Barbar (Glob 1954b: 152) and Shahr-i Sokhta (Piperno and Tosi 1975: 196), and Yahya IV B (Lamberg-Karlovsky 1973: 35).

In summary, the preceding discussion has argued for the export westwards of a certain amount of copper by the Harappans; but the import of tin or bronze, if not from Mesopotamia, perhaps from Iran via several intermediaries.

Wood

It is well known that on the alluvial plains of Mesopotamia there are few trees which can offer good quality timber or logs of sufficient

thinner cold-hammered Harappan counterparts. More important, however, is the occurrence of beads of perhaps Harappan manufacture including two strings of respectively 160 and 175 carnelian, jasper and crystal beads, and a hoard of some 40,000 disc-shaped micro-beads of steatite from a Kayatha-period house floor. The latter type of bead is almost a type-fossil of the Harappa culture, and although there are no long barrel beads of carnelian at Kayatha, the beads of the two strings 'recall to mind those from Mohenjo-daro'. (Ansari and Dhavalikar 1975: 151, fig. 82; 5, 9, 115). It is not unreasonable to suggest, then, that the Harappans were exchanging beads for copper from the Kayatha people, but before such a suggestion is validated we need to ascertain the ores exploited by the Kayatha people and to ask under what circumstances they would have parted with copper for beads.

[18]The objects from earliest Kayatha await analysis.

girth for use in house construction, furniture making, or boat building. Thus it is not surprising that the trade and lexical texts mention many varieties of timber as coming from Meluhha, Magan and Dilmun. In fact wood appears to have been one of the earliest commodities traded: Ur-Nanshe of Lagash (ED III A) records the arrival of boat-loads of wood from Dilmun (Sollberger and Kupper 1971: IC3 a, b, c). In the course of his temple building Gudea acquired special kinds of wood and also had a divine chariot made of imported timber. Gudea refers to timber coming down from the mountains of Magan and Meluhha and from Dilmun, Gubin and the 'lowland' (Thureau Dangin 1907: 66 ff). Details are given in Table 2.1. In several Ur III texts special varieties of wood, specified as 'of Meluhha' or 'of Magan' or 'of Dilmun', are used for making furniture. The lexical text HAR.ra=*hubullu* specifies Dilmun, Magan, Meluhha and other regions as the sources of particular kinds of wood (Leemans 1960: 126, 161, 9). Finally, a year formula of Ilushuma (*c.* 2000 B.C.) from Eshnunna mentions the making of a throne of Meluhha wood inlaid with lapis lazuli (Leemans 1960: 125–6; Frankfort et al. 1940: 194 no. 121).

This textual evidence, tabulated in Table 2.1, remains the sole evidence for long-distance trade in wood. There are very few reports of the species of wood excavated at Mesopotamian sites. The identification of the various species in Table 2.1, therefore, remains hypothetical.

There are, however, numerous species which have been identified at the Harappan sites, and they include teak and deodar, two of the three most prominent general utility timbers of the subcontinent (the third being sal). These are set out in Table 2.2. The Harappans must have tapped several forested areas for wood, which was used extensively for house construction (Marshall 1931: 19, 277; Wheeler 1968: 47), and for agricultural implements, as well as for carts and boats. Harappan supplies of wood could have come from the Jammu ranges, the Panjab piedmont and the Siwaliks, from Girnar, and from the Sahyadris. Up to the early medieval period at least, judging from the evidence of Sanskrit literature and Chinese travellers' accounts, Saurashtra, especially the region around Mt Girnar, was thickly forested (Beal 1906: II: 269). The Western Ghats have been a valuable source of wood through the ages, and this wood was often exported, as the *Periplus* indicates (§ 36, etc.) The *Gazetteers* of Surat and Broach districts (1877: 41–3, 172, 181) indicate that the timber was felled by local people (including tribesmen) and brought down to markets at Bulsar, Karod or Bilimora on the coastal plain. Here it was sold to merchants who despatched the wood by sea to other regions. On this analogy it may be possible to interpret the Harappan sites of the west coast of southern Gujarat as involved in the collection of timber from the Sahyadris. It is, however, believed that these sites (such as Bhagatrav and Malvan) are late in Harappan history: it is thus strange that the Larsa period texts from Ur, which present the latest written evidence for overseas trade, make no mention of timber. For the moment it may be best to shelve the problem of the function of the coastal settlements of southern Gujarat.

We must also bear in mind the importance of the forests of the Siwaliks and the Punjab piedmont region. Here wood has until recently been a major natural resource. Traditionally it has been collected and transported down the Sutlej, Ravi, Jhelum and Chenab rivers. Substantial forests were noticed in the nineteenth century along the upper and middle reaches of these rivers (Andrew 1857: 170 ff). Moreover, the location of the sites of Rupar and of Manda near Jammu, points to the exploitation of timbers from high-altitude regions in the north.

Mesopotamia must have imported fine woods not only for 'prestige' purposes such as the building and decoration of temples and temple furniture, but also for functional objects such as carts, wagons, furniture and boats. Salonen (1939: 138 ff) gives a list of the species occurring in texts as boat-building woods. These are šu. dim.ma$_2$; *iṣu ša eleppi; gušuru; ašuhu* (fir); eren = *erenu* (cedar); *ṣarbatu* (mulberry); mes.ma.kan.na = *musukannu; huṣabu; qanû* (cane); and *ašlu* (rushes). Of these, *musukannu* alone features in the texts as originating from regions to the southeast of Mesopotamia.

Depending on the habitats of the different types of wood listed hypothetically as identifications of traded species in Table 2.1, and the occurrence of any of these at Harappan sites (Table 2.2), it should, theoretically at least, be possible to suggest which woods were transported from Meluhha to Sumer. Another clue to identification might come from a comparison of textual references to the uses of particular types with the known present-day uses of the species proposed as identifications.

TABLE 2.1 TEXTUAL REFERENCES TO TIMBERS TRADED BY SEA

	Imported from	*Textual References*	*Uses*
giš a. ab. ba = *kusâbku meluhhie*	Meluhha, Dilmun	Hh III; UET III 430, 660, etc. DP 18; 54 OIP 43:194 (Ischali) inscription of Ilushuma *c.* 2000 B.C.	furniture (Ur III); building construction (Gudea, Hammurapi); throne (Ischali)
giš.mes (ma.kan.na)/ (me.luh.ha) = *musukannu*, *mêsu*	Magan, Meluhha	Hh III; Hh IV; UET III 818, 1498; UET V 292	furniture (UET III); Chariots, boats
giš. MES.me.luh.ha = *ṣulum meluhhi* ('black wood of Meluhha').	Meluhha	Hh III	
giš. gišimmar = *tilmununu, asnu*	Dilmun	Hh III	in later texts, this timber is very valuable
giš.gišimmar = *makmanu*	Magan	Hh III	
giš. gišimmar = *meluhhū*	Meluhha	Hh III	
giš. esi = *ešû*, *ušû*	Meluhha, 'mountains'	Gudea Cyl. A, Statue B	temple building
'Magan reed'	Magan, Dilmun	UET III	container fittings, long dagger shafts, boxes, furniture (UET III)
All kinds of timber for building & statuary at Lagash	Dilmun, Magan, Meluhha	Gudea: Ur-Nanshe	building, statues
Cedar wood	Lagash to Dilmun (Lambert 1953 b)		
giš. mes.ha.lu.úb = *tatitu, haluppu*	Magan, Gubin, 'Lowlands'	Hh III; Hh IV; Gudea Cyl. A; Gudea Statue B	important in Sumerian literature. Furniture (Ur III); temple building (Gudea); chariots

CAD: 'a thorn tree'. Literally means 'sea wood'. According to Hansman (1973:560 ff) it is the common mangrove, growing in the Indus delta region and Pakistani Makran, and also in Oman (Miles 1919: 393), used today for parts of boats, houseposts, firewood (Watt 1893). But mangrove wood, though hard, is not particularly fine and it is difficult to imagine that it would have been valued so greatly in Mesopotamia. Probably it was *teak* (see *Tectona grandis*).

Mulberry according to *DAB*, and Wiseman (1953:120). According to Gershevitch (1957) it is *D. sissoo* on the following grounds: it grows in Kerman and India; Darius says 'yaka' came from Karmana & Gandhara; it was exported from India in the Classical period. Etymologically, O.P. yaka and the modern Persian for sissoo, are related. Note both mulberry and sissoo found in the Punjab, but only sissoo is known in the Harappan period (see *D. sissoo*).

Ebony (Leemans 1960:160–2). But ebony grows only in south India (Watt: 1893: sub *Diospyros*). In classical times, however, Barygaza exported ebony wood to Omana (*Periplus* § 36).

Date palm (CAD) Thick groves in Bahrain, Hofuf, etc. CAD: *asnu* = 'Dilmun date palm' (a variety of date palm), 'Dilmun date'. (Dilmun dates occur as temple offerings from the OB period onwards).

Date palm (CAD). Common in Gulf.

Date palm (CAD), *Phoenix sylvestris*, and *P. dactylifera*, the wild and edible date palm respectively, grow in almost all Harappan territory. But the latter may be a late introduction (Watt 1893, sub Phoenix). But why should this wood have travelled to Iraq, the land of superior dates? Remains of date wood and stones at Shahr-i Sokhta (Constantini 1977).

Ebony (Hansman 1973:560)?

Bamboo (Legrain). Does wild bamboo grow in south Iran or was it cultivated there at an early date? See *Bambusae*. Today there are small cultivated patches in the humid coastal areas of Makran (Hansman 1973:559).

CAD: an eastern species of oak. Oak grows on the Zagros slopes at altitudes above 6,000 ft. But it does not grow near the sea, nor does it seem likely in the Kerman Bampur area. Here, the present vegetation is mainly pistachio–almond–maple forest on higher altitudes. In the wadis myrtle, oleander, acacia, tamarisk, and poplar grow (CHI 1968: 287–97). Thus oak from Magan is still problematic.

TABLE 2.2 SOME TIMBERS IDENTIFIED AT HARAPPAN SITES

	Archaeological Occurrence
Tectona grandis (teak)	Lothal. Rao 1973: 50
Dalbergia sissoo (shisham)	Mohenjo-daro, Marshall 1931: 19
Dalbergia latifolia (rosewood)	Harappa. Chowdhury & Ghosh 1951: 3, 13–14
Cedrus deodara (deodar)	Mohenjo-daro, Harappa, ibid.
Saccharum arundinaceum (a reed)	Harappa. Vats 1940: 467–8
Pinus spp. (pine)	Harappa, ibid.
Acacia spp. (acacia)	Rangpur, Lothal. Rao 1962–3: 173; Chowdhury 1970: 141–2
Bambusae spp. (bamboo)	Harappa. Vats 1940: 467–8
Tamarix spp. (tamarind)	Rangpur. Rao 1962–3: 173
Zizyphus spp. (ber)	Harappa. Chowdhury & Ghosh 1951: 3–14
Ulmus lancifolia (elm)	Harappa, ibid
also *Albizzia; Soymida febrifuga; Adina cordifolia*	Lothal. Chowdhury 1970: 142–3

Provenance (Watt 1893; Trotter 1944)	*Use (archaeological evidence)*
Deccan; Konkani Sahyadri; Central India	ships, furniture & several others
Kerman; UP, Punjab in altitudes up to 900 m.	(rafters), boats, agricultural implements
N. Rajasthan, UP, Panchmahals, west peninsular India	(coffins)
High altitudes above 1200 m in NWFP, Punjab. Also in Iran (H. Crawford 1973: 233)	(rafters, coffins,) buildings, boats, oars. Principal timber of the Punjab (Andrew 1857: 170 ff)
A few pine species on mountain slopes of Punjab (Andrew 1857: 170 ff) at altitudes over 1000 m.	house building
Drier parts of India, Sind, Kutch, Kathiawar	buildings, carts, agricultural tools, furniture, ship parts
No wild bamboo in Harappan territory–cultivated in Makran	buildings, oars, masts
Sind, Punjab, Kutch, Iran (sandy & saline soils)	fuel
Punjab, etc.	(mortar)
Subtropical Himalaya east of Dehra Dun; altitudes 300 to 1500 m.	house building

But so far it appears that there is little concordance: only three species proposed as identifications in Table 2.1 (teak, bamboo and shisham) are known at Harappan sites. Of these, bamboo is mentioned as coming only from Magan.

Teak has always been much valued for building boats and has been continuously exported from western India to the Gulf. It is the timber *par excellence* of India, strong, durable and resistant to warping and shrinkage. Thus it is a serious difficulty that this wood, found in the archaeological debris at Lothal,[19] cannot be identified for certain as one of the woods mentioned in Mesopotamian texts.

In Meluhha originated 'sea wood', *mêsu*, 'black wood' and *ušû*. Neither the CAD or Hansman (1973) give really acceptable definitions of 'sea wood' (CAD: 'a thorny tree'; Hansman: 'mangrove'). The texts clearly indicate that 'sea wood' was valuable and useful for buildings and furniture. Although mangrove is a hard wood, it does not season well, and can scarcely be considered suitable for the manufacture of a throne inlaid with lapis lazuli. Today it is used for firewood, for certain parts of boats, and for house posts (Watt 1893: sub *Ceriops*). There is no justification for identifying mangrove with 'sea wood' merely because mangrove grows in estuarine regions and by the sea. In this connexion we may mention the statement of Theophrastus concerning a particularly fine wood used at Tylos (Bahrain), which survived admirably when immersed in water. According to Hourani (1951 : 90–1) 'this is almost certainly teak imported from India'. Teak therefore appears to be a more probable identification for 'sea wood' than mangrove.

Gershevitch (1957) has produced a convincing argument for the identification of *musukannu* = yaka (Old Persian) as *Dalbergia sissoo*. This wood came to Sumer from both Magan and Meluhha. Darius obtained it from Karmana and Gandhara. *Dalbergia sissoo* grows in Kerman and Seistan (Constantini 1977) as well as in the Indus region mainly on alluvial soils at altitudes below 900 m. Moreover, this wood has been found at Mohenjo-daro, where it was used for ceiling rafters. It is strong and elastic timber, useful for making boat frames and knees, for cart frames, for house building, and for furniture. These uses tally with those of *musukannu* wood in the Mesopotamian texts.

[19]Teak is mainly found south of the Narbada but does grow in southern Kathiawar as well (Sagreiya 1979: map 4).

'Black wood' has been identified as ebony. Today ebony grows only in southernmost India (south Konkan to Madras), and it is not attested at any Harappan site. However, according to the *Periplus* (§ 36), Barygaza exported ebony to Ommana. Another type of wood, *ešû*, has alternatively been identified with ebony. This Akkadian word denotes a type of wood as well as a kind of stone. Now na.$_4$ *ešû* ('*ešû* stone') is definitely diorite. Leemans (1960:11, n.5) suggests that giš. *esû* must be a wood resembling diorite, and therefore hard and black.

The 'date palm of Meluhha' is somewhat perplexing. Date palms are known in all Harappan territory, especially Makran, today. Date palm wood and date stones have been identified at Shahr-i Sokhta (Constantini 1977). But why date palm wood should have been carried to Mesopotamia, a land of date palms, remains to be explained: perhaps this was not an import but merely the name for a variety of timber.

Coming now to timbers of Magan: *mesu* has been discussed above, and the term 'magan date palms' is also understandable. Magan reed has been identified as bamboo. Bamboo is a major product of India. Bamboo is still cultivated in Iranian Makran, but the question remains as to whether the bamboo is indigenous to this region or was introduced later. This problem concerning bamboo from Magan will become clear after the chronological analysis in Chapter IV.

Bahrain, Hofuf and other parts of the Gulf littoral have until recently seen much date culture, and the date palm of Dilmun, which might refer to a variety rather than an import, is not surprisingly one of the specifically-mentioned timbers in the texts.

Stones

Royal inscriptions, lexicons and trade texts refer to the import by sea into southern Mesopotamia of several varieties of stone.

Especially important among these was diorite, na$_4$.esi = *ušû*, acquired in Magan by Gudea (Thureau-Dangin 1907: 67, etc.) Diorite is plentiful in the Makran mountain ranges (CHI: 85) and is also found in Oman (personal communication, R. Jäckli). Perhaps it was to one of these sources that Naram Sin referred when he mentioned the quarrying of stones in the Magan mountains for use in making statues. Occasionally diorite was also imported from Dilmun.

Among the other kinds of stone mentioned in the texts, only na_4.gug = *ṣamtu* is identified. This 'red stone' is almost certainly carnelian and according to the inscriptions of Gudea (Thompson 1936: 123–8) and the *lipšur* litanies, came from Meluhha. It is also mentioned in trade texts (UET V 286, 678, 546, 548) usually as a part of the tithes on the Dilmun trade paid to Ningal. Other sources were Aratta, Marhashi and Gutium (Leemans1960:18–36; Kramer 1952; Hh XVI).[20] It has been mentioned before that carnelian is available on Bushire peninsula, near Shahr-i Sokhta, in western Sind and in Gujarat. Considering that etched carnelian beads were sent to Mesopotamia from India, unworked pieces of carnelian may also have been traded at the same time. Thus Mesopotamia must have obtained carnelian from several sources including India.

Pigments

Of the various minerals used as pigments in the third millennium, one, namely red ochre, features as an item of overseas trade. Red ochre (na_4.z ú. im. sa_5) is mentioned as an import in UET III 751 and occurs in a list of articles presented to Ningal as a tithe on a trade venture to Dilmun (UET V 292, Leemans 1960: 207–8).

Red ochre is not to be found in Barbar territory, and thus, as is the case with many traded materials, we must assume that the Dilmunites functioned as intermediaries in its trade. Red ochre is available in many places in Kathiawar and central India, and also on Hormuz Island. At Hormuz the ochre is of a particularly brilliant shade (Marshall 1931: 32). Although the island is barren and has no prehistoric sites (Stein 1937), it is not impossible that Dilmunite sailors occasionally visited it in order to quarry the mineral.

Gold

Gold occurs as an impurity in most ores and can be a by-product of the smelting of copper, silver or lead ores. Whether in early times gold was obtained from these ores is however doubtful (SAT VIII: 154–7).

[20]Marhasi is perhaps the Zagros region to the northwest of Elam (Pettinato 1972: 115).

The techniques of production from gold ores are simple, as gold occurs in nature in the metallic form, and simply has to be extracted from its rocky matrix (if reef gold) or from associated sands and gravels (if it is placer gold). Extraction thus requires little more than breaking and crushing implements, or sluicing troughs and a plentiful supply of water, respectively.

In ancient times Egypt was a major supplier of gold for the Middle East, procuring the bulk of her gold from the Nubian desert. It was however only in the late bronze age, after the period under study here, that Egyptian gold was commonly used in the Levant and Mesopotamia. In Mesopotamia there are no references to Egyptian gold until the Kassite period(RLA : sub Gold). Prior to this period gold was relatively scarce in western Asia and it is important to note the lack of evidence for direct relations between Egypt and Mesopotamia in the third and early second millennia B.C. (Sasson 1966a: 166–7; Leemans 1960a; Ward 1964).

There are rich gold deposits in western Arabia, for example in Midian and the Yemen, the locale of flourishing kingdoms in later periods. How early on Arabia became a major exporter of gold, however, we do not know.[21] In the first millennium B.C. Phrygia and Lydia in western Anatolia were important gold producers.

Gold was mined by the famous Chalybes tribes in Armenia, but again, how early, we cannot tell. According to Karajian (1920: 138–49) alluvial gold is found in the Pontus; south of Lake Van near Shirvan; and in the sands of the Murad Su near Harput.

In Iran gold occurs in very small quantities in about seven localities in the neighbourhood of Zanjan, Damghan, Meshed–Nishapur, Hamadan, Anarak and Kerman. Some of this is reef gold, some placer (CHI: 514 ff). Important gold deposits lie at Muteh, northwest of Isfahan (Maxwell-Hyslop 1977 : 85).

Placer gold is collected from the River Kokcha in Badakhshan (Adamec 1972 : 32–3).

Gold is available in several localities in India: reef gold in Mysore, Andhra Pradesh, Madras and Chhotanagpur, and placer gold in Kashmir, the Punjab (in the beds of the Chenab, Indus and Soan), UP and Chhotanagpur (Brown and Dey 1955: 123–37). There is reason to believe that in southern India gold mining is of

[21] Certainly by the 1st century A.D. gold had become the main product of Arabia, judging from the evidence of the *Periplus* (§ 36 etc.).

considerable antiquity. Allchin (1962: 205–11) has pointed out that the southern neolithic sites such as Maski, Piklihal and Kotegal are situated within eight kilometres of the Maski gold deposits, and that the presence of large numbers of crushing and rubbing stones at some sites might indicate that gold bearing rocks lying near the surface were crushed. The gold from Kolar and Anantapur contains silver and Marshall has pointed out that the gold at Mohenjo-daro contains a substantial proportion of silver and is very light in colour (Marshall 1931: 29–30, 524). The same may be said about the gold from Lothal (Rao 1973: 116).

Is it then possible that the southern neolithic communities supplied gold to the Harappan people? The early neolithic period in the south is contemporary with the later Harappa period. Although gold is not known from the earliest strata of the neolithic sites of Karnataka (Allchin and Allchin 1968: 163, 284), and we still need to ascertain the date of the beginnings of gold working in the area, there are a few tantalising pieces of evidence which speak for possible Indus valley–peninsular India contacts. At Piklihal, Maski, Brahmagiri and Tekkalkota in neolithic levels small quantities of disc-shaped micro-beads in steatite paste occur (Allchin 1960: 109 ff; Nagaraja Rao and Malhotra 1965: 79–80).[22] At Piklihal in early neolithic levels was found a copper/bronze chisel, for which the excavator has noticed a close parallel from Harappa (Allchin 1960: 107, 125).

At the same time the use of fuschite for a cup at Mohenjo-daro (Mackay 1938: 320–1) and two beads at Chanhu-daro (Mackay 1943: 209), and the popular use of amazonite for beads at Mohenjo-daro, Chanhu-daro and Harappa (Marshall 1931: 525; Mackay 1943: 200; Vats 1940: 402–3) indicate possible connexions with the Nilgiris, although amazonite also occurs in Kashmir (Marshall 1931: 32, 678) and in the Sabarmati valley (Maloney 1969: 26). Also the amethyst which is found as lumps and in the form of beads at Mohenjo-daro (Marshall 1931: 526) and Chanhu-daro may well have originated in the Deccan (Marshall 1931: 526, 680; Mackay 1943: 243 ff).

While the problem of the southern gold remains unsolved, it is also likely that the Harappans obtained gold from the north. We

[22] It should be noted, however, that steatite is available in the Bellary region (Nagaraja Rao and Malhotra 1965: 79–80).

may mention here a reference in Jaina canonical literature to the Ṭankaṇa Mlechchhas of north India who brought gold and ivory for sale to the Deccan (Moti Chandra 1957–9: 8–9). Moreover, classical sources also appear to refer to placer gold from northern India. According to Herodotus, 360 talents of gold dust were paid annually as tribute by the Indian provinces to the Persian emperor. Herodotus states that this gold was available in a sand desert adjoining the Indian territory. Quintius Curtius (III: 9) refers to 'gold carried down by several rivers' and Strabo (XV:i:57), quoting Megasthenes, to gold dust in the mountains adjoining, presumably, the Punjab (McCrindle 1896: 187; Adhya 1966: 61 ff). These writers, however, also refer to gold dug up from the sand by 'ants' the size of foxes (Adhya 1966: 61–2), the meaning of which remains obscure.

It is not impossible that the Harappans exported gold to Mesopotamia. Gudea claims to have obtained gold[23] from the mountains of Meluhha (Thureau-Dangin 1907: 70–1). Merchants of Ur obtained gold from Dilmun in the Larsa period (Leemans 1960: 24, 27 ff), which means that gold was being traded down the sea route in this period. Finally, some Sumerian gold (including objects from the Royal Cemetery), like the gold from Mohenjo-daro and Lothal, contains a high percentage of silver (UE II: 294; Limet 1960: 43). (It should, however, be pointed out that long before the period of the Harappan trade, gold was known in southern Mesopotamia. It occurs in Ubaid period levels at Ur and in the Uruk–JN period at Warka).

It would be useful to have many more analyses of gold samples from the major sites. This would for one thing indicate, on the basis of the quantity of silver contained, whether the Kolar gold was used. Tin impurities in gold can indicate alluvial sources, as tin is rare in reef deposits, but can easily become incorporated with gold particles during washing. On the other hand copper is dissolved during sluicing and panning processes and its presence will indicate vein gold. More than about 1.5 per cent copper will, however, indicate deliberate alloying (Tylecote 1970: 22–3). Some Sumerian gold contains copper. Examples from the Royal Cemetery showed from 0.32 per cent to 2.65 per cent copper (UE II: 294), thus this

[23]guškin. sahar. ba, which means either gold in its matrix or gold 'dust' (placer gold) (Limet 1960: 46, 88).

was probably reef gold (ibid: 298). An Ur III text, UET III 452, states that copper and gold were alloyed for the manufacture of two earrings (Limet 1960: 45). It is possible that some Anatolian gold came into Mesopotamia when we consider the occurrence of platinum–iridium–osmium impurities in pieces from Ur and Brak (Maxwell-Hyslop 1977).

At least three varieties of gold are known in early Mesopotamian texts: ordinary gold, red gold and pure gold (Limet 1960: 42). Sometimes different qualities were melted together.

We can thus infer that in southern Mesopotamia the gold of several sources was utilized. The texts support this inference. Enmarkar demanded gold as well as lapis lazuli from the ruler of Aratta (Kramer 1952). Gudea obtained gold from Mt Hahum (as yet unidentified), and gold dust from Mt Kimash (probably the Western Zagros north of the Jebel Hamrin), and Meluhha (Thureau Dangin 1907: 66 ff). Lexical texts refer to Arallu or Harali as a source (HAR. ra=*hubullu* XXII, also *lipšur*). Hubu and Zaršu are other regions whence Mesopotamia obtained gold (RLA : sub Gold). The last three places mentioned have not yet been identified. Gold also came to Ur via Diimun in the Larsa period, as mentioned before. Finally, we may also note that a certain quantity of gold regularly came into northern Mesopotamia from the Cappadocian trade centres, as evidenced in the Cappadocian trade texts (Garelli 1963: 265 ff).

Tools used specifically for gold working are rare at archaeological sites. In Old Assyrian and Ur III graves at Assur, bronze pans with circular ridges and handles were found. These could have been used for gold washing (Maxwell-Hyslop 1970: 227–8). This indicates that there must have been localities where alluvial gold was available reasonably close to Assur (perhaps the 'Kimash' region?).

A gold worker's hoard of scrap pieces awaiting melting has been found at Mohenjo-daro (Marshall 1931: 522). Mackay (1938: 396) suggests that some beautifully made, carefully finished triangular chert objects at Mohenjo-daro were burnishers used by gold workers.

Mesopotamian texts such as the royal inscriptions, 'The Curse of Akkad', and 'Enmerkar and the En of Aratta' give adequate evidence for the ceremonial and prestige uses of gold. It was to a large extent amassed in temple storehouses and reserved for temple adornment and offerings (Limet 1972: 8–9) though also used for personal adornment. Gold was used for the making of cult statues, ceremonial cups, emblems of gods, and tiaras (RLA: sub Gold).

Gold in the form of ornaments and odd pieces has been found at Mohenjo-daro, Harappa, Lothal, Rangpur and Rojdi. There is none at Chanhu-daro. Gold jewellery includes beads of all shapes, conical bead caps, hair ornaments, bracelets and earrings. No real parallels have been found between these and ornaments from Sumer.

Outside Mesopotamia and India there are few finds of gold from habitation debris. In the deposit of the second temple at Barbar, a narrow sheet was found (Mortensen 1970: 394), while Stein (1931: 126) found a thin sheet with traces of ornamentation from the Kulli mound. In both cases the most probable source of the gold is India. In proto-Elamite levels at Tal-i Malyan the emblem of a miniature leopard in gold foil was found (Sumner 1976: 106, fig. 5n) and a few pieces of gold jewellery occur at proto-Elamite Sialk (Ghirshman 1938: 69–71). A very small quantity of gold foil was discovered at Shahr-i Sokhta (Piperno and Tosi 1975: 196). This might have come together with lapis lazuli from the Kokcha valley of Badakhshan.

Ivory

There are many references to ivory in Sumerian and Akkadian texts. A figurine of ivory is mentioned in an ED text from Lagash, which is a list of gifts from the queen of Adab to the wife of Lugalanda (RTC 19; Lambert 1953b: 58). Another ED text from the same site mentions pieces of unworked ivory (RTC 221; Sheldon 1971: 177–8). In Ur III texts ivory objects are often mentioned (in various contexts): small statuettes, roundels, furniture appendages and DAR.mušen. Meluhha ('birds of Meluhha') of ivory (Oppenheim 1954: 11, 15, n. 24). In Larsa period texts from Ur, rods, combs, inlays, boxes, spoons and breastplates of ivory feature as part of tithes paid into the temple by merchants returning from Dilmun (Oppenheim 1954: 6–12; Leemans 1960: 25 ff), and an OB text from Susa mentions ivory combs (MDP XXIII: 310; Oppenheim 1954: 11, n. 20).

It may be noted that Meluhha is mentioned in connexion with ivory only as far as bird figurines are concerned. Otherwise Dilmun is the only explicitly mentioned source of ivory. As pointed out in

Chapter I, Dilmun must only have dealt in ivory, and could not have been the producer.

Archaeologically elephant ivory occurs in Mesopotamia from the ED III period onwards, boar's tusk ivory preceding it in the earlier periods (Sheldon 1971). An ivory piece, forming part of a chair leg, was found at Ubaid in ED III levels (UE I: 39). At Mari, many ivory inlay and appliqué pieces were found in the ED temples of Ištar, Ninni-zaza, Shamash and Dagan (Parrot 1956: Parrot 1967; Sheldon 1971: 13 ff). The 'Ur Treasure', found in the contemporary palace at Mari, contained two female figurines of ivory, and silver and bronze pins with ivory heads (Parrot 1968: 18–22, 25; pls. VII; VIII; pl. XIII.3). At Kish a carved ivory dagger handle was found in a late ED III grave, and a plain ivory comb dates to the same period at the site (Mackay 1929: 135, pl. XXXIX.8, pl. LIX.6). In a grave from the Z area, Tell Ingharra (Kish), dating to ED IIIb, a miniature monument with human-headed ivory bulls (Moorey 1970: pl. XVII) and an 'engraved comb' (Watelin 1934: 50–1) were found.

In the G (Akkadian period) levels at Assur were discovered fragments of figurines and a pin made of ivory, some of which lay in the temple cella (Sheldon 1971: 36–40). An unpublished ivory comb fragment, pierced, comes from Akkadian levels of the palace at Asmar (As. 32. 367).

Sheldon (1971: 40, pl. 12) menions an ivory male statuette dedicated to Inanna, in Ur III Nippur.[24] At Ur two ivory pieces, a rod circular in section with broken ends (U 16294) and a circular lid with engraved line border and a central rosette (U 7903) date to the Ur III period (UE VI).

In the Inshushinak temple foundations (probably post Ur III in date: Hinz 1972: 82) at Susa a large number of ivory objects and fragments occur: statue fragments, rectangular pieces, discs, a pin, etc. (MDP VII: 119–21, figs. 411–33). Very often these bear incised decoration in dotted-circle or guilloche patterns. A few ivory pieces were found at the Elamite site of Liyan on the Bushire peninsula (MDP XV: 30–1, pl. VIII), but their date is uncertain. At Tepe Yahya ivory beads, a perforated plaque and other objects were

[24]A number of unpublished ivory pieces lie in the Iraq Museum: a toggle (U. 17927, IM 20972), two pins (As. 36, IM 9930; IM 9407); a comb fragment with dot-and-circle and parallel lines incised (IM 21904), etc. Unfortunately the dates and provenance of these were not available.

found in level IV B (Lamberg-Karlovsky 1970: 66; Sheldon 1971: 172, n. 14).

Much ivory has been reported from Bahrain. In the various tumuli excavated by Mackay et al. ivory figurines, rectangular pieces, boxes and rods were found (Mackay et al. 1929: 22–3, pl. I, pl. IV. 4, 5). In the 'Royal' mounds of 'Ali, Prideaux found two fragmentary ivory statuettes (Bibby 1972: 35). Durand (1880: 198) also reported ivory pieces from mounds in Bahrain. The date of many of these mounds is, of course, not established. But at both Barbar and Ras al Qala'a (Barbar period), ivory was found (Bibby 1957: 157–8; Mortensen 1970: 394). At Barbar Temple II were found two small pieces, sawn off from larger ones, and also part of a flat object decorated with dot-and-circle motifs. At Ras al Qala'a only unworked pieces were found (personal communication, Peder Mortensen).

At Harappan sites ivory is plentiful. Ivory tusks were found at Mohenjo-daro (Mackay 1938: 579), Chanhu-daro (Mackay 1943: 14), Lothal (Rao 1962: 23) and Surkotada IC (Joshi 1972b: 135). Large numbers of objects come from Harappa, Mohenjo-daro and Chanhu-daro, whereas Lothal and Surkotada have also produced some ivory. Ivory is indeed so common at Mohenjo-daro, that bone takes second place to it (Mackay 1938: 579). In the Harappa culture ivory was used for objects of everyday use such as containers, combs, kohl-sticks, pins, awls, hooks, toggles, gamesmen, 'batons', rods, scales, plaques, dice, inlay, furniture fittings and personal ornaments.[25]

As pointed out above, except for references to ivory figurines of 'Meluhha birds' there are no other textual references to ivory coming from Meluhha. Did the Mesopotamian ivory, then, come from Syria or Egypt or from India? Unfortunately it is not possible to distinguish African ivory from Indian except in freshly cut pieces.

Could Syria have been a source of ivory for the towns of lower Mesopotamia? The flourishing ivory industry of the Levant in the early first millennium B.C. is well known. The elephant is attested in Syria from about 1450 B.C. to the 8th century B.C.

According to Sheldon (1971: 147–7) there is no evidence that elephants were indigenous to Syria, or were found there before the

[25]Marshall 1931: 562 ff, pl. CXXXII, XLVIII, CLVI, etc.; Mackay 1938: 432–3, 439, pl. CXXXVIII, CXLIII; Vats 1940: 459–61, pl. CXIX, CXXXIV; Mackay 1943: 53, 171, 233–4, pl. LXXXIX; Rao 1973: 105; B.K. Thapar 1975: 31 no. 4).

mid-second millennium B.C. (A herd of elephants may well have been introduced to that region at this time). If so, Syria cannot have been the source of early south Mesopotamian ivories (see also Oppenheim 1954: 12). But we may point out that in Anatolia ivory is known in the chalcolithic period, and in Cappadocia, for example at Acemhüyük, Alishar and Kültepe, some ivory objects date to the Assyrian colony period. It is possible that the Anatolian ivory came from Syria (see Mellaart, comments on Adams 1974: 252–3).

In Egypt ivory was much in use from Old Kingdom times, and was imported from regions further south (Lucas 1948). Connexions between Egypt and Sumer from ED to OB times were only of an incidental nature and via several intermediaries (Ward 1964), and Egypt may be ruled out as a source of Sumerian ivory.

On the whole, although Syria is a possibility, we may infer that the major source of ivory for pre-OB Mesopotamia was India: originally, elephants were probably distributed over almost the entire Indian subcontinent except the Thar desert. The elephant, judging from its frequent appearance on Harappan seals, was either sacred to or very popular with the Harappans. The animal is usually accurately carved, often with a rug or covering cloth depicted on its back (Zeuner 1963: 275–9; 285–6). Thus it is likely that elephants were not merely hunted for their ivory, but were tamed. In this connexion, we may mention the occurrence of elephant bones at Mohenjo-daro, Harappa, Rupar and Lothal (Nath 1968: 3–6).

Ivory was known even before the Harappan period, at Damb Sadaat II–III (Fairservis 1956: 230, fig. 25). For the Harappans it was a common material for everyday objects, which indicates that ivory was cheap and therefore easily available. Further, the occurrence of tusks at several Harappan sites mentioned above points to local carving.

In Mesopotamia ivory is practically unknown (archaeologically and in texts) from the OB to the Late Assyrian periods (Leemans 1968: 216; Oppenheim 1954: 11–12). It may have been because of the ceasure of the Indian trade that the Mesopotamians were unable to procure ivory, until the Syrian ivories began to flood 'international markets'.

The archaeological and textual evidence for the use and handling of ivory in the Gulf also speaks for an India-to-Mesopotamia sea trade.

Finally, we may refer to the great tradition of Indian ivory carving[26] (Moti Chandra 1957–9), the imports of ivory from Ophir by Solomon (I Kings X 22), and the ivory exports by Barygaza in the first century A.D. according to the *Periplus* (§ 49).[27] It may therefore be concluded that India was the source of Sumerian ivory.

By the time it had reached Sumer, the price of ivory must have been high, for in Sumer ivory is not as in India a material used for household objects, but for ornamental purposes, usually found in temples or graves or as part of royal gifts as at Mari.

The excavated Mesopotamian ivories appear to have been carved in local style and tradition (Sheldon 1971: 85–6), but the Larsa period Ur texts refer to imported ivory objects from Dilmun.

With so little ivory having been excavated at Ur, we cannot expect a concordance between archaeological and textual data. Nevertheless, it may be useful to ask whether the ivory objects mentioned as imports in the texts, have counterparts in excavated Harappan pieces. Thus the tabulation on p. 116:

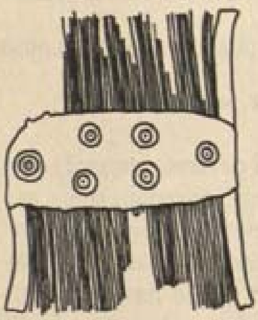


Fig. 1

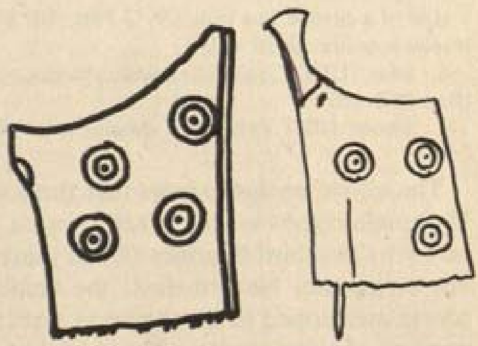


Fig. 2

1. Comb: incised dot-and-circle decoration, from Mohenjo-daro (after Mackay 1938: pl. C. 15). **2.** Comb fragment: incised dot-and-circle decoration, from Mohenjo-daro (after Marshall 1931: pl. CXIX. 6).

[26]It may not be out of place to mention here a reference in the Jaina canonical literature to ivory trade being in the hands of the Tankana Mlechchhas of northern India, who transported ivory and gold to the Deccan (Moti Chandra 1957–9: 8–9). The possible connexion between 'Mlechchha' and 'Meluhha' has been discussed in Chapter I.

[27]To be fair we must also point out that northeast Africa also figures as an exporter of ivory in the *Periplus*.

MESOPOTAMIAN TEXTS. IMPORTED IVORY OBJECTS IN 'TRADE' TEXTS—HARAPPAN EXCAVATED PIECES

1. *Combs* (UET V) Almost all Harappan combs have dot-and-circle incised decoration. Chanhu-daro (Mackay 1943: 196, pl. LXXXIX: 12); Mohenjo-daro (Marshall 1931: pl. CXXXII. 13, 21); Harappa (Vats 1940: 549, pl. CXIX.6, 1); Kalibangan (B.K. Thapar 1975: 31, no. 4); Surkotada (Joshi 1972b: 126).

(Ivory combs were found at Kish and Asmar; neither has the decorative motifs characteristic of Harappan combs. But an unpublished comb fragment, IM 21904, has incised lines and a row of dotted circles. Note so also the flat fragment with dot-and-circle incision from Barbar Temple II).

2. *'Meluhha birds'* (UET III) (no ivory bird figurines in Mesopotamia or India)

3. *'breast-plates'* (UET V) sometimes as offerings to ^{d} Ningal. If for temple statuary, would have been miniature:

Mohenjo-daro plaque, 3.8 x 2.5 cm, with male warrior on face (Marshall 1931: 562–3, pl. CXXXII. 10)

4. *'rods'* (PA. KUD) (UET V) Mohenjo-daro rectangular rods, circular batons, latter carefully finished and polished and often with incised hatching (Mackay 1938: 422–3, 432–4; pl. CIX, CX). Harappa: Kohl stick (Vats 1940: 460, pl. CXIX. 13, 15, 16). Lothal: Kohl sticks (Rao 1973: 105).

(One rod from Ur, U. 16294 (UE VI: 101), circular section, ends tapering but broken. Ur III in date)

5. *'boxes'* (UET V) Mohenjo-daro container (Mackay 1938: 324, 579, pl. CXLII. 48, 49, pl. CXLIII.15).

(Lid of a circular box from Ur, U 7903 (UE VI: 99). Convex, with 12-petalled rosette in centre. Ur III in date)

6. *'inlay'* (UET V) (on dishes, tables) Mohenjo-daro (Mackay 1938: 584), Lothal (Rao 1973: 105).

7. *'spoons'* (UET V) Harappa spatula (Vats 1940: 461, pl. CXIX. 57).

The above analysis shows that there is no perfect concordance: Harappan combs are not exactly similar to the Sumerian; there are no excavated bird figurines of ivory anywhere; and 'breast plates' are enigmatic. Nevertheless, the combs, rods, boxes and inlay pieces mentioned in Larsa period texts from Ur do have counterparts at Harappan sites. This fact and the dot-and-circle incised fragment from Barbar, speak clearly for a movement of ivory by sea from northwest India to Sumer.

Steatite and Greyware Containers

Containers of steatite—or sometimes chlorite (Beale 1973: 136)—carved with very distinctive designs, have probably the widest distribution among all the traded items discussed here. Tables 2.3 and 2.4 indicate the distribution, by category of decorative motifs or shapes, of these and of similar containers made in hard grey pottery. The distribution of steatite containers has been discussed by

TABLE 2.3 THE OCCURRENCE OF GREYWARE CONTAINERS

	Bampur IV-VI	*Kulli Sites*	*Damin*	*Yahya*	*Shahr-I Sokhta IV*	*Umm-an Nar*	*Shahdad*	*Susa*
Hut Pots	De Cardi 1970: 320–5, figs. 45, 46. Stein 1937: pl. VI, VIII. Many fragments. Also from Katukan. Stein 1937: pl. VI.		two fragments Tosi 1970: 44–5 fig. 23 A, B.		Tosi 1970: 44–5 Lamberg-Karlovsky & Tosi 1970: 43–4, figs. 147–150.	Buraimi burials. Bibby 1966: 94, fig. 12; Frifelt 1970. Umm-an Nar. cairns. Tosi 1970: 44–5	several complete vessels Lamberg-Karlovsky & Tosi 1973: 43–4	
Triangles Chevrons Hatched zones etc.	ibid.	Mehi Piggott 1950: fig. 10	Tosi 1974a: fig. 37	surface. Lamberg-Karlovsky 1970: pl. 26, G	ibid.	Buraimi. Frifelt 1970: fig. 3 Umm-an Nar. Tosi 1970: 44–5; Thorvildsen 1962: 213, fig. 20.	ibid.	level Dd (ED III B) MDP III: 24, fig. 16

NB: All designs incised

TABLE 2.4 THE OCCURRENCE OF VARIOUS TYPES OF STEATITE CONTAINERS

	YAHYA IV B	SHAHDAD	BAMPUR	KHURAB ETC	MAKRAN	KULLI	SHAHR-I SOKHTA	UMM AN NAR	BARBAR	MOHENJO-DARO
BASKET-WEAVE	Lamberg Karlovsky 1970: Pl. 23 A,K.	Catalogue Pl. XV C XI A	De Cardi 1970 319-20	?	Dasht valley. Piggott 1950: 118–19		Surface Kohl 1975 28 No. 2		Tarut: surface Burkholder 1971: Pl. III 1-2	Mackay 1938 Pl. CXLII, 45 Small fragment Very early stratum
BRAID AND WAVY LINES	Ibid: Fig. 23. J; Pl. 23.E, M Pl. 24.A		Ibid. (Level IV)							
INCISED TRIANGLES, CHEVRONS, HATCHING	Ibid: Fig. 23. F; Pl. 26.E	Ibid: Pl. XIV B, Pl. XI C		Stein 1937: 121, Pl. VI	Shahi Tump Stein 1931: Pl. XIII	Mehi. Stein 1931: Pl. XXVIII, p. 160 2 pieces.				
'HUT-POTS'	Ibid: Pl. 23.B/C D; Pl. 26.H	Ibid: Pl. XV D	Ibid: Stein 1937: Pl. VI.2 (Unstratified)	Katukan Stein 1937: Pl. VI					Tarut: surface. Ibid: Pl. III, IV	
DOT-AND-CIRCLE		Ibid: Pl. IX B, XI C						Common. Frifelt 1970: 375 ff. Fig. 3A, Fig. 14	Bahrain. Ltd. No. 520.50 Vessel, No. 521.1 (surface). Both unpublished Fragment, Bibby 1957: 157-8	
INTERLOCKED SPIRALS	Ibid: Pl. 23.I									
BRICKWORK	Ibid: Pl. 23.G, H; Pl. 26.C, F								Tarut; surface Burkholder 1971: Pl. III	
SQUARE/ RECTANGULAR, SHALLOW OFTEN WITH INCISED TRIANGLES	Ibid: 67 not illustrated. Ht. 2.0 cm: 8 cm square triangle motifs on base	Ibid: Pl. XIV A, B, both with lids, 4 compartments. One has alternating blank and vertically hatched squares. Other has incised chevrons in three registers				Mehi. Deep, with 4 compartments 2 large incised crosses on each side. Piggott 1950: 112-13, Fig 10		Buraimi. Frifelt 1970: Fig. 3A rectangular, 2 compartments, dot-and-circle motif		Marshall 1931: 369, Pl. CXXXI: 36, 37. Two examples. Hatched Triangles in 2 registers (on sides) 4 compartments.
CYLINDRICAL WITH HATCHED TRIANGLES CHEVRONS				Stein 1937: 121, Pl. VI. Slightly concave sided vase	Shahi Tump Stein 1931: Pl. XIII	Mehi. 3 pieces One compartmented (Stein 1931: Pl. XXX). Second has groups of parallel diagonal lines (Ibid: Pl. XXVIII). Third has triangles (Piggot 1950: 113, Fig. 10)				
PLAIN, BELL-SHAPED (EVERTED RIM, RING BASE)	Ibid: 81 Fig. 23.E,H,I	Ibid: Pl. IX B, E								
PLAIN, CYLINDRICAL OR WITH SLIGHTLY CONCAVE SIDES	Ibid: Pl. 23.U	Ibid: Pl. IX A.						Frifelt 1970: Fig. 3B During Caspers 1970a: Fig. 13.1.		
CONVEX SIDED WITH OR WITHOUT LUGS, INCISED CIRCLE OR LINE MOTIFS IN REGISTERS		Ibid: Pl. XI B (with lugs) and IX C (no lugs)							Bahrain bowl. No. 520 SP. unpublished	
NATURALISTIC: COMBATANT SNAKES HUMPED BULL	Snakes: Ibid: 87 (inlay holes)						Surface. Small fragment with lion and stylized palm. (Tosi 1969: 369.		Tarut, several (Burkholder 1971). Failaka inscribed 'Inzak' (Bibby 1972: 269) Bull: holes for inlay. (Kohl 1975: 27 No. 8)	

UR	MARI	DIYALA	WARKA	KISH	TELLO	NIPPUR	SIPPAR	ADAD	SUSA	MAL-YAN	BUSHIRE
UE II: Pl. 178 (PG. 800-ED III); Pl. 243.29; Pl. 241.10; etc. UE IV: Pl. 35 (2 examples)		Khafaje, ED. Houses (KH. V. 83) Unpublished Khafaje, Oval temple ED I-II (ED) (KH. IV. 60) Unpublished	W. 16884 (Ur III) Unpublished fragments	Field 1933: 94-5 Pl. II. 1, 2					Delougaz 1960: Pl. VI 8 Double vase		
UE II: Pl. 178 (PG. 800-ED III)	Parrot 1956: Pl. 51 (ED)							Delougaz 1960: Pl. 9C (Unstratified)			
	Parrot 1956 No. 284 Istar Temple (ED II-III)								Durrani 1964: Pl. I.11		
	Parrot 1967: 182 ff. Pl. LXXI Ninnizaza Temple (ED) Parrot 1956: Nos. 268, 131, 190, 171, 333 Istar temple	Khafaje Sin Temple IX (ED II) OIC 19:53, Fig. 58. Delougaz 1960: VII	W. 16531 (Pre-Ur III) W. 19757 (surface) Both unpublished		Parrot 1948: 102 Fig. 21 (Unstratified)		Durrani 1964: Pl. IV. 3 (Unstratified)	Delougaz 1960: Pl. 9C (Unstratified)	Delougaz 1960: Pl. VI 8 Double vase	Sumner 1972: 176	
UE VI: U. 283 Vase (Ur III) UE VI: u. 405 lid with knob (Ur III)	Durrani 1964: Pl. II. 7,8		W. 19817 G. Sinkasid-palace Larsa period Rim Sherd. Unpublished								Lid design infilled with white pigment. Date ? MDP XV. Pl. VIII. 4,5
			W. 21690 (IM 69557). Unpublished	Mackay 1929: Pl. XXXVI. 8 ('A' palace) ED II-III.					Durrani 1964: Pl. I.10		
UE II: Pl. 178 (PG. 800-ED III)	Parrot 1956: 113 ff. nos. 131, 465, etc.) Istar temple (ED II-III)	Khafaje, K. 443 Date ? Unpublished. Khafaje, Oval I (ED II) KH. IV. 37 Unpublished. Khafaje IM 31955- Rim sherd. Unpublished						Delougaz 1960: Pl. IX 8 with inscription of Mesilim (ED III A)	Ibid: Pl. I, 11, 12, 13		
			W. 21690 HT. 2 cm., 8.3 cm square. Base: guilloche and zigzag decoration. Unstratified. Unpublished								
UE II: 378 Pl. 245 Nos. 49-51 (ED II-III)											
PG 800, PG 1503 (ED III). During Caspers 1970: Fig. 13.2, 17											
			3 examples: One with lug. W. 16755; W. 19817 G: ? Date: Larsa and OB. All unpublished								MDP XV: 24, Pl. VIII. No lug. Date ?
UE IV: Pl. 173; Pl. 35 (above Larsa houses). Also other pieces.	Parrot 1956: Pl. XLVII and others (ED). Lion, snake, eagles etc.	Agrab, Asmar, Khafaje: Delougaz 1960: VIII Durrani 1964: Bull: Agrab, Kohl 1975: 29	W. 4489 Animals with curved tails. Date ? Unpublished		Durrani 1964: Pl. V; Eagle	Durrani 1964: Porada 1971: 374 several. Snake: Inanna VII (Kohl 1975: 25)			Ibid: Pl. I. 9		

Durrani (1964) and that of incised greyware by During Caspers (1970a). The accompanying tables contribute a few additions to the above compendia, including some unpublished pieces from Bahrain, Warka and Khafaje.

Before we proceed, we should note the use of steatite as a material. In Mesopotamia steatite was frequently used for undecorated containers, carved plaques, and numerous other purposes from the earliest times. Harappan sites have produced a great wealth of steatite seals and beads. Considering that this stone was almost invariably used for seals, it may be inferred that it was easily obtained by the Harappans from a constant and dependable source. Before the mature Harappa period, a limited number of steatite beads were used at Kalibangan, Pandi Wahi, and Ghazi Shah (Mughal 1970: 144, 331). Finally, steatite is also the material from which, besides other objects, hundreds of 'Persian Gulf' seals were made. These were probably manufactured at Failaka, where blanks have been found. Thus, like the Mesopotamians and the Harappans, the Barbar people also must have had continuous access to steatite supplies.

X-ray diffraction and neutron-activation analyses have been undertaken (Beale 1973: 136) to determine the sources of steatite used in different regions.

Steatite is available in several localities in Rajasthan in districts Jaipur, Sikar, Tonk, Bhilwara, Udaipur as well as in the Dungarpur, Sabarkantha and Banswara regions (Sethi 1956: 146–55). There are also sources of steatite in northern Baluchistan, approximately fifty kilometres north of Fort Sandeman and the Harappan 'outpost' at Periano Ghundai. Veins of steatite including chlorite are found at several places in the mountains of Makran (Mughal 1970: 194; Kohl 1976: 74).

What is popularly known as steatite is found in Oman near Muscat and in western Oman (Pilgrim 1908: 157; Kohl 1976: 74).

Chlorite is plentiful in the mountains near Yahya, where there is evidence of former strip-mining, and is also found in several localities in the western Zagros. Steatite also occurs near Bandar Abbas (Lamberg-Karlovsky 1970: 61; During Caspers 1970a: 30).

The great majority of the steatite vessels mentioned in Table 2.4 are very distinctive, and are strikingly uniform in decorative motifs and composition. Nevertheless, variations do occur, which leaves it doubtful whether they are to be ascribed to a single or to several workshops. Variations in detail may simply result from the fact that they were handmade (Kohl 1975: 29), but, more important, differences in the kind of stone used suggest that more than one manufacturing centre may have existed.

So far, Yahya is the only attested manufacturing centre.[28] At this site chlorite was in use in all periods, but in period IV B the large proportion of waste pieces indicates manufacture for exchange (Kohl 1976: 20). That Yahya was a manufacturing centre is also indicated by the fact that the widest range of steatite decorative forms occurs here. It may also be observed that steatite containers are mostly found in the area of Magan, as defined in Chapter I, and in Mesopotamia. A final pointer to Magan as the source of these containers is the evidence of the carved 'hut-pot' motif indicating wood and thatch architecture (Delougaz 1960). Although reed architecture is known in the marshes of southern Iraq, in general it is brick which was the building material of Mesopotamia. Reed and thatch houses are, on the other hand, especially prevalent in Bahrain, Oman (Azzi 1973: 226–7) and various other parts of the Gulf, in the Bampur valley (Harrison 1943: 216), Makran (Lorimer 1915: IIB: 1130 ff), and Seistan (le Strange 1905: 351). The making of baskets is an important industry in Bampur and Seistan, calling to mind the 'basket weave' pots made in steatite and greyware. Thus it is hard to agree with E. Carter (1973: 334–5) that the motifs on the steatite vases originated in Mesopotamia. Only the naturalistic motifs may have been Mesopotamian in origin (see below).

Whereas steatite vessels are widely distributed through the entire region from Sumer to Sind, the incised greyware is restricted to the sites of the Magan area, with one known piece from Susa. This ware is baked hard to resemble steatite, and its incised designs are clear imitations of those on stone vessels. But the greyware repertory of designs is much narrower, limited to hut–pot motifs and geometric designs such as zones of hatching, chevrons and triangles.

The incised greyware can be interpreted either as cheap imitations of a much valued kind of vessel, which would explain why greyware, except for one fragment, is absent at Yahya where steatite pots were plentiful. Alternatively, the greyware may have been

[28]During Caspers (1970a: 320) mentions unfinished vessels at Mehi, but gives no reference. Stein (1931: 154 ff) does not mention any unfinished pieces. Piggott (1950: 112) refers to 'some simple cups, one unfinished', from Mehi.

later in date and based on stone prototypes (During Caspers 1970a: 319).

In Mesopotamia the majority of steatite containers occur in temples or palaces or graves. The very fact that, for example, three typical examples were buried with Shub-ad (UE II: pl. 178) indicates that they were highly valued. It is, of course, equally likely that they were prized not for themselves but for what they contained: perhaps some special cosmetic or perfume (Piggott 1950: 112). In the latter case we will have to find out what precious ointments or liquids were available in southeast Iran, that were exported in such expensive and specially-made containers.

While it is clear that the pots were valuable objects, it is hard to accept Lamberg-Karlovsky's suggestion (1970: 66–7) that they were objects of ceremonial exchange. If gift-exchange is to be understood in the classic sense, then the wide-ranging findspots and the ubiquitousness of the objects must completely rule out such a possibility (see Chapter V).

There are only three examples of steatite vessels from Mohenjo-daro, and no incised greyware. (This is the only Harappan site where this kind of vessel was found). One small fragment with a basket-weave pattern comes from a structure belonging to very early levels (Mackay 1938: 321), but no other details about its findspot are available. Two examples of square/rectangular compartmented boxes made to take lids were found in one room in House XIII, in the VS area (Marshall 1931: 20 ff, 218 ff). This is a fairly large building with more than twenty rooms. The steatite fragments were found in a room which appears to have had clerestory windows and five deep niches with double reveals along one wall,[29] and which thus must have been the most important part of the building. Other objects from the building were alabaster pots, stone weights, and a figurine. Also found in the building were six seals and a hoard of 41 shell cores. It is very difficult to interpret the function of this building.

The basket-weave fragment from Mohenjo-daro has numerous parallels, in Mesopotamia, Susa, the Gulf and southeast Iran, as can be inferred from Table 2.4. The two other pieces, however, compartmented rectangular, one with hatched triangles point-to-base in two registers on the sides, have fewer immediate parallels. At

[29]This ornamental feature while not especially rare is not common in the architecture of Mohenjo-daro (Marshall 1931: 262, no. 2).

Fig. 3

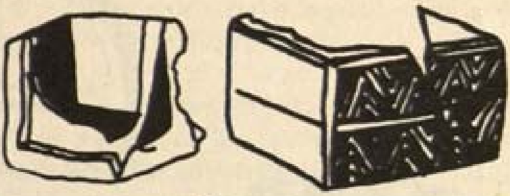


Fig. 4

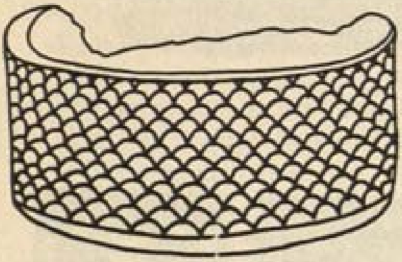


Fig. 5

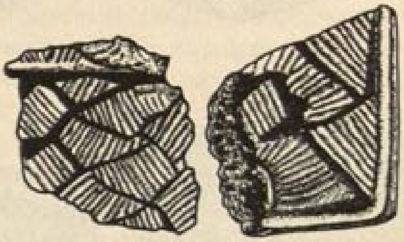


Fig. 6

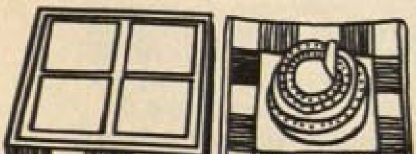


Fig 7

Fig. 8

3. Steatite vessel fragment: basket-weave pattern, from Mohenjo-daro (after Mackay 1938: pl. CXL II.45). **4.** Rectangular steatite containers from Mohenjo-daro (after Marshall 1931: pl. CXXXI. 36, 37). **5.** Steatite vessel with basket weave from Shahdad (after Shahdad Catalogue: pl. XI. A). **6.** Steatite basket-weave fragments from Yahya (after Lamberg-Karlovsky 1970: pl. 23. A, K). **7.** Compartmented steatite container from Shahdad (after Shahdad Catalogue pl. XIV. A). **8.** Compartmented steatite container from Shahdad (after Shahdad Catalogue pl. XIV. B).

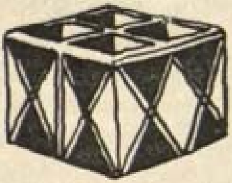


Fig. 9

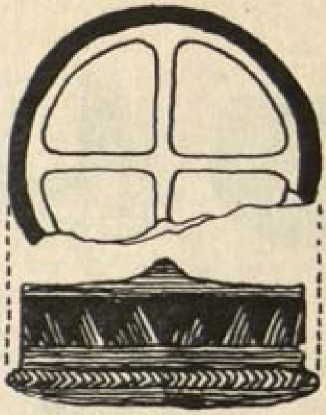


Fig. 10

Fig. 11

9. Incised compartmented steatite box from Mehi (after Piggott 1950: Fig. 10).
10. Cylindrical compartmented container from Mehi (after Piggott 1950: Fig. 10).
11. Cylindrical steatite containers from Kulli sites (after Piggott 1950: Fig. 10).

Shahdad a square container[30] divided into four compartments has alternating blank and vertically-hatched squares in two registers on the sides. Another similar container has three horizontal rows of chevrons. At Mehi a four-compartment box has two incised crosses on each side. A fragment from Buraimi is not really similar as it has two divisions and dot-and-circle decoration. Also in some ways similar to the Mohenjo-daro pieces are two examples, one from Yahya IV B, and an unstratified, unpublished vessel from Warka. Both are square with hatched triangles, point-to-base, on the sides in single registers. But they are very shallow containers (each two cm in depth), have no internal compartments, and are elaborately decorated on the base. Finally, one may also mention the similarity

[30]All references are given in Table 2.4.

of a four-compartmented vessel from Mehi with similar designs, but which is cylindrical in shape.

In Mesopotamia the majority of steatite vessels occur in ED II–III contexts, although there are a few examples from Ur III and Larsa levels also.

Unfortunately the complete corpus of pots from Yahya, Shahdad and Adab have not been published. The problem of deciding the source of individual pieces on the basis of stylistic features has also been mentioned. Kohl, however, has carried out laboratory analyses of more than 350 pieces, of which 109 were carved in the distinctive style. His results indicate that stone from different sources was utilized (1975: 29–31). The majority of pieces appear to have been manufactured from chlorite at Yahya, and used at Mari, Susa and Adab. A second group of chlorite vessels may also have originated at Yahya, of which examples are also found at Susa and Mari. At Adab, however, there are also 16 steatite pieces, and corresponding to these are single pieces each from Tarut, Kish and Mari; thus the Adab steatite must have come from a separate source. Equally interesting is Kohl's inference that there must have been a chlorite workshop east of Yahya. Chlorite pieces of this group occur at Yahya, Damin, Bampur and Shahr-i Sokhta. In this connexion it may be noted that small cylindrical containers, with or without compartments, with diagonal hatching or hatched triangles, are apparently restricted to the Kulli sites of Shahi Tump and Mehi.[31]

It may therefore be suggested that the Yahya-originating core category of widely distributed steatite vessels, with motifs such as the 'hut', basketry or imbrications, braid-and-wavy lines, and linear hatching or triangles, had a wide distribution especially west of Yahya, but that there were subsidiary workshops, one supplying Adab, and one perhaps in the Kulli region, where containers of a related type were made, having a much more limited distribution. If this is at all accurate, then we can suggest that Mohenjo-daro received the basket-weave fragment from Yahya and the boxes from the Kulli region. Whether the two sources were contemporary, or whether the Kulli products came on to the 'market' after the period of Yahya IV B, it is as yet too early to decide, but it has been

[31]Similarly, containers with naturalistic designs appear to be confined to Yahya, Shahdad, Tarut and Mesopotamia.

TABLE 2.5 THE OCCURRENCE OF ETCHED CARNELIAN BEADS BY DESIGN

DESIGN	TYPE	SHAPE	CHANHU-DARO	MOHENJO-DARO	HARAPPA	AMRI III	LOTHAL	GUMLA
CONCENTRIC CIRCLES 	I,II	Spherical or barrel	Mackay 1943: 199-202. Pl. LXXIX	Marshall 1931: Pl. CXLVI. 45; Mackay 1938: Pl. CXXXV. 19	Vats 1940: Pl. CXXXI.4		Rao 1962: 23	Dani 1970-1: 86; Fig. 8.3
PERIPHERAL RING 	I,III	Flat oval	Ibid.	Marshall 1931: Pl. CXLVI. 44; Mackay 1938: Pl. CXXXIV. 6	Ibid.			
FIGURE OF EIGHT  	I,II	Flat oval	Ibid. (Common)					
GUILLOCHE 	I	Spherical or long oval				Casal 1964: 155, Fig. 122.16		
COMPLEX LINES AND CIRCLES  	I,II	Rectangular or hexagonal; flat or round	Ibid.	Marshall 1931: Pl. CXLVI. 43; Mackay 1938: Pl. CXXV. 5				
CHEVRONS OR ZIGZAG 	I	Barrel	Ibid.					
HORIZONTAL LINES OR ETCHED ZONES  	I	Barrel		Mackay 1938: Pl. CXXXIV. 15, 16, 18	Ibid.			
CIRCLE AND DOUBLE-QUADRANT ARCS 	I	Oval, flat or lenticular	Ibid.					
SCALE MOTIF	I	Pear						
STEPPED MOTIF	II	?						

SEE BECK 1933 OR DIKSHIT 1949

NO DETAILS AVAILABLE FOR YAHYA SURKOTDA, KALIBANGAN LOTHAL

READ ALL REFERENCES VERTICALLY

⊗ *FOUND IN BURIAL*

* *UNPUBLISHED*

ROJDI I B	MUNDIGAK III 3	UMM AN NAR	HISSAR III	SUSA (Akkadian)	NIPPUR (UR III)	ASMAR (ED III TO LARSA)	UR (ED III TO UR III)	KISH (ED III)	AL HIBA (ED III)
Nanavati 1961-2: 424 5						Frankfort et. al. 1940 Fig. 105: (Larsa)	UE IV Pl. 28 Akkadian ⊗ UE II Pl. 133 ⊗	Mackay 1929: 184 6 ⊗	Hansen 1973: 69 Fig. 16
				MDP 29: Fig. 84 7				Ibid. ⊗	
	Casal 1961 Fig. 138					AS. 33: 130* (ED III) OIC 16: Figs. 31-2 (Akkadian)	UE II: Pl. 133 ⊗	Ibid. ⊗	
						Frankfort et. al. 1940 Fig. 105: (Larsa)		Langdon 1924: ⊗ Pl. XXIV 2 'A' Cemetery	
						AS. 32 232* Unstratified	UE II: Pl. 133 ⊗		
			Schmidt 1937: 229 Pl. XXXV			OIC 17 Fig. 29 (several from Akkadian palace and houses)	UE IV Pl. 28 (ED III) ⊗	Mackay 1925a: 698-701, Pl. X	
		During Caspers 1972a: 92			McCown et al. 1967 Pl. 150 10 ⊗	Beck 1933: 389 OIC 16 Fig. 32 (Akkadian)	UE II Pl. 133 ⊗	Mackay 1925b: 56-7 ⊗ 'A' Cemetery	
							UE II Pl. 133 ⊗	Mackay 1925a: 698-701, Pl. X	
							UE IV Pl. 28 ⊗ (Akkadian) UE II Pl. 133 ⊗	Ibid	
							UE IV Pl. 28		
							At Ur cemetery, found in 'Early Second Dynasty' and 'Sargonid' Graves (UE II: 374, n. 2)		

pointed out that the basket-weave fragment comes from a very low stratum of Mohenjo-daro.

Etched Carnelian Beads

The close typological similarities between etched carnelian beads from Harappan and Mesopotamian sites have been discussed by Beck (1933), Dikshit (1949) and During Caspers (1972a).

Etched carnelian beads have always been popular in India, and fairly widespread in distribution (Dikshit 1949: 1–10, 14). For this reason Gordon (1940: 10) believes that etched beads are poor evidence of cultural contacts. Yet it is quite certain that in the third and second millennia B.C. they were sent from India to Mesopotamia. The evidence is as follows.

In the first place, the technique of etching is as far as we know peculiar to the Indian subcontinent. Second, Table 2.5 shows that all (but perhaps two) of the design motifs on the Sumerian examples can be matched by beads from Harappan sites. Woolley (UE II: 374) has pointed out that these patterns are not characteristic of Mesopotamian art. Moreover, the lapis and carnelian beads at Kish appeared to have been made in different workshops. As shown in the discussion on lapis lazuli, beads of this material were made in Mesopotamia. Whereas carnelian is the harder stone (having a hardness of 7 as against 5.5 for lapis lazuli), the carnelian beads at Kish were expertly shaped and finished, whereas the lapis beads were not (Mackay 1925a: 699–700). Thus it is more than likely that the carnelian beads were not locally manufactured.

As in subsequent periods, the agate and carnelian of the Harappa culture probably came from the lower Narbada valley, more specifically from the Rajpipla mines.[32] The stones were probably sent downstream to the stations of Bhagatrav and Mehgam whence they could have been dispatched to Lothal and to Sind. Such a supposition would be supported by analogies from later periods. In the late nineteenth century the stone mined at Rajpipla was sorted and baked at a nearby village and then carted to the Narbada, down which it was shipped to Bharuch. From Bharuch it was shipped to Cambay. In the historic period Nagara, and later Cambay, were

[32]Carnelian is found in the Hab valley, in the Helmand basin and near Bushire (Whitehouse 1975: 129–30) as well.

agate manufacturing centres (Rao 1973: 102–3). It may also be noted that carnelian and agate were exported from Barygaza in Roman times (*Periplus* § 49– Schoff 1912: 193–4).[33] Etching techniques have survived up to the last century in Sind (Dikshit 1949: 1–2), and Fairservis has reported the occurrence of carnelian in the bed of the river Hab.

Archaeological evidence for the manufacture of beads comes from Lothal (Rao 1962–3: 23), which like Nagara and Cambay is well situated in relation to the stone deposits. There is also evidence for manufacture at Chanhu-daro where 15 complete, and many unfinished beads and rejects have been found (Mackay 1937: 13–15). More etched carnelian beads have occurred at Lothal than elsewhere (Rao 1962–3: 23), but details have yet to be published.

At Mohenjo-daro and Harappa etched carnelian beads were rare: not more than 8 have turned up at each site (Marshall 1931: 583; Mackay 1938: 505–7; Vats 1940: 400–2). This might indicate that the beads were primarily intended for export. That they were considered valuable is indicated by the steatite imitations which were made of them.

Dikshit (1949: 10–14) has described three principal types of etched carnelian beads based on technique and colour combinations. The most common type (I) had a design engraved and filled with white pigment on the natural (red) stone surface. Also known was the method of fixing white pigment on the surface and then etching a black design (Type II). The third type, with a black design etched on the natural stone surface is rather rare in our period.

Table 2.5 indicates that etched carnelian beads are to be found from the ED III to the Larsa periods in Mesopotamia. At Ur they occurred in graves dated from the ED III to Ur III, while at Asmar there are ED III, Akkadian and Larsa period examples. The two beads from Nippur are Ur III in date whereas the beads from al-Hiba and Kish are ED III.

The carnelian[34] of Meluhha is mentioned in several texts from the post-Akkadian to the Larsa period: Gudea's cylinder B (Thureau-Dangin 1907: 134–5), the Ninurta hymn (Kramer 1970: 279), *lipšur* (Reiner 1956) and the 'Vocabulary of Stones' (Leemans 1960: 10);

[33]The *Periplus* (§ 51) states that carnelian was brought to Barygaza from Paethana 'in great quantity' in wagons.

[34]For NA_4-gug - ṣandu, to be translated as 'carnelian', see Thompson 1936: 123–8.

carnelian is a typical import from Dilmun (in the form of lumps or beads) into Ur in the Larsa period (UET V-Leemans 1960: 23 ff).

Considering that archaeological and written evidence both cover the same general chronological periods it is surprising that there are no textual references to any item which may be interpreted as 'etched carnelian beads'. It is, however, possible that references to NA_4.BIR.gug in Larsa period texts (UET V, Leemans 1960: 23–7) as tithes presented to Ningal on return from Dilmun can be interpreted as imports of these beads.

Three examples of etched carnelian beads occur at Mundigak (Casal 1961: 242, fig. 138.28) and one at Umm an Nar (During Caspers 1972a); two were found at Yahya IV A (lowest levels) (Lamberg-Karlovsky 1976: 172). It is strange that none have occurred on the Barbar sites on the sea route. Considering the large numbers in which they occur in Mesopotamia these beads were perhaps manufactured mainly for the Sumerians.

Lapis Lazuli

Lapis lazuli is a mineral formed in crystalline limestone as a product of contact metamorphism near granite masses, and is therefore not widely distributed in nature.

It has been thought that lapis lazuli was formerly mined in Iran. Considering the evidence of Islamic writers and the distribution of metamorphic limestones in Iran, while we can say that Kerman and Dizmar (Azerbaijan) are two theoretically possible sources of lapis, hitherto geologists have found no trace of lapis lazuli in these localities. If one were to suggest that there were ancient sources which are now depleted, it should be borne in mind that as early as the Achaemenid period there were no sources in Iran, for Darius sent to Sogdia (Central Asia including Badakhshan) for lapis lazuli.

We shall therefore assume (along with most writers on the subject) that the Mesopotamian, Iranian and Indian lapis lazuli of the third and second millennia all came from the famous mines of Badakhshan, the only known source today. Attempts to match modern specimens from these mines with excavated pieces have yielded favourable results, especially as regards colour (Herrmann 1968: 21–9). Moreover, at Shahr-i Sokhta the excavated lapis lazuli, by its quartz and pyrite inclusions, can readily be identified as Badakhi in origin (Lamberg-Karlovsky and Tosi 1973: 46).

Information regarding the locale and accessibility of the Badakhi mines (situated at four or more points in the Kokcha valley) and the mining techniques in use today can be obtained from Herrmann (1968), Wood (1841), Nasiri (1962-3) and Sarianidi (1971) and will not be repeated here.

Table 2.6 shows the distribution of lapis lazuli at the excavated sites. On the basis of this distribution we shall attempt to trace the routes along which this stone was carried.

One route is attested by the modern track which follows the Kokcha river up (or south) from the mines, then goes along the Anjuman (or Karan) tributary, and passing over the Anjuman Pass, follows the Panjshir river to Charikar and Kabul. According to Barger and Wright (1941: 38–51) the journey from Jurm to Kabul along this route is a matter of a few days on horseback. There has been much traffic along this route in recent times (Herrmann 1968: 27). From Kabul, the age-old cross-roads of routes from all directions, there are much-frequented routes to India and Iran.

The location of the site of Khosh Tapa or Fullol (Tosi and Wardak 1972: 10–12) might indicate that the mines could also be approached by a route from the west. (Khosh Tapa has produced a hoard of metal vessels showing distinct Mesopotamian–Elamite connexions, and can be explained as a station exchanging valuable lapis lazuli for the manufactured goods of Mesopotamia and Elam. Thus its location may be taken as evidence for the location of a trade route for lapis). Khosh Tapa lies on the right bank of the Sohi Azora, a tributary of the Kunduz, a good bit to the west of the Panjshir–Anjuman route. Travellers like Wood, Barger and Wright approached the mines by this route, via Bamian and Khanabad, then eastward along the Kunduz and Kokcha rivers, and finally south up the Kokcha valley towards Sar-i Sang and the other mining villages. The region around Baghlan, Khanabad and Kunduz is rich in ancient mounds—unfortunately unexcavated (Barger and Wright 1941: 39–42; Tosi 10–12). This route avoids high altitudes and strenuous passes, but nevertheless is more difficult than the Anjuman route (Wood 1841: 251–64; Holdich 1910: 427, 436).

Where was the lapis lazuli carried from the boundaries of Badakhshan? The nearest ancient centres were Mundigak, Shahr-i Sokhta, Tepe Hissar and the Indus Valley. Of these, Shahr-i Sokhta (periods II–III) is the most impressive working centre for lapis. It

TABLE 2.6 THE OCCURRENCE OF LAPIS LAZULI

	SHAHR-I SOKHTA II—III	MUNDIGAK IV	SHAHDAD	EARLY INDUS	HARAPPAN
BEADS PENDANTS BUTTONS	Tosi 1968: 59-60	Casal 1961, 229, 240 ff; Fig. 138	Very common. Hakemi 1973 A	Sarai Khola, 11 beads (Halim 1972 : 16); Amri, Pandi Wahi (Mughal 1970 : 144) Jalilpur (Mughal 1972 : 124); Rahman Dheri; Balakot (Dales 1977) Mehrgarh	Mohenjo-daro (Marshall 1931 : 542-3 Mackay 1938 : pl. cxx-xvii Harappa (Vats 1940 : 59, 403, 441 Lothal (Rao 1973 : 102) Somnath; Chanhu-daro (Mackay 1943 : 209); Pabumath (Joshi 1966 : Fig. 5b) Jhukar (Majumdar 1934 : 11)
PIGMENT	Tosi 1969: 322-3				
INLAY					Harappa (Vats 1940 : 441) Mohenjo-daro (Mackay 1938 : 289)
PIN HEADS					
SEALS	Tosi 1968: 59-60				
VESSELS					
STATUARY					
AMULETS					
IN GRAVES	Piperno and Tosi 1975		Hakemi 1973 A		
AS CEREMONIAL GIFTS					
IN TEMPLES					
GAMESMEN					

NAL ETC	KULLI	BARBAR	ELAM	MESOPOTAMIA*	ELSEWHERE
Nal, several (Hergreaves 1929 : 32, 34, 43, Pl. XV a) Damb Sadaat II, one bead (Fairservis 1956 : 230)	Kulli (Stein 1931 : 123)	Barbar Temple II. Fragments cylindrical pieces. (Mortensen 1970 : 394 and personal communication) Beads from Ras al Qala'a (Ibid.)	Susa (MDP XXV: 190, 218, MDP XXIX : 15 114) Tall-i-Malyan (Sumner 1972 : 176)	Ur; Mari; Kish; Asmar (OIC 17 : 35-7); Khafaje (Ibid : 61); Taya (Reade 1968 : 248); Mentioned in Mari letters; ARM VII, 246, 248, etc.	Hissar (Bulgarelli 1974)
				Ur; Mari	Kultepe (Ozguc 1969 : 255)
	Mehi (Stein 1931 : Pl. XXXII		Susa D c/d. (Le Breton 1957 :19 Fig. 41)	Kish A cemetery (Langdon 1924 : 77) Several from Ur Khafaje (OIC 13 : 111)	Kültepe (Ibid.)
				Kish Mentioned in Mari letter ARM VII, 246	
				Ur. Royal cemetery, spouted cup	
			Susa (MDP XXV: 190, 218)	Khafaje, monkey (OIC 17 : 71, Fig. 61) Head of unknown provenance (Moortgat-Correns 1967)	
				Ur	
				Ur Royal cemetery Kish 'A' cemetery	
				Gift of Mesannepada to king of Mari (Parrot 1968 : 31-2, 43)	
				Mari : Istar Temple objects Khafaje : Model brick in oval temple foundations (OIC 19:36); Adab (Charvat 1974:164-165) See 'Enmerkar and the En of Aratta,' Cyl. A & B of Gudea etc.	
		3 conical gamesmen (Mortensen p.c.)		*Ref : Herrmann 1968 unless otherwise stated	

affords ample evidence for the large-scale working of lapis: finished and unfinished beads, hundreds of unworked lumps, as well as stone working tools. The latter are highly specialized and were found in clusters in well-defined areas of the site (Tosi and Piperno 1973: 15 ff). Only ten per cent of the total number of pieces are finished objects, which means that most of the produce was meant for export (Lamberg-Karlovsky and Tosi 1973: 46). From the Kabul region the lapis lazuli could have been transported down the Helmand valley to Shahr-i Sokhta.

Mundigak, showing in period IV.1–2 strong cultural ties with Shahr-i Sokhta II–III (Tosi 1969: 374), has produced a fair quantity of lapis objects (Casal 1961: 240 ff), but there is nothing like the intensive exploitation at Shahr-i Sokhta.

Interestingly, there is hardly any lapis at Mundigak after period IV.2, and it also appears that after period III Shahr-i Sokhta ceased to be a lapis lazuli working centre, for this stone is virtually absent in period IV (Piperno 1973: 120).

At Tepe Hissar there appears to have been much lapis working. During a surface exploration it was found that among the thousands of surface tools and wasters, there were many pieces which still bore traces of lapis powder (Bulgarelli 1974).

It is not impossible that Mundigak re-exported this material eastward towards the Indus Valley. Much lapis lazuli has been found at 'Early Harappan' Jalilpur, and apparently also at the Harappan sites in the vicinity of the Gomal Pass, which one would have assumed to be on the route between Kandahar and Jalilpur.[35] As Sarai Khola at the mouth of the Taxila valley has produced lapis lazuli which could have come along the Khyber route, it is possible that in the Early Indus period there was an independent procurement mechanism from the Kabul region.

No lapis lazuli has been found in mature Harappan contexts which indicate the use of the Khyber pass, which in turn would indicate direct supplies from northern Afghanistan. Lapis is known at the early and mature Harappan sites of Sind: in early levels at Balakot, at Amri, Mehrgarh, Pandi Wahi, Karchat, Chanhu-daro and Mohenjo-daro. It is more plentiful at the latter two sites than at Harappa, where only three or four pieces are known. As Kulli and

[35] There are as yet no demonstrable cultural links between the Gomal sites and Mundigak (Dani 1970–1).

Mehi have produced small quantities of lapis lazuli, and Mehrgarh enormous quantities in the Early Indus period, it is not unlikely that there was a lapis route into Sind from southern Baluchistan or the Bolan pass.

A little lapis has been reported from Lothal, Somnath, Umm an Nar and Barbar. This indicates that the stone was traded by sea. At Barbar temples I and II three conical gamesmen and two cylindrical beads were found, and at Ras al-Qala'a, a few beads (Mortensen 1970: 394, and personal communication).

In southern Mesopotamia lapis lazuli was known from the JN period onwards, whereas in the north it was used even earlier (Herrmann 1968: 21, 29–53). Many objects from the southern sites have been studied (Tosi and Piperno 1973), but no typological similarities were detected with those of Hissar or Shahr-i Sokhta. It appears certain that the lapis objects of Sumer were locally made.

The high proportion of waste pieces at Shahr-i Sokhta thus cannot be explained by suggesting that the finished objects made here were exported to Sumer. Tosi and Piperno (1973) thus suggest that blocks of stone were cleaned of cortex and impurities (which comprised 60 per cent of the adhering mass) at Shahr-i Sokhta and only then exported, so as to reduce the costs of transport.

Whereas this explanation is highly plausible, it is still not clear to what extent, if at all, Mesopotamia obtained lapis lazuli from Shahr-i Sokhta. According to texts, this stone came to Mesopotamia from either Aratta or Meluhha or Dilmun, and to Dilmun from Tukrish.[36] In epics such as 'Enmerkar and the EN of Aratta', Aratta is the sole supplier of lapis. In a hymn to Ninurta (Kramer 1970: 279) carnelian and lapis lazuli come from Meluhha. Gudea (Cylinder B XIV, Thureau-Dangin 1907: 134–5) obtained lapis from Meluhha. In Larsa period texts (UET V, Leemans 1960: 23 ff) lapis lazuli is often part of a tithe paid to the temple by merchants returning from Dilmun. But there is no textual reference to Magan (by which name we would expect the Mesopotamians to have referred to Shahr-i Sokhta) as a source.

It is thus clear that we cannot rule out the possibility that Harappan sites carried on a transit trade in this much-valued material. This would explain the sporadic occurrence of lapis in Bahrain and its paucity at the sites of Sind and Gujarat as the Harappans may

[36]The location of Tukriš is not known.

have preferred to re-export the stone which fetched a good 'price' in Mesopotamia, rather than to use it in bulk for home consumption. Against this theory however lies the fact that there is no mention in the excavation reports of unworked pieces of lapis at the Harappan sites. Similarly there are no unworked lumps from Bahrain.[37]

But as the texts and archaeological data indicate that lapis came to Ur by sea, and from regions other than Magan, it is equally difficult to interpret Shahr-i Sokhta as the immediate trading partner of Sumer.

At this stage we may consider the evidence of the epics 'Enmerkar and the EN of Aratta', 'Lugalbanda and Enmerkar', and 'Ensukushsiranna of Aratta' (Kramer 1970: 269–76; Sarianidi 1971: 15). These texts indicate that Aratta was situated reasonably close to the lapis mines or else that it held a monopoly on the supplies of this stone, and that the 'city' was organized under some kind of monarchical leadership. It was reached from Sumer by crossing 'the seven mountains of Anshan'.

Anshan, it is now known, was situated in Fars. Thus it would at first thought appear that Aratta was located in Kerman and that the major lapis-using site of third-millennium Kerman, Shahdad, is to be equated with Aratta. But considerable quantities of lapis were buried in the graves at Shahdad, and it is hard to imagine that at a transit station so much of the material was deliberately put out of circulation. It is easier to interpret Shahdad as a consumer of, and not a dealer in, lapis lazuli.

We had also indicated the difficulties in the interpretation of Shahr-i Sokhta as a trading partner of Sumer. Thus it is difficult to equate Aratta with Shahr-i Sokhta.

It is interesting to note that in the epics the Sumerians demanded from Aratta not only lapis lazuli but also gold, carnelian and silver. We may point out that the mines of Badakhshan produce besides lapis lazuli, rubies, sapphires and lead and that placer gold is available in the River Kokcha and is even today collected and taken to Kabul (Adamec 1972: 26 ff, 152–3, 32–3). Moreover, locally available carnelian was exploited at Shahr-i Sokhta, and a lead-silver alloy at Shahdad.

A possible solution of the problem of the identification of Aratta and the supplier of lapis to Sumer, based on relative chronologies, is offered in Chapter IV.

[37]Personal communication, P. Mortensen.

Who the ancient miners were, whence they came, we do not know. Today it is the people of the neighbouring lower countryside who come to work at the mines during the months when their fields do not require much attention and the miners' village at Sar-i Sang consists of about two dozen houses (Adamec 1972: 157 ff). Sometimes in the ancient past peoples from neighbouring areas visited a local source of stone, quarried it for themselves, and left. But in Badakhshan the mines are relatively inaccessible, situated at high altitudes in vertical mountain faces thirty kilometres from the nearest supplies of wood and food. However simple the actual extraction process, access to and survival at the mines would have called for considerable local expertise. The Harappan stations on the Oxus may however have controlled or directed the mining processes.

The evidence available indicates clearly that of all the regions involved, it was southern Mesopotamia which was the greatest utilizer of lapis lazuli. Lapis lazuli is not a material of any utilitarian value; it was used for personal ornaments or occasionally for ceremonial purposes. Lapis beads have been found in private houses, but the more spectacular finds have been associated with the graves of notables or ordinary persons (at Ur, Kish, Khafaje, Shahdad and Mehi), in palaces (Mari, Asmar), as part of hoards or ceremonial gifts (Mari, Taya), in temple statuary (Mari, Asmar and Khafaje), and in temple foundations as foundation tablets (Khafaje Oval and Mari Ishtar temples). Gudea utilized lapis lazuli for the furnishings of a sacred marriage chamber and for a deity's chariot. A year formula of Bur-Sin records the making of an emblem for Enlil in which lapis lazuli was used. A version of the Gilgamesh epic indicates that a lapis tablet recounting the exploits of Gilgamesh was locked in a copper box and placed in the foundations of the Ishtar temple at Uruk. In sum, lapis lazuli appears to have been valued for its rarity and for reasons of aesthetics and prestige. There is no doubt that in Mesopotamia at least it was a very expensive commodity. If it were desired by the ruling sections of society for ideological reasons and used in temple consecrations and funerary offerings, this would place substantial quantities of lapis lazuli permanently out of circulation, and in turn make necessary the acquisition of more. The Aratta epics reflect the great concern of a ruler when he was unable to procure the much valued stone for his temples.

It is therefore impossible that this commodity was incidentally dispersed westward towards Sumer. Its specific preferential distribution in the ancient cultures shows that Shahdad and lower Mesopotamia were 'end-monopoly' zones, and that Shahr-i Sokhta was only a preliminary 'manufacturer' and intermediary. The Harappans also appear to have been traders rather than consumers of lapis lazuli.

In the early stages it is likely that this 'trade' in lapis had a political–ceremonial rather than commercial nature. In the Aratta epics we see the prevalence of concepts such as cultural–political parity between rulers, and the desire to cement political relationships. It appears that either ceremonial exchange or forced tribute are involved in the relationships reflected in those epics. Perhaps a more 'commercial' form of exchange handled by the Harappans followed in later periods.

Pearls

In the merchandise imported from Dilmun in the Larsa period were included IGI.HA or 'fish-eyes', usually translated as 'pearls'.[38] In UET V 286, 292, 558, 678, etc. (Leemans 1960: 23–30), a few pearls (anything up to 26 in number) form parts of individual offerings to Ningal from merchants having returned from Dilmun. In one text dated to the reign of Rim Sin (UET V 428, Leemans 1960: 37) a loan of five shekels of silver is taken by a merchant 'for buying "fish-eyes" and other merchandise on an expedition to Dilmun'.

It has been suggested that these pearls came from Harappan territory. In Sind there was formerly a lucrative oyster industry, but the oysters found here and near Kutch and Kathiawar are the winnow oyster, not the true pearl. The winnow very rarely produces pearls, and they tend to be small and misshapen, thus valued more for medicinal than for ornamental purposes. In this connexion one might mention the heap of oyster shells found in a Mohenjo-daro house (Marshall 1931: 197).

[38] This translation is accepted by Thompson (1936), Oppenheim (1954) and Leemans (1960).

It is Bahrain which has since time immemorial been famous for its pearls.[39] Pearl banks are plentiful in the warm and shallow waters of the Gulf, off the Arabian coast between Saudi Arabia and Oman. The richest banks lie off the north and east shores of the Bahrain archipelago (Miles 1919: 414–17), and formerly much of Bahrain's wealth came from pearls. On the east coast of Qatar, settlements were formerly greatly dependent on pearl-fishing as a means of livelihood. Pearl-fishers' villages were located at Doha and Khor (Johnstone and Wilkinson 1960: 444–5; Bibby 1972: 141). In the large embayment formed between the peninsulae of Qatar and Oman lie numerous islands, some of which (for example Halul, Sir Bani Yas, Dalma) have excellent pearl fisheries in their proximity (Glob 1958a: 164–5; Wilkinson 1964: 337).

Besides the occurrence of several oyster middens on the Hasa coast between Jubail and Ras Tanura and al-Khubr, with associatd crude pottery, pestles and diving weights (Cornwall 1946a: 38; Bowen 1951b: 176), a pearling settlement of the Barbar culture itself is known to exist. This is the midden at Ras al-Jazayir, in southwest Bahrain. Here, along with pearl oysters, food refuse and red Barbar ware form the archaeological debris (Nielsen 1958). It is therefore the Barbar people and not the Harappans who must have produced the pearls which the merchants of Ur imported.[40]

Whereas mother-of-pearl[41] is commonly found at Mesopotamian sites, used for inlays, handles and decorative pieces, pearls themselves cannot be expected to survive in habitational debris. Nevertheless, a small number of pearls were found in a hoard in Level III (JN) at Uruk (During Caspers 1971a: 33). This testifies to the early date of pearl fisheries and trade, the texts testifying to pearl trade in a much later period.

Present-day methods of gathering pearls are so primitive that there is little doubt they were in use in the third millennium also. The equipment required comprises a boat manned by a few sailors

[39]These have been mentioned by Arrian, the *Periplus*, Isidorus Characenos, Khusrau, Ibn Batuta and others (Nielsen 1958: 157–60). Bibby suggests that verse 13 of Sura 35 of the Quran refers to the pearls of Bahrain: 'from both ye ... take forth for you ornaments to wear' (Bibby 1970: 274).

[40]In the *Periplus*, § 36, Ommana exports pearls to Barygaza and to Arabia. There is no mention of pearl exports from any part of western India.

[41]All three varieties of pearl oysters found in the Gulf yield mother-of-pearl (Lorimer 1915: I: 2226–7).

to carry the divers to the pearl banks; a sweep projecting from the boat, from which dives are made; and ropes, palm-leaf baskets, nose clips and stone weights which are tied to the diver's feet to enable him to plummet down to the sea bed.[42] The collected oysters are exposed to sunlight either on deck or on the nearest shore, opened and the pearls extracted. If the opening is done on land, oyster middens mark the location of divers' camps.

If in the third and early second millennia B.C., pearls were shipped from the Gulf to southern Mesopotamia, we would expect them to be sent to other regions as well. The evidence is scarce, but we do know of the occurrence of a single bead of mother-of-pearl at Mohenjo-daro (Mackay 1938: 585, n. 1), and of four beads of the same material at Chandu-daro (Mackay 1943: 205 n. 1).

Silver and Lead

Silver and lead will be discussed in the same section as their use has been interconnected.

Silver supplies are almost always obtained as a by-product of the smelting of other metals: lead, gold, copper and zinc. Native silver is a rarity and is never found near the surface of the earth or in alluvial deposits or gravels, as the action of chlorine in rain water reduces it to a chloride (SAT VIII: 202–3). Silver ores such as argentite and pyrargyrite, usually the decomposition products overlying lead ores, are generally absent in western and southern Asia. Silver is often found in native gold, and almost always occurs as an impurity in lead, copper and zinc ores (usually sulphides). More than two-thirds of present-day silver comes from lead and copper ores, and of the two, lead has always been the more important.

We shall therefore enumerate here the lead deposits known in western and south Asia. Of these, galena (lead sulphide) is the most common in ocurrence. Cerussite and anglesite can occur as the oxidized upper layers of galena. The following localities contain lead ores, mainly argentiferous galena. The most extensive deposits

[42] Oppenheim (1954: 7) has pointed out that an incident in the epic of Gilgamesh (Glg. XI 272–5) is strangely reminiscent of the traditional techniques of pearl diving in the Gulf. Gilgamesh ties heavy stones to his feet and dives down into 'the deep' to find the life-giving plant recommended by Utnapishtim. Bibby (1972: 172–3) goes so far as to suggest that this 'plant' was a pearl. In India at least pearls are supposed to have invigorating powers (Pithawala 1936–7: 316).

occur in Anatolia, and these usually lie close to the surface of the earth; the mines are almost inexhaustible. Those of Karahissar are richest in silver content. There are mines near Trabzon, Ergani, Erzurum, Keban, Sivas and Erevan in the northeast, as well as several mines near Kayseri and in Cilicia (SAT VIII; Karajian 1920).

In Iran, galena is reported from the area southeast of Lake Urmiah (Layard 1849: II: 417), from the Damghan area, from Neyriz in Fars, and from Anarak (CHI: 505 ff; GSI No. 21: 7–26). Many deposits occur in southeast Iran as well, in the Kuh-i Naiband and near Taerz where there are rich deposits and several old mines and furnaces, and near Tabas (Wertime 1968: 932–3; GSI No. 3: 65–8, 4); and in the Kuh-i Jebel Bariz and the Kuh-i Taftan (Skrine 1931: 335; Hansman 1973: 558). Lead is also found in the Zagros, in particular near the source of the Diyala (in the Sulaimaniyah region) and Greater Zab (between Lakes Van and Rezaiyeh). Ancient lead mines are known in Khorasan in the Kuh-i Binalud west of Meshed (SAT VIII: 206–15).

In Afghanistan, the Panjshir and Ghorband valleys north of Kabul produce lead and silver, and their mines were famous in the Islamic period (le Strange 1905: 350). Tucci et al. (1978: 334) report the occurrence of galena near the Helmand north of Mundigak.

Lead deposits are reported from the Kanrach valley in Las Bela, where copper is also found (Del'Hoste 1841–4b: 119; Lambrick 1964: 63–5). A local tradition associates lead mining with the 'Wudwa' folk whose capital was near Shah Billawal (Frere 1854: 349–50). Some galena veins occur in the Saindak region also (Khan et al. 1964; Vredenburg n.d.: 293–4).

In India, galena deposits are found in the Kulu Valley, in central India, and in Rajasthan (in Zawar, Kadbalia, Banswara and other localities). Silver can also be obtained from the gold of Kolar (Brown and Dey 1955: 156–63; Marshall 1931: 675).

Silver mining can be a difficult process when the ores are found at depth, and the smelting procedures for galena are also complex.

Very few analyses have been made of lead or silver objects of the third and second millennia. Isotopic analysis can help in lead ore–artefact correlations, at least in a negative way. But only the beginnings of such work have been made (Brill and Wampler 1967; Tylecote 1970: 23–4). Sporadic impurities analyses of Harappan silver (Marshall 1931: 523–4; Mackay 1938: 599–600) have not helped to locate any sources, but it is interesting that gold objects from Lothal have an appreciable silver content (Rao 1973: 116).

Archaeological occurrence of lead and silver and references in texts to usage

Silver is known from the Uruk period onwards in southern Mesopotamia, where its earliest occurrence is in the form of a spouted vessel and numerous fragments at Warka. It is mentioned in the Fara (ED II) texts (Limet 1960: 46). Numerous silver objects were found in the Ur Royal Cemetery. From the Akkadian period onwards there are frequent references to objects of silver (KU.BABBAR=*kaspum)* including vases, boxes and necklaces (Limet 1972: 6–8). In Akkadian period Tell Asmar, ingots, wires, seal caps and other objects of silver were frequently buried in pots in private houses (OIC 16: 47). A somewhat large quantity of silver occurs in a jewellery hoard from Tell Taya VIII (Akkadian period): 8 ingots, lumps, 38 rings, ring fragments, and 5 biconical beads (Reade 1968: 248).

Textual evidence indicates that lead (*abārum)* was used for figurines, instruments, axes, and glazes. Lumps of lead ore or of white lead are mentioned in texts (CAD: sub *abāru)*.

Silver weapons are mentioned in Elamite texts (Limet 1972: 6–8). In third millennium tombs at Susa, silver ingots, pieces of wire and jewellery have been found (de Mecquenem 1931: 335). At proto-Elamite Sialk some fragments of silver jewellery were found (Ghirshman 1938: 69–71).

No silver has as yet been reported from the Gulf sites or from Yahya, Bampur and the Kulli sites. This is somewhat surprising considering the numerous lead deposits in the Kerman region and the great number of objects (bracelets, pendants and plàques) of silver and natural lead–silver alloy found at Shahdad (Hakemi 1973a: 63–6).

At Harappan sites, lead objects are known and lead occurs often as an alloy in copper tools. Six per cent of the analysed copper tools from Mohenjo-daro and Harappa contain 1–32 per cent lead (Agrawal 1971: 155, table 32). At Chanhu-daro small, irregular lumps of lead have been found in various localities (Mackay 1943: 188); at Mohenjo-daro lead is scarce: a lump, a small ornament (Marshall 1931: 30) and a plumb-bob (Mackay 1938: 476) are the only objects; a fragmentary lead vase was found at Harappa (Vats 1940: 158).

There are substantial quantities of silver objects at Mohenjo-daro and Harappa such as vases, large vessels, jewellery and scrap metal. But silver is absent at Chanhu-daro (Mackay 1943: 190), and only a bangle and two indeterminate pieces have been found at Lothal (Rao 1973: 116). At Mohenjo-daro silver is more plentiful than gold.

Evidence for trade in silver

ED texts testify to imports by Lagash of silver from Elam (Limet 1960: 94–5). Sargon of Akkad mentions warlike campaigns to the 'silver mountain' (Hirsch 1963: 38), which was probably located in Anatolia. The hoard of silver objects at Tell Taya may also speak for a silver route from Anatolia to southern Mesopotamia in the Akkadian period. Manishtusu claims to have conquered Anshan and Sherihum, having crossed the Lower Sea and seized land up to the 'Silver Mines' (Sollberger and Kupper 1971: 104 ff).[43]

In his 'Cylinder A' inscription Gudea says after a reference to imports of copper from Kimash (the western Zagros region) that he obtained 'silver from its mountain' (Thureau-Dangin 1907: 106–7). It is reasonable to assume that the reference here is to the mountain of Kimash (see Limet 1960: 94).[44]

In the Old Assyrian period, the Mesopotamians appear to have set up an efficient mechanism for a steady and continuous procurement of silver from Anatolia where the best silver mines are to be found.[45] The caravans of the Assyrian merchants carried tin and textiles to Cappadocia in return for large quantities of silver (as well as gold) (Garelli 1963: Larsen 1967). The Kültepe texts mention many varieties of silver and refer to Kanesh, Binarama and other localities as sources of silver, but these were probably silver 'markets' rather than mining centres (Garelli 1963: 267–8). Numerous texts from different sites indicate that from Assur silver was subsequently traded southward towards central and southern Mesopotamia. For example, contracts found at Larsa which were

[43]Could this be a reference to the silver of the Kerman region?

[44]A reference to the silver near Sulaimaniyah?

[45]Forbes (SAT VIII: 194–6) suggests that the peoples of northeastern Anatolia (the Pontus region) were the first to develop a technology for the smelting of silver and lead.

drawn up in Eshnunna deal with trade between the two cities and indicate that silver moved southward along the Diyala valley into Babylonia (Leemans 1960: 57 ff, 130–1). From here it was probably traded southward to Ur.

In this connexion it is significant that whereas the Ur III texts dealing with the trade by the Gulf route make no mention of silver,[46] by the time of Rim Sin of Larsa, silver was one of the chief commodities traded by Ur for the Gulf merchandise. Silver was borrowed by Ur merchants who intended to make trade expeditions to Dilmun 'to buy copper there' (Leemans 1960: 36ff). Sometimes silver alone, and sometimes also other commodities (garments and oil) are mentioned as 'exports'. If indeed Anatolia had become the chief supplier of silver which travelled down to Ur or Larsa in the course of several transactions, then this pattern makes sense. For up to the end of the Ur III period there would not have been a very great quantity of silver in circulation in Mesopotamia. The Cappadocian merchant colonies were established somewhat later: Kültepe Karum II is generally dated to about 1900 to 1824 B.C. (or 1920 to 1840 B.C.), and Ib to about 1800 to 1750 B.C. Considering that the Larsa dynasty ruled from approximately 2000 to 1763 B.C., with the reign of Rim Sin about 1822–1763, that is, contemporary with Kültepe Ib, the increased exports of silver down the Gulf route during the late Larsa period are easily understood.

There is no silver in northwestern India before the Harappan period. Cuneiform texts testify to the eastward movement of much silver, especially in the Larsa period. It appears (except for the enigmatic reference by Manishtusu) that the Kerman region silver was not transported over long distances. Not only is silver first known in India during the Harappa period, but it is 'almost unknown in the later pre-historic and protohistoric contexts in the subcontinent' (Allchin and Allchin 1968: 285). There are no references to silver in the Rg Veda either (Macdonnell and Keith 1912: sub *rajat*).

All these facts appear to indicate that there was no indigenous production of silver in India until a fairly late period,[47] and that the

[46]However, in ED III b there were exports of silver (with wool) from Lagash to Dilmun (Lambert 1953b: 62–3).

[47]In a few graves of the 'Gandhara Grave Culture' a few silver ornaments do occur (Dani 1967: 29, 31, 191). This silver, however, may well have come from Afghanistan rather than from any part of the subcontinent. Throughout history the Gandhara region has been equally under Indian and Afghan or Central Asian influence.

Harappan silver came from Mesopotamia. (In all fairness, however, the possibility of its origins in Las Bela, Afghanistan or Rajasthan must be admitted).

Of all items of long-distance trade, silver appears to have been unique in that it was acquired less for use than for its 'exchange value'. The silver brought by the Assyrian caravans to Assur was not used for manufactures or put into temple or palace treasuries, but used to acquire more tin and textiles for transport back to Cappadocia (Larsen 1967: 8 ff; Garelli 1963: 265–7; Veenhof 1972: 350–1). Similar patterns are to be found in the dispersal of silver supplies southward from Assur.

We may therefore be justified in inferring that once substantial quantities of silver began to come into Mesopotamia regularly from the northwest, much of it was used for exchange in the Gulf trade and the major part of Harappan silver may thus have been acquired from this trade.

The trade in silver may have been important not so much because of its use-value as its exchange-value or function as currency.[48]

There is much evidence that in Mesopotamia from the Akkadian period onwards silver served as a means of payment, a unit of account and (less often) a store of value (Curtis and Hallo 1959; Hallo 1963b; Birot 1962; Limet 1972). This would mean that silver functioned as 'currency' (Balmuth 1975) or 'primitive money' (Einzig 1949), being characterized by limited liquidity and not exchangeable in all transactions covering the whole range of economic activities (Belshaw 1965).

In the Cappadocian trade, silver (and to a lesser extent tin) functioned as currency in that it was not put to industrial use or store in treasuries when it arrived in Assur, but was used to acquire further quantities of tin and textiles for export to Cappadocia. We have also seen that in the time of Rim Sin loans taken for capital for trading ventures to Dilmun consisted almost entirely of silver, although garments and oil were also borrowed (Leemans 1960: 36–47).

Did silver, then, function as currency in the trade encompassing the Gulf and Arabian Sea? In order to prove this we would need evidence that silver was not merely a Mesopotamian export but was

[48] 'Metal when used to facilitate the exchange of goods is currency; currency when used according to specific weight standards is money; money when stamped with a device is coin.' (Balmuth 1975: 293, quoting Seltman).

exchanged in several transactions and that it was valuable to the Harappans not only for direct consumption but also for re-export. On the other hand it is possible that as the Harappans were the major suppliers of goods in this trade, they were able to accumulate large 'balances' of silver (as did the Indians, several centuries later, of Roman gold) which they used for the making of vessels and jewellery.

Dice and Gamesmen

It was pointed out by Dales (1968b) that cubical dice occur in Mesopotamia as well as in northwestern India. The placement of the dots on a die from Pit X of the Royal Cemetery at Ur (ED III to Ur III in date) is the same as that on the majority of Harappan dice. A terracotta die from ED III b levels at al-Hiba has a dot arrangement with no parallels in Mesopotamia, but a parallel at Mohenjo-daro (Hansen 1973: 69, fig. 17; Marshall 1931: 551–2, pl. CLIII. 7–10). It may have been that the game of dice attained popularity over a world united to a greater or lesser extent by commercial interactions.

Another game which the seafaring merchants may have been instrumental in making internationally popular was one in which gamesmen were used. At Barbar, linga-shaped gamesmen were found which have identical parallels at Mohenjo-daro (Glob 1954: 152; Mackay 1938: pl. CXL. 12, CXXXIX.18, 21). Alternatively, as gamesmen occur frequently at Harappan sites, it is possible that Harappan traders whiled away their leisure hours at overseas ports with a game which they took around with them.

Bird Figurines

At Mohenjo-daro (Marshall 1931: 350, pl. XCVI.1; Mackay 1938: 295–6, pl. LXXI.28, LXXVII) and Harappa (Vats 1940: 302, pl. LXXVIII.3, 5, 6, 11, 15) were found clay figurines of birds on small pedestal bases or pierced at the base in order to be supported on a stick. The majority of these may well represent doves. A few similar figurines, but usually without the pedestal base, occur also at Chanhu-daro (Mackay 1943: pl. LVII).

Similar figurines are reported from Ur and Kish (Mackay 1931 466–7), some of which have no pedestal base. There are several examples from Akkadian and Ur III levels at Nippur also (McCown et al. 1967: 93, pl. 142.2–4).

While the similarities between figurines from Mesopotamia and India are too striking to be ignored, it is however not known where these figurines originated, and their exact significance is unknown. The dove is common in Iraq as well as in India.

Shells

In Mesopotamia shell was extensively used for inlays, statuary and other decorative purposes, and together with steatite and lapis lazuli, was one of the most important art materials.

At Harappan sites also, shell working is attested, and in fact shell was used more extensively than bone or ivory. Shell inlays, beads, gamesmen, bangles, ladles, feeding cups and other objects have been found at several sites. At Mohenjo-daro shell-workers' quarters have been identified by the presence of shankh shells and numerous inlay pieces and hoards of shell cores (Marshall 1931: 170, 219). Lothal was also a shell-working centre: complete shells, cores and finished objects have been found in two workshops (Rao 1962: 22–3). At Rangpur also there is evidence for shell working (Rao 1962–3: 149–55). The Harappans at Balakot were involved in large-scale exploitation of marine resources: here conch shell was used for the manufacture of beads, bangles and other objects (Durante 1977).

Many species of shell were used by the Harappans. Sea shells found at the sites include *Turbinella (Xancus) pyrum* L. (shankh), *Murex ramosus* L., *Fasciolaria trapezium*, *Cypraea* sp. (cowrie), *Arabica arabica* (cowrie), *Babylonia spirata* L., dentalium, mussel, and *Arca granosa* (marine ark). All these varieties are available in Indian waters, mostly off the Sind, Kutch and Kathiawar coats (Hornell 1951; Marshall 1931: 664–6).

In general it may be said that the shells used in Mesopotamia originated no further southeast than the Gulf, but there are a few exceptions.

In graves at Kish (Watelin 1934: 25–6) and Ur (UE II: 283, pl. 101a) shankh shells were found. These had been cut on the inside and around the orifices, to serve as ladles or lamps. They are duplicated by examples at Mohenjo-daro (Mackay 1938: 421–2) and Chanhu-daro (Mackay 1943: 231–3, pl. XC. 2, 17), and are clearly imports from India as the shankh shell is only to be found off the south and west coasts of India and does not occur in the Gulf (Hornell 1951: 21–7). Moreover, at Telloh perforated and engraved amulets were made from pieces of shankh shell (Hornell 1942a: 132).[49]

As to the date of these Indian imports into Mesopotamia, at Ur these occurred in graves PG 143 and PG 127. PG 143, classified as 'Pre-dynastic' by Woolley (UE II), is now believed to be Akkadian in date (Buchanan 1954: 151, n. 28). PG 127 is also Akkadian in date. At Kish the shankh shells were found in graves of the Y Cemetery and may be dated to ED III. Shankh shells have, incidentally, also been found at Shahr-i Sokhta where they were worked into bangles and seals. It may be noted that these finds came from the surface of the site (Tucci et al. 1978: 228; Durante 1977).

There are no references to shell imports from overseas in the texts, except for mention of *ajartu* as imports from Dilmun in the Larsa period texts from Ur. According to Oppenheim (1963), these were not 'white corals', as is generally believed, but 'a cowrie of a special kind'. It has been mentioned above that cowrie shells occur at Harappan sites.

Marshall (1931: 197) refers to a heap of oyster shells in a house at Mohenjo-daro. Other finds in this relatively unspectacular house were three troughs, perhaps used for dyeing, and, perhaps significantly, a round seal with Harappan design and script of the kind that has also been found in Mesopotamia. These oyster shells are not mentioned in the technical reports and appear to have been overlooked. Winnow oysters are available in the seas off Sind and Gujarat.

It is also important to note that a single bead of mother-of-pearl has been found at Mohenjo-daro and four disc-shaped beads of this material at Chanhu-daro (Mackay 1938: 585, n. 1; 1943: 205, n. 1). It is almost certain that this shell came from the Gulf as it is not available in western Indian waters (Jameson 1901: 372 ff). (In south Asia it occurs only in the Gulf of Mannar). Mother-of-pearl has also been found at Shahr-i Sokhta IV (Tosi 1974b: 164).

[49]Copies of shankh shells in gold, silver or stone are found at ED Kish, Asmar, Ur and Fara (Aynard 1966: 27–9, 34).

Monkey Figurines

In a Larsa period text (UET V 295, Oppenheim 1954: 12 n. 21) a monkey figurine of carnelian is mentioned. There are several indications that carnelian came to Mesopotamia from Meluhha. Thus it is likely that monkey figurines of carnelian also came from Meluhha (Leemans 1960: 163).

Several monkey figurines have been found at Mesopotamian sites dating from the ED to the Larsa periods, but there is only one which is made of a stone which may be carnelian.

As there are no monkeys or apes indigenous to Mesopotamia, or for that matter to the entire region from the Levant to the Kirthar mountains, one is led to conclude that either these figurines or else live monkeys were imported into Mesopotamia from India. This hypothesis is supported by the fact that comparable figurines are known at Harappan sites. Further, Leemans (1960: 5, n. 3) points out that after the period of the Indian trade, that is, from the OB period onwards, monkeys are depicted in an inaccurate manner in Mesopotamian art. Moreover, it appears that Harappan craftsmen were better acquainted with the monkey, as the true simian pose with rounded back and shoulders occurs more often in Indian pieces (for example, nos. 15 and 17 in Table 2.7, both from Mohenjo-daro) than in Mesopotamian examples (for example, no. 10, from Ishchali, has very human characteristics, with its straight back and square shoulders).

It can be argued that since monkey figurines are known as early as the JN period at Brak (Mallowan 1947: 42, pl. VII. 6, 7, pl. XI. 2) and Warka (UVB VIII: S. 52), and since several monkey figurines of Egyptian type have been found at Byblos (Ward 1964: 13–14), the Mesopotamian figurines were not Indian but Egyptian in origin. But the archaeological evidence available does not point to Mesopotamia–Egypt contacts, except of the most indirect kind, for the period under study (Ward 1964: 1–2). It is, therefore, just possible that the Brak figurines owe their ultimate origins to Egypt, whereas the majority of later figurines were Indian in inspiration or authorship. The Brak figurines appear to depict the cynocephalus baboon (Mallowan 1947: 42) or *Papio cynocephalus* in respect of the face and the length of the limbs. This species is today found in central Africa. On the other hand, the majority of the later figurines appear to depict an Indian species, as we shall attempt to demonstrate in the following discussion. Details of known occurrences of monkey figurines are given in Table 2.7. These figurines come only from Mesopotamia and northwestern India

TABLE 2.7 THE OCCURRENCE OF MONKEY FIGURINES

1. Figurine from Anu precinct, Warka, JN period.
   Seated.
   (UVB VIII S. 52)
2. Lapis pendant from private house at Khafaje, ED period.
   Squatting, hands on knees. No discernible tail.
   (OIC 17: 71, fig. 61)
3. Silver on bitumen pendant from private house at Khafaje, ED period.
   No discernible tail.
   (OIC 17: 71, fig. 61)
4. Shell pendant from surface, Khafaje.
   Squatting, hands on knees. No discernible tail.
   (Site Register Kh. VI. 44)
5. Gold figurine mounted on a rod from PG 755 (Meskalamdug), Ur, ED III.
   Squatting, hands on knees. Tail clearly visible on back.
   (UE II: 552, pl. 165)
6. Red stone figurine from Tell Taya. Akkadian period.
   Squatting, hands on knees. Tail not discernible. Drilled eyes.
   Flat back with arms incised.
   (Site Register TA 2727)
7. Frit figurine from Ur, Akkadian period.
   Squatting, hands on knees.
   (UE II: 300)
8. Figurine from Telloh, Ur III period.
   Squatting, hands on knees. No discernible tail.
   (Parrot 1948: 266, fig. 53b)
9. Crystal pendant (?) from Tell Asmar, Ur III/Larsa period.
   No discernible tail.
   (Frankfort et al. 1940: 204, fig. 105e)
10. Alabaster figurine mounted on rod from Ishtar Kititum temple level IIA, Ishchali, Larsa period.
    Seated, hands on knees. Cheeks hollowed, ridge on forehead, prominent muzzle, square shoulders. Tail?
    (Frankfort 1943: 20–1, 34, pl. 74)
11. Clay figurine from unstratified context, Nippur. Fragment.
    Hands raised. Hair grows straight back from forehead. Tail?
    (Site Register 6N 24)
12. White stone figurine from unstratified context, Nippur.
    Tail?
    (Site Register 6N 77)

13. Lapis lazuli figurine mounted on a rod from Shushinak temple foundations, Susa, Ur III period.
    Squatting, hands on knees. Prominent ears and muzzle. Tail not discernible.
    (MDP VII: 115, figs. 373, 398)
14. Clay figurine from Mohenjo-daro.
    Squatting, hands on knees. Incised hair on head (parted at centre) and body. No tail.
    (Marshall 1931: 351, pl. XCVI.11)
15. Figurine from Mohenjo-daro.
    Squatting, hands on knees. Rounded shoulders, in true monkey posture. No tail.
    (Marshall 1931: 351–2, pl. XCVI. 13)
16. Faience figurine from Mohenjo-daro.
    Squatting, hands on knees. Hair parted. Hollows for eyes, nostrils, mouth. Tail?
    (Mackay 1938: 304, pl. LXXVIII.4)
17. Clay pendant from Mohenjo-daro.
    Squatting, hands on knees. Rounded shoulders, in true monkey posture. Tail?
    (Mackay 1938: 310, pl. LXXX.2)
18. Faience figurine from Mohenjo-daro.
    Seated mother and babe. Three horizontal lines on mother's forehead. Mother has short tail. Open mouths.
    (Mackay 1938: 310, pl. LXXX.1)
19. Clay figurine from Harappa.
    Climbing a tree. Upraised tail. Incised hair on body, including spine. Hair appears to grow straight back from forehead.
    (Vats 1941: 304–5, pl. LXXVIII.36)
20. Clay figurine from Harappa.
    Seated, hands on knees. Monkey?
    (Vats 1941: 304–5, pl. LXXVIII. 36)
21. Alabaster figurine from Susa, proto-Elamite period.
    Seated, drinking. Very stylized figure, wearing collar.
    (Amiet 1966: fig. 73)
22. Alabaster figurine from Susa, proto–Elamite period.
    Seated, hands on knees. Rounded shoulders, no neck. Groove under shoulder blade. Ridged forehead. Muzzle realistically portrayed.
    (Amiet 1966: 116, fig. 74)
23. Red porphyry figurine from Susa, date uncertain.
    Seated, hands on knees. Rounded shoulders, hairline depicted, muzzle carved with horizontal ridges.
    (Amiet 1966: 200, fig. 150)

Van Buren (1939: 22–4) distinguishes the Mesopotamian monkeys depicted as figurines from those carved on seals, stating that the former are tail-less apes and the latter, monkeys. This is not accurate. In Table 2.7 it is shown that some statuettes do have tails (for example, no. 5). Occasionally tail-less squatting figures are shown on seals (see Frankfort 1939b: pl. XXVIe, XXVIIg, which are Ur III and OB in date respectively).

Monkeys with tails occur on cylinder seals of the ED III and OB periods. It would be noted that they occur on Cappadocian, Syrian and Mitannian seals as well (Frankfort 1939 b: pl. XIII h, XXVIII b, 244, 253, pl. XLI p, XLIIIi).

It is not possible to generalize about the actual species depicted by the monkey figurines, especially as details are visible on only a few, and some have been carved in a very stylized manner. It appears[50] to a layman's eye that there are five possible identifications:

1. The rhesus macaque (*Macacus mulatta*). This is the common monkey of northern India up to the Godavari (Prater 1965: 36–7). It has a medium-sized tail, and hair which grows back from the forehead without a central parting. (No. 11 from Nippur has the characteristic hair pattern. No. 19 from Harappa has an upturned tail and hair which grows back from the forehead).

2. The Barbary 'ape' (*Macacus sylvanus*). This is a tail-less macaque with erect hair growing on the forehead and crown. It is found in Morocco and Algeria and in Gibraltar (Napier and Napier 1967: 405).

3. The female baboon, *Papio hamadryas*. This is a monkey with a tail and a prominent muzzle found in Ethiopia, Somalia and southern Arabia (Napier 1967: 249). (No. 10 from Ishchali has a prominent muzzle and short tail).

4. The chimpanzee (*Pan troglodytes*), a tail-less ape with protruding ears, ridged forehead, flat nose and hair parted in the centre, common in central and east Africa (Napier 1967: 238). (Nos. 14 and 16, both from Mohenjo-daro, have parted hair and no tail).

5. The gibbon (*Hylobates hoolock*). This is a small ape (tail-less) with dense, shaggy fur and extraordinarily long arms and legs, found in Assam and Burma (Napier 1967: 172).

It will be apparent that nos. 14 and 16 from Mohenjo-daro, though superficially resembling the chimpanzee, are really not likely to be such because the chimpanzee is an African species. It therefore appears that the rhesus macaque and the female baboon are the most likely identification. The rhesus macaque is favoured

[50]It has been impossible to study the actual figurines and I have been dependent on photographs alone.

(Mackay 1938: 293–4; Parker 1955: 116, n. 4, quoting Zeuner) over the baboon. The rhesus macaque is not found in Africa today, and if the identification is correct, the figurines or the monkeys which inspired them came from India.

Why did so many monkeys or monkey statuettes come to Mesopotamia from India? Several of the Mesopotamian pieces are pierced for suspension and may have functioned as amulets or pendants. Others were mounted on poles or rods. Parker (1955: 116–17) has suggested that the imported monkeys must have captured the imagination of the Mesopotamians 'as suitable for repelling demons and evil spirits'.

The Kidney-shape Motif

In three Larsa period texts (UET V 286, 678, 546) tithes paid to Ningal by merchants returning from Dilmun include NA_4. BIR.gug, in quantities 1, 3 and 2 respectively (Leemans 1960: 23, 25, 27). Leemans interprets these as 'kidney-shaped beads of carnelian' because BIR means 'kidney'. There are *no* kidney-shaped beads at any Mesopotamian or Harappan site.

It has been suggested, therefore, that the texts cited above could have referred to other kidney-shaped objects such as stone inlays (During Caspers 1970–1: 114). But it may be pointed out that kidney-shaped inlays are not common either in Mesopotamia[51] or India.[52]

The NA_4.BIR, specified by the kind of stone, is a very frequent entry in the stone list MSL X, together with kišib (=seal) and lagab (=lump). Thus it must have been a very common object. It is therefore inferred that although BIR does mean 'kidney', these objects were simply 'beads' (personal communication, J.N. Postgate). Whether the UET V entries could then have referred to plain or etched carnelian beads, we cannot however tell.

[51]These occur in bone at Akkadian period Tell Asmar (OIC 16: fig. 32); on a JN period macehead from Ur, and on a steatite bowl dedicated by Shulgi (During Caspers 1970–1: 113–14). The so-called kidney-shaped shell amulet from Ur (UE IV: pl. 27) is not convincing.

[52]These occur in shell and faience at Mohenjo-daro (Marshall 1931: pl. CLV 38–44, CLVI 12, CLVII 34; Mackay 1938: pl. CVII 5, CXLI 11–13, CXLII 34) and in shell at Harappa (Vats 1940: 461–2, pl. CXXXIX 79, 84).

Thus we may for the present disregard the so-called kidney-shape[53] motif as evidence for culture contact.

Turquoise

Turquoise is one of the few materials which does not appear to have entered the maritime trade circuit. It is found in the Kerman–Seistan region (Marshall 1931: 678); in the region of the Kuh-i Binalud at Nishapur in Khurasan (CHI I: 68–9); and in several hills of the Kyzyl Kum desert where there is evidence of very early (*c.* 3000 B.C.) exploitation (Tosi 1973–4: 43).

Turquoise was used at several early sites in eastern Iran: Hissar, Shahr-i Sokhta, Iblis and Yahya. Although there is little evidence for turquoise in southern Mesopotamia, a few pieces are known at Mohenjo-daro (Mackay 1938: 500; Marshall 1931: 521–5).

We have seen that both archaeological data and written evidence testify to trade in the various materials. These two sets of sources however do not always coincide with or complement each other. For example, steatite containers and etched carnelian beads, found in such large numbers in Mesopotamia, are not mentioned in royal inscriptions, lexicons or trade texts. On the other hand, if it had not been for the Ur texts, we would never have known that textiles, foodstuffs and silver were exported from Sumer. Imports of timber into the various Mesopotamian cities are also evidenced solely by royal inscriptions and lexical lists. Our evidence therefore by its very nature is patchy.

In this connexion we may cite the analogy of the Cappadocian trade system, in which tin and textiles from Assyria were exchanged for silver and gold from Cappadocia. In spite of prolonged excavations at Kültepe, Alishar and other sites, there is little artefactual evidence for trade, let alone remains of the actual traded materials.

[53]This shape is not, as alleged by Leemans (1960: 33, 163) and During Caspers (1970–1: 113), both quoting Porada, a prevalent or characteristic Harappan motif. Besides the inlays mentioned above, the kidney motif occurs on pottery in one cited instance at Mohenjo-daro (Marshall 1931: pl. LXXXVII 4); and two at Harappa (Vats 1940: pl. LXVII 19, 32); on a miniature yoni ring and gold pendant (Vats 1940: pl. CXVII 7, pl. CXXXVII 8) both from Harappa; on a stone amulet (Mackay 1938: pl. CXL 59); and on the bodies of animal figures inscribed on copper tablets from Mohenjo-daro (Pande 1973).

The texts indicate that large quantities of cloth and metals were regularly exchanged and that the Assyrian merchants resident in Anatolia used their own calendar, language, and weights and measures in the pursuit of their commercial activities. Yet, were it not for their tablets and the 'Cappadocian-style' seals and seal impressions, the presence of foreign colonies at these sites, let alone of trading activities, would not have been detected.

The degree to which we should accept at face value textual references to specific commodities coming from specific places remains uncertain. In the historical period Bahrain was primarily an intermediary centre, to and from which many commodities were carried over long distances. It is clear that Dilmun in the third millennium played the same role, for although mentioned as the source of copper, timber, ivory and lapis lazuli, it could not possibly have produced these items, but only handled the trade in them.

The Roman–Indian trade presents interesting analogies to this situation, especially in the matter of trade secrets (Warmington 1928: 258–60; van Beek 1958: 147, n. 40 and 41). The most remarkable of these was the secret of the origin of cinnamon, much valued by the Romans. Cinnamon grows only in India and Ceylon and regions further east. But the *Periplus,* Pliny, Herodotus and other classical sources stated that the cinnamon bark and shoots came from Arabia and northeastern Africa. This misconception was due to the fact that Roman merchants had little direct contact with Indian merchants, whose ships were kept out of the Red Sea, and the Arab and African merchant middlemen found it profitable to conceal the source of cinnamon so that their near-monopoly of its trade could not be threatened. In fact, this trade secret was kept so well that when the Romans saw cinnamon leaves in India they failed to recognize them (Warmington 1928: 186–9).

Similarly, the Phoenicians kept their sources of the tin and lead which they traded over appreciable distances as middlemen, secret (van Beek, 1958: 147, n. 40, 41).

If the Dilmunites were professional traders engaged in 'cross-trade' (see Chapter V) then it is probable that they too had certain trade secrets. It may also be that they traded in such large quantities of materials such as copper that these were thought to be their products.

Because of the limitations of our data, few significant patterns emerge regarding the trade in different materials. For example, we cannot confidently decide which items were traded more regularly and in larger quantities, and which were less important. We cannot say that trade in bulk goods was subsequently succeeded by trade in luxuries, or vice versa: ivory, steatite vessels, lapis lazuli and conch shells were imported into Mesopotamia as early as wood or copper.

In fact it is clear that gold, lapis lazuli, pearls and copper came into the southern cities of Mesopotamia long before the period of the Indian trade.[54] In this connexion it is important to note that even during the latter period there were alternative trade routes into Mesopotamia for metals and wood.

As the evidence stands it appears that Mesopotamia was a kind of end-monopoly zone to which the bulk of the merchandise was directed. This may, however, be due to the peculiar nature of our sources: the availability of written documents only from Mesopotamia, the greater volume of archaeological data for Mesopotamia as compared to the other regions, and the perishable nature of commodities which may have been imported into Sind and Gujarat.

[54]Gold: first in the Ubaid–Uruk periods; pearls: JN period; lapis: JN period; copper: Ubaid period.

CHAPTER III

Trade Mechanisms

Under this heading we shall discuss the actual mechanics of exchange between cultures. The major element involved is, of course, transport. The data set out in the previous chapters show that the major part of long-distance trade was carried on between the Harappans, the Dilmunites and the Mesopotamians, and that this trade was to a large extent carried over the sea. Another possible means of long-distance transport, for example between the Kullis and the Harappans, or between the south Iranian cultures, is the pack animal. Obviously transport by river or by cart cannot have been utilized for trade between widely spaced centres, but was important only within the smaller geographic units defined by the various cultures. Thus we shall pay less attention to these.

Various other mechanisms involve the receipt, storage, despatch or actual handing over of goods: the packaging of goods, weights and measures utilized in computing their value; and the use of seals in the exchange of goods.

The mechanics of transport will throw light on the physical possibilities of long-distance exchanges: just how much could be traded, and how often. The other mechanisms will ultimately provide clues concerning the nature of the trade, that is, how far it was subject to state intervention or left to individual enterprise or chance. The findings of this chapter will thus lead to a discussion on the organization of the trade in Chapter V.

Sea Transport

In previous chapters we had referred to several factors which indicate that the major means of transport used in the trade between western India, the Gulf and Mesopotamia was the ship. The Ur texts make frequent references to imports and exports by sea, from Dilmun, Magan, and Meluhha. The Barbar culture sites with their coastal distribution, have yielded a number of elements of Mesopotamian or Harappan origin. Finally, the location of Sutkagen-dor and Sotka-koh speaks for the importance of westerly connexions by sea for the Harappans. For bulk and heavy goods, water transport is more efficient than land transport. Pelly (1863–4 a: 48) for example states that a 500-ton boat can carry as much cargo as a 3000-mule caravan.

If transport by sea were the major means of transference of bulk goods we must ascertain its efficiency at this early date. Had the sailors of the third millennium mastered the difficulties of sailing in the Arabian Sea and the Gulf? If not, the scale and frequency of trading expeditions would have been correspondingly limited.

We may enumerate the factors involved in the mechanics of sea transport as the design and construction—that is, the efficiency—of the boats used; the availability of adequate supplies for boat building and repairs; constant maintenance and repairs; the availability of shelter at sufficient places along the sailing route (a paucity of sheltered anchorages would mean that boats would have to be hauled up on to beaches and this would place limitations on the size of the boat and the weight of its cargo); the availability of supplies for crews along the route; and the direction of winds and the ability of seacraft to utilize them for journeys in chosen directions.

We have only meagre archaeological and textual evidence—and that usually circumstantial—on these points. Frequent references have thus been made to ethnographic and historical data for information on primitive sailing methods.

Boats

A few graphic representations and clay models from Mohenjo-daro, Lothal, Eridu and Warka present the only concrete evidence for the types of boats used. We need to ascertain how these ships were designed and constructed. If the visible features of these representations are compared with those of boats used in the more recent past, we may be able to obtain some clues regarding the efficiency of the third-millennium craft.

In the following discussion it will be shown that our ancient sailors probably used not only reed but also timber boats, oars as well as sails. It can thus be assumed that the long merchant run from the head of the Gulf to the Indian coasts was made by timber sailing-vessels. For the kinds of sails used we have only circumstantial evidence, and this is an important matter as it would determine the kinds of wind and weather conditions under which the ships would have been able to ply. Even a cursory survey of the ethnographic and historical evidence, however, leads to the conclusion that boats we would today consider primitive are surprisingly seaworthy.

Reed boats

A reed boat appears to have been depicted on a square seal from Mohenjo-daro (Mackay 1938: 340–1, pl. LXXXIII.30, LXXXIX A). One end has projecting sticks or fronds, and cross strokes over much of the length of the boat might indicate the tying of the reeds.

Fig. 12. Seal showing a reed (?) boat, from Mohenjo-daro (after Mackay 1938: pl. LXXXIX. A)

Boats made of bundles of reeds tied at both ends, sometimes having a metre high (presumably bipod) mast, were to be seen bv the dozen in the bay of Kuwait as late as 1939. These were fairly seaworthy, even if they did not keep the water out (Villiers 1952: 87–8). On the Batineh Coast also, there are similar small boats (called *shasha*'s), made of date sticks, bark and coir, and propelled with paddles (Wilson 1928: 21).[1]

The sailing experiments of Heyerdahl in recent years have proved that long ocean journeys by reed boat are indeed possible. In the Gulf the advantage of such boats would have been the low cost, as all wood for boats must be imported from distant regions such as western India. In general, however, we may say that there is no reason to presume that in the third millennium wood was not used for boats except in a few cases.

Row boats

There are several representations of row boats: silver and bitumen models from Ur (UE II: 71, 145, 154, 182, pl. 169a); a boat on a limestone relief from Ur (UE IV: 42, pl. 38); a seal design from Mohenjo-daro (Mackay 1938: 340–1) and a design on an 'amulet'

[1] An illustration of such a type may be seen in Goldsmith-Carter 1969: 4, although this is a river boat.

from the same site (Dales 1968c: 39); a few models and a multi-oared boat painted on a pot at Lothal (Rao 1973: 124); and rock carvings, unfortunately undated, of boats with several oars and steering paddles from the Jebel Jesasiyah in northeast Qatar (Bibby 1964: 104, fig. 4).

Row boats need to carry large crews and the necessary provisions for them, and thus can take comparatively little cargo. Moreover, oared ocean boats need to be finely built (Villiers 1952: 49–50). Thus the transport of bulk cargos such as cloth, grains, wood and metal over long distances in oared ships would have been more troublesome than in sailing vessels. It is therefore possible that the examples cited above, except for those from Qatar, were boats used for short-distance transport or for river transport. In the latter case the flow of river water reduces the manpower required to propel the boat. True, the earliest merchant ships in the eastern Mediterranean were propelled by oars. But in the summer (when trading activities were at their peak) the Mediterranean lacks reliable steady winds and only oars could get a vessel to its destination with speed (Casson 1971).

Oared boats such as the *hoori*, *ramas* and pearling *sambuk* (Wilson 1928: 20–1, Villiers 1952; 198–203, pl. 6) were in use in the Indian Ocean and the Gulf until recent times. But these are short-distance fishing or pearling craft, often built for negotiating between reefs in shallow seas, and are not good analogies for cargo boats.

Oared boats, in brief, are useful for river transport or for short-distance sea transport when there are no backing winds, and compared to sailing boats of the same size carry less cargo weight.

Sailing boats

We can be fairly certain that ships which made the long run from Gujarat or Sind to Mesopotamia used sails, although they may have had arrangements for rowing as well.

A graffito on a sherd from Mohenjo-daro (Mackay 1938: 183, pl. LXIX.4) shows a boat with a sharply upturned prow and stern, a mast, a yard and probably a furled sail (or two yards) and an oar or steering-paddle. The greatly upturned ends are somewhat unusual for a sea boat. In fact Mackay suggests that this was a river boat, its ends suitable for docking at steep river banks.

At Lothal, terracotta models of sailing boats have been found. One type has a keel[2] and upturned prow and stern though this is not very clear in the picture. Three blind holes probably represent sockets for the mast, for the sail riggings, and for a post which could have supported a steering paddle (Rao 1973: 124, pl. XXXV B). The steering paddle fixed to the hull is, as a means of propulsion, an advance over the free steering oar held in the hand of the helmsman as seen on the earliest sailing ships (Phillips-Birt 1971: 24–39). The relatively flat base of the Lothal model is also of interest. Flat-bottomed boats are most useful for sailing with cargos in shallow tidal waters under a single sail (Greenhill 1976: 197 ff).

From Mesopotamia there are at least two models of sailing ships, one from Ubaid levels at Eridu, and the other from Larsa period remains at Warka. The former is a wide boat, oval in shape, with a fairly sharp prow and stern, a mast-hole slightly off-centre, and three holes on the edges, probably for securing the sail ropes. The ends are upturned, the sides high, and the base rounded (Barnett 1958: pl. XXI b). The Warka model, however, has a flat base. Neither of these examples has a keel.

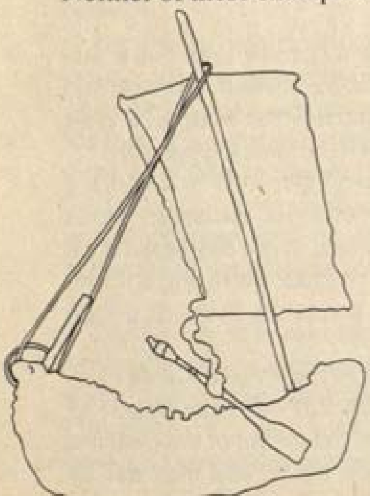


Fig. 13

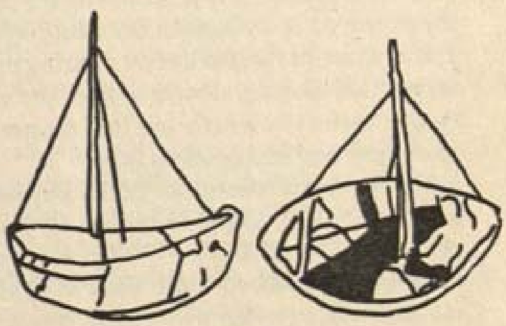


Fig. 14

13. Clay model of a sailing ship, from Lothal. **14.** Clay model of sailing ship, from Eridu (after Barnett 1958: pl. XXI, b).

[2]A device which gives lateral resistance and prevents the boat from being blown sideways by the wind.

Although this evidence is obviously inadequate, certain design elements in these representations are of interest. The Eridu example has a deeply rounded base whereas the examples from Lothal and Warka have flat bases. Flat-based timber boats are easier to build (Greenhill 1976: 197 ff), are faster boats, and are especially useful in shallow waters where rocks or sands prevail. On the other hand round-bottomed boats have greater displacement and take more cargo. The Lothal piece illustrates a boat of narrower design than the Mesopotamian examples. Narrow boats without a pronounced widening towards the centre are again useful for coasting trips, being easier to manoeuvre, quicker, and also more resilient to strong winds than wider-bodied vessels. On the Eridu example, the slight sharpening of stem and stern would have given a certain amount of resistance in rough weather to the vessel which lacks a keel. The slightly raked stem of the Lothal boat—not obvious on the Mesopotamian examples—also adds to resilience in heavy, rolling seas and facilitates banking the craft. Considering that it was the Harappans alone who had easy access to good boat-building timbers, it would not be surprising that they were ahead of their contemporaries in boat construction.

Several features of the Lothal boat are also to be seen in the first millennium Phoenician trading ship. This ship had a sharp stem and stern with the stern-post incurved, a relatively flat bottom, a mast carrying a square sail at the centre, and a fixed steering paddle.

Another analogy is provided by the *padav* (Apte 1973: 147–9), a simple cargo craft used on the west coast of India. Although it sails under a lateen rig and has no steering paddle, it is a flat-based craft with a keel, a sharp stem at a rake, and a rounded stern and is about twelve metres in length and four metres across the beam. It is easy to manoeuvre and quick to turn.

Boats such as the *zaruk* of the pirates of the Trucial Coast (Villiers 1952: 178; 1948: 412; Hornell 1970: 239–40), the *badan* of Aden (Goldsmith Carter 1969: 9–11), and the *jalibut* of the Gulf are somewhat advanced types used in coastal trade, and may not be cited as analogies for bronze age boats, except that they tend to be long and narrow and suitable for coasting trips, and of shallow draught, thus able to negotiate the shallow waters of the Gulf. For example, the *jalibut*, even when fully loaded, has a draught of only four feet or a little over a metre (Mackie 1924: 190–7).

Fig. 15

Fig. 16

15. The Phoenician sailing boat (after Goldsmith-Carter 1969: 14). **16.** The *padav* (after Apte 1973: Fig. 31.A)

Sails

If the major vehicle of transport was as we have suggested the sailing boat, it is important to know what kind of sails were used. The square sail, used for example by the Phoenicians and Minoans for their long-distance trading ships, is useful only for sailing in the same direction as the wind or with the wind at an angle of less than thirty degrees from dead astern. Boats with square sails must therefore also have oars or paddles for use when the wind is in an unfavourable direction, for changing direction to put into port, and so on.

The lateen, fore-and-aft sail is a great improvement on the latter, very adaptable to changing winds, and even enabling a ship to make, by tacking, in a direction against the wind (Casson 1954). This sail makes oars totally redundant. In strong tail winds, however, a square sail is preferable (see Kaplan 1974: 341). Also, lateen rigs require larger crews and lateen boats have thus to be large for their tonnage (Prins 1965–6: 3).

It is not known exactly when the lateen rig was invented. In the Mediterranean it is first attested as late as the Christian era, and in the Indian Ocean it is considered an Arab invention (Casson 1954). Today in India even primitive craft such as the coasting *toni* have only lateen sails. But van Beek (1960: 138, quoting Bowen) points out that some Yemeni and East African sea boats were using square sails even in the mid-twentieth century. Therefore, until there is evidence to the contrary, we must assume that in the bronze age there were only square rigs.

As regards the sails themselves, they could have been made of cotton[3] or linen, both materials being known to these early people. But it is also possible that they were made of rush or reed or leaf matting. Numerous examples of sails made of these materials are to be found in historical and ethnographic records. Hornell (1942 b: 14) quotes a nineteenth-century description of an African boat with a sail 'like a straw mattress, made of the leaves of a kind of palm tree . . .it was fixed above, and drew up like a curtain, but did not lower with a yard like a sail.' Fryer (1681: Vol. II: 134) saw boats with mat sails on the seas north of Cochin in the seventeenth century. In *c.* 1500, Santo Stefano made a journey from Cosseir to Aden in a ship with rush mat sails (Major 1857: 3–5).

Boat fastenings

It is certain that no iron was used for the joinings and fastenings of our third millennium boats. It is not impossible that bronze fittings were used; bronze is as useful as iron in this matter, and has the added advantage that it does not rust. But it is equally likely that no metal fastenings were used at all, and that either fibre or wood or cane pegs were used for joints.[4] Sewn vessels can be very large, even up to 200 tons (van Beek 1960: 137),[5] and are competent for long voyages on the high seas, for example from Aden to Calicut, as described by Santo Stefano (Major 1875: 3–5) or from Hormuz to Thana as done by Friar Odoric (Schoff 1912: 155). Stitched boats are flexible and resilient at the joints and therefore do not break easily. It would be well not to underestimate their utility for long coastal voyages in the third millennium.

Stitched boats are depicted on the reliefs at Sanchi (Schoff: 121–2). They are to be seen even today on parts of the west coast of

[3]The early Dutch traders found the traditional Indian sail-cloth of cotton a tolerable substitute for canvas (Moreland 1939: 67, n. 1).

[4]All early descriptions of Arabian Sea boats emphasise this as the most obvious characteristic (Moreland 1939: 65–7).

[5]For such large boats, however, stitching becomes a disadvantage (Moreland 1939: 65–7).

India where they are used for fishing. They were observed by le Gentil off the Coromandel Coast (Marco Polo, ed. Masefield 1908: 67, n.1). The *Periplus* (§ 36) describes boats which were 'sewn together' at 'Ommana'. In Oman even today there are boats made of planks fastened with cane pegs and palm fibre (Schoff 1912: 154–6). The *Periplus* also mentions stitched boats off the East African coast (§ 15–16; Schoff 1912: 28). Marco Polo (Ch. XVII) observed at Hormuz boats whose planks were bored, fitted with wooden pins, and then stitched together with coir rope. The boats were smeared with oil and caulked with oakum, and they had single masts. Stitched boats were common in the Indian Ocean until about 1500 A.D. (Casson 1971: 9–10).

Anchors
Iron is not absolutely necessary for anchors either. Stone anchors have been adequate for small boats even in recent times (Hornell 1942 b: 13–14).

We may thus assume that the materials used by our ancient boat builders were timber (teak, deodar, etc.),[6] rope from vegetation fibre, cotton, flax or rush matting for sails, bamboo or wood or bronze for pegs or nails, stones for anchors and ballast, and probably bitumen, resin, fish oil or animal fat for caulking.

Boat size and capacity
It would be useful to know the capacities of the third millennium boats. How much bulk cargo were they able to carry? We can only make guesses in this matter.

One point of reference would be the capacities of river boats as indicated in several Mesopotamian texts. The capacity or displacement of boats is often described in terms of the measure gur = *kurru* (CAD: sub *kurru*). An Ur III tablet from Ur (Lutz 1928: no. 24, 131–3), a record of the hire of various boats of different sizes, quotes capacities of usually 60, 90 or 120 gur. 120 gur by the Babylonian standard appears to have been the usual capacity of the larger river boats (see Jacobsen 1953: 39–40). This is equivalent to 300 gur of the Mari standard (Burke 1964: 70 ff). If contemporary

[6]In the historic period most Indian boats were made of teak. Even Arab craft were made on the west coast of India, due to the availability of wood. It is not impossible that deodar and teak were used for boat-building by the Harappans.

sea ships were of comparable size, we would then be able to gauge their capacity. But it is not yet known just what a gur meant in terms of boat capacity. Its exact value has yet to be worked out.

A Mari letter (ARM XIII 99) concerns two boats loaded with a cargo of wine in jars. The boats are stated to have carried between them 600 jars in all, that is, about 300 jars each. On the calculation that a jar contained ten litres, it has been estimated that each boat carried approximately 3000 litres = 3 tons, plus the weight of the jars. From ARM XIII 35 it appears that six men manned a boat, but the size of the boat is not specified (Burke 1964: 70; 74).

Another clue is presented by the evidence of Egyptian representations of Mediterranean ships in the time of Rameses III (*c.* 1200 B.C.), and a bronze age shipwreck off the southern coast of Turkey. The latter had been carrying copper ingots laid inside the hollow of the boat. The spread of these ingots on the ocean floor suggests a vessel nine to twelve metres in length. According to Hodges (1970: 133 ff) this size tallies with the fact that the comparable Egyptian boats are shown to have seven oars on either side.

The size of present-day sea craft of simple type such as described above may also give clues to the average size of bronze age ships. The lateen-rigged Arab dhows of today are of 100–150 tons. These are relatively sophisticated boats, but even stitched vessels in the Indian Ocean can be of 200 tons (van Beek 1960: 137). The *padav*, 7 to 10 metres long, is of 40 to 120 khandis capacity (Apte 1973: 147–9). Although the ratio between length and tonnage would depend on the particular design of the craft, it is not impossible that the Harappan or Dilmunite vessels, by analogy, were up to about 10 metres in length, or as much as 70 to 80 tons in capacity. This is of course totally hypothetical.

Sailing Techniques

The efficiency of these early boats as a means of transport must have depended not only on their design and size, but also on the know-how of the sailors.

The use of winds

Sailors had to contend with the monsoon winds in the Arabian Sea, but with the shemal and other winds in the Gulf. In the Arabian Sea the prevalent winds are the southwest monsoon from May to October and the northeast monsoon from November to March or

April. In the Gulf, the shemal which blows from the northwest is the prevalent wind for at least nine months of the year, but the qaus can also blow strongly in the winter months from the southeast, and the suahili in summer from the south. On the coastal route the sailors also had to contend with land breezes.

We have seen that there is no evidence for the lateen sail in the third and second millennia B.C. We therefore have to assume that only square sails were used. This would mean that the boats could only sail with a wind behind them (and at other times would have to depend on oars). We must therefore consider the possibility that in order to make the eastward journey towards India, our sailors utilized the southwest monsoon. In classical tradition an individual named Hippalus is credited with the discovery of the art of sailing with the southwest monsoon. There is a controversy whether this is in fact historically correct (Bowen 1951a: 6–12; Villiers 1952: 52–3; Abbott 1953; van Beek 1958, 1960; Hourani 1951, 1960). Were early boats, often of the stitched variety, able to sail in the bad weather conditions during the southwest monsoon?

For our purposes the pertinent fact that needs to be taken into account is that bad weather does not necessarily prevail during all six months from May to October in all parts of the Arabian Sea. Seasonal fluctuations in present-day sailing practices are also relevant. The monsoon hits Goa earlier, and with greater force, than it does Porbunder, and by the time it reaches Kutch and Sind, much of its force has been spent. Thus while ships from Konkan must be safely docked by the middle of May, those of Kathiawar and Kutch may stay out almost a month later. Similarly the monsoon withdraws from the north earlier (about the end of August in Sind) than it does from the south (in October). Along the Makran coast the weather is generally fine. Monsoon rains do not fall westward of Ormara in Makran, and the force of the winds decreases as one goes further west along this coast. Although there are swells from June to September, in the vicinity of Gwadar the winds are not so strong as at Karachi, and by the time one has reached Jask they are reduced to light breezes. The Makrani Harappan ports were therefore located away from the reach of the rough monsoon weather.[7] In the

[7] 'During the three months of the monsoon, small fishing boats (in the vicinity of Pasni and Gwadar) can follow their ordinary occupations, but trade in large vessels is practically at a standstill.' At most, native craft are grounded in June and July (*Gaz. Makran*: 25 ff).

rest of Harappan waters there would have been no sailing in June, July and August. There is no reason, however, to assume that the sailors would not have utilized either the forerunners or the tail end of the southwest monsoon for eastward journeys in May and September respectively. In the Gulf, sailing is possible at all times of the year.

The implications of this—that is, the ability of ships to sail in the Arabian Sea only before prevalent winds, and the stoppage of shipping for three months of the year in Harappan waters (except in Makran)—would be that Indian boats would have to wait until the last weeks of the winter monsoon (February or March) to set out on a westward journey in order that the return trip might be made with the westerly monsoon breezes in May. Fleets of the Gulf or Mesopotamia, however, if they set out in May, would have to be docked during the rough-weather monsoon months. To avoid this, they would have to sail eastward from the mouth of the Gulf in about September, with westerly breezes behind them, and utilize the lighter, fair-weather northeast monsoon winds and currents, which set in by mid-November, for the return journey.[8] In this context it may be noted that according to the Ur texts, all merchandise for Magan was handed out in March (Leemans 1968: 219). This would mean that by the time the Ur fleets had left the Gulf, the westerly breezes of the southwest monsoon would have revived. It will be argued in Chapter IV that the 'Magan' destination of these boats may have referred to Makran. On the Makran coast the weather is favourable for sailing in May and early June, when easterly winds alternate with heavier winds from the west (*Pilot* 1915: 18–19). In fact, the major explanation for the location of Sutkagen-dor and Sotka-koh may well be the fact that this part of Makran lies outside the reach of the bad weather brought by the southwest monsoon.

Times required

It would be useful to know the time taken by third millennium craft to make their trading journeys between the head of the Gulf and the west coast of India. Lateen-rigged boats which are adaptable to

[8]On such a journey coastal currents would also help. Along the coasts of the Arabian Sea, currents move clockwise during the Southwest Monsoon, and counter-clockwise during the first three months of the Northeast Monsoon (*West Coast of India Pilot*: 13–15).

changing winds can make good speed. The *bheddi* of Karachi, for example can make a trip to the western border of Pakistan and back in five days (Greenhill 1971: 150). Cargo craft off the west coast of India, when fully loaded, can in favourable weather make an average speed of 120 to 160 kilometres per day (Vaidya 1945: 2–15). Such craft are known to be able to make a return journey between Kathiawar and the upper Gulf in three to four months.

We would expect the square-sailed boats to have been appreciably slower, and to have made no more than one round trip in the year.

It should also be noted that sailing schedules have always been subject to the changeability of winds, especially in the Gulf.[9] We see from the accounts of Palgrave (1866) and Villiers (1940), for example, that a sailing boat might intend to make for one port but might be blown elsewhere. Often, in bad weather, a boat would have to anchor at a sheltered port or island for days. Crews and cargos could be delayed for several days until a favourable wind came up. Thus the enterprise of sailing was probably very flexible, subject to the prevalence of winds rather than to any fixed schedule or routine.[10] Without the adaptable lateen rig, boats would be delayed even more by unsuitable winds.

In the open ocean outside the Gulf, the monsoon winds are relatively more reliable, but, especially by the coasts where land and sea breezes prevail, are not totally predictable.

Transshipment

Single fleets did not necessarily sail the entire distance from the mouths of the Tigris and Euphrates to Sind or Kathiawar. In the Ur III period for example, Mesopotamian boats sailed only to Magan and later only to Dilmun although the majority of goods acquired in the latter country were almost certainly Indian in origin. The furthest west we have evidence for a Harappan settlement is Sutkagen-dor. We had hinted above at the possibility that this fortified Harappan centre functioned as a terminating point outside

[9]In the Gulf a 'succession of squalls from opposite quarters, each lasting only a few minues and alternating thus several times, is occasionally experienced' (*Pilot* 1915: 13).

[10]The experience of Mackie (1924: 190–1) in a *jalibut* is a case in point. Because of unfavourable winds, his trip from Manama to Uqair, usually a 7-hour run (95 kilometres), took 26 hours one way and 22 hours on the return.

monsoon waters, for boats coming from the Gulf. If such were the case, if the transport were conducted by different fleets over different stages, boats would have made shorter and more frequent trips. It is, however, certain that transshipment, involving off-loading, storage, and re-embarkation, would have greatly increased the cost of sea transport, and in certain periods archaeological and textual evidence does indicate direct contact between Harappans and Mesopotamians (see Chapter V).

The coastal route

In the Arabian Sea outside the Gulf the sailing route was in all likelihood one that kept to the coast, as in the present day (Bowen 1951 a: 15). Such a route was more dangerous than one across the high seas, but definitely more easy to navigate when sailors had no aids other than the position of the sun and stars; and more convenient for repairs and maintenance work which all ships constantly need. Thus boats would be obliged to keep the coast always in sight, and put in to land frequently for repairs and supplies (Bowen 1951 a: 22–37). This may not have been applicable near the low Arabian shores of the Gulf which are hard to sight, treacherous to navigate, and lacking in sheltered stopping places. The argument against a coastal sailing route in the Gulf has been set out in Chapter I.[11]

A number of coastal sites of the Dilmun and Harappa cultures are known. Assuming that these were some kind of 'refuelling' stations or anchorages if not actual ports, just how much of our coastal route can we consider to be mapped by the known distribution of sites? As regards the Gulf, this question has been discussed in Chapter I, where we suggested the possibility of sites along the Persian Coast, especially near Minab.

In the Makran we have the sites of Sutkagen-dor and Sotka-koh, and in Sonmiani Bay there is Balakot. Further southeast there are no coastal Harappan sites until we come to the southwest coast of Kutch.

Dales (1962) sailed from Jiwani to Gwadar in a small fishing sail-boat, about seven metres long, in ten hours. On this basis it may

[11] It is not known how ships would have kept to the right course when steering across the width of the Gulf between Bahrain or Tarut and Bushire or Naiband. Considering the fact that the Minoans of Crete of the second millennium were able to sail across the high seas to Egypt, a distance of more than 700 kilometres, we may be doing our early sailors an injustice by believing too literally in a coastal route.

be suggested that from Sutkagen-dor to Sotka-koh, under normal conditions, a boat might take about 30 hours—say two days' sailing time at the most. Probably then the voyage between the two sites formed one lap of the journey.

If this is acceptable, then west of Sutkagen-dor progresssive laps, on analogy, may be marked by Chahbahar bay, Ras Meydani, Jask and Minab. All these places have sheltered anchorages and water courses or wells in their vicinity.

Eastward from Sotka-koh perhaps subsequent laps were: (1) Sotka-koh to Ormara. (At Ormara there is a bay where a fishing settlement today flourishes.) (2) Ormara to Ras Malan[12] or Hinglaj.[13] (Dales sailed this distance in a sailing boat in twenty-four hours. The Hinglaj valley, incidentally, is an important route to the interior of Baluchistan). (3) Ras Malan to Balakot (or to Khaira Kot in west Sonmiani Bay, a possible Harappan site (Snead 1967: 560).

This is only a hypothesis and it should be noted that during a survey of the Hinglaj area R. Mughal found no Harappan sites (personal communication, G.F. Dales, May 1976).

The major Harappan port of Sind—and presumably there was one—remains unknown. The mouths of the Indus, a 'water wilderness' and a maze of creeks and streams, mostly sheltered, are a very important water route, not only between the lower Indus and the sea, but also from the Karachi region southward to the Rann of Kutch (Greenhill 1971: 144). Any Harappan sites on these mouths would of course have been liable to erosion or silting over.

In Kutch there are at least two Harappan sites which might mark the location of ports of call: Todio and Navinal.

As regards Kathiawar, the *District Gazetteer* (1884: 236) states that every little creek in the Peninsula provides a potential outlet for and access to Kathiawari markets, and that in 1842 there were sixty-two such centres. The coastal Harappan sites are the Amra group, Bet Dwarka, Kindarkhera, Somnath, Kanjetar, Lothal and the Narbada, Kim and Tapti sites. If we study the chain of halts marked by the *Gazetteer* for country craft from Kutch to Bombay, namely Mandvi, Porbunder, Veraval, Diu, and Jafarabad, we see that all except the last two have a Harappan site in their vicinity. We

[12]Dales' 1960 survey terminated eastward at Ras Malan.

[13]Hinglaj has, for many centuries, been a place of pilgrimage for many religious groups.

may thus tentatively conclude that the coastal Gujarat sites can be interpreted as a chain of sea halts, except that stations in the vicinity of Mangrol, Diu/Jafarabad and Gogha/Bhavnagar are as yet unknown.

It is therefore necessary to understand more fully the problems of sea transport in the third millennium context. It appears that boats could well have been large enough to carry substantial cargos, and strong enough to withstand rough weather at sea. Consignments of cargos between India and Mesopotamia were possibly made but once a year. The boats may not always have made their destinations in the scheduled time, and at this early date such an ambitious trade must have involved much risk and loss of life and cargos.

Land Transport: Pack Animals

We can be fairly certain that such long-distance overland trade as existed was carried on the backs of pack animals. Let us examine the evidence for the different animals which could have been used.

The dromedary or one-humped camel is today used as a pack animal over almost the entire area covered by this study. Its wild ancestors however were confined to Arabia, northern Africa and northwestern India. Only one centre for domestication is so far evidenced, viz. Arabia (Zeuner 1963:340).

The value of the dromedary as a pack animal is particularly high in arid and semi-arid regions, and it is equally at home in the swamps and marshes of the Indus delta. Its ability to do without food and water for long periods is well known, and it can carry very heavy loads, even up to 225 kg.

According to Zeuner the dromedary could have been domesticated by *c.* 2000 B.C., or at the latest 1800 B.C., in the Middle East. In Mesopotamia itself, however, it was used for transport only in the Late Assyrian period, *c.* 1000 B.C. onwards.

Today in the Makran a good strain of dromedary is bred. The Dasht Valley especially is famous for its camels. At Khurab a copper shaft-hole pick bears the figure of a seated camel (Maxwell Hyslop 1955). This figure, however, appears to combine the features of the dromedary and the Bactrian camel (Zeuner 1963: 360).

Camel bones have been found at the Umm an Nar settlement and representations of the camel were carved on local cairn slabs. That the camel was domesticated and used for transport here, however, awaits proof. A vase buried in a house floor at Shahr-i Sokhta was found to contain camel dung (Tosi 1974 b: 162).

At (early) Mohenjo-daro (Marshall 1931: 660), Harappa (Gupta 1968: 34) and Kalibangan (IAR 1964–5: 38), bones of the domesticated dromedary have been found. (There are no pictorial representations of the dromedary in Harappan art, however.)

We do not know if this animal was used for carrying loads by the Harappans. It has long been one of the most favoured means of transport in Sind and Rajasthan, being bred in Hyderabad and in Thar Parkar, as well as in Bikaner. These breeds can carry up to 180 kg and a journey from Karachi to Shikarpur north of Mohenjo-daro would take twenty to twenty-five days. In Kutch also transport on land has been almost entirely dependent on the camel through the centuries.

Incidentally, no prehistoric or protohistoric culture of the sub-continent other than the Harappan has produced camel bones.

The onager (*Equus hemionus*) or Asiatic half-ass, is probably the earliest pack animal of western Asia, where its wild ancestor was found and where it survived up to the twentieth century.

The Mesopotamian onager was a light and swift animal, though probably not easy to handle. The anše. kur. ra = *imeru* of the texts has been translated as 'donkey', but it is not clear exactly when it came to mean the donkey rather than the onager.

The anše (kur. ra) appears in several texts, from which we conclude that it was an important pack animal, often organized in caravans of 10 to 50 beasts (Leemans 1960: 133–4). These caravans, referred to by the terms *illatu*, *harranu*, etc., were the sole means of transport in the Kültepe trade. A study of the Kültepe texts shows that a 'donkey-load' could comprise the harness, about 130 *manas* of tin wrapped in cloth (packed in two half-packs), 10 to 12 *manas* of loose tin, 4 to 6 bundles of textiles, and food and private possessions of the freighter (Veenhof 1972: 45).

That this animal was used further east as well is indicated by the identification of onager bones at Shahri-i Sokhta (Tucci et al. 1978: 208 ff).

In India the counterpart of the onager was the donkey or ass (*Equus asinus*). Its wild ancestor is still to be seen in Kutch, and can apparently be tamed if caught young.

Remains of E. *asinus* have been identified at Harappa, Rupar, Rangpur III (Rao 1962–3: 156) and Surkotada (IAR 1971–2: 21).

Donkey bones have also been found at Shahr-i Sokhta (Tucci et al. 1978: 208 ff).

Today the donkey is used in Kutch to carry grain and other commodities. In Makran, a strain of donkey remarkable for its swiftness, is bred, and is used for all transport work in the region. Donkeys are also exported from Oman to Makran (Field 1959: 40). The Omani ass is famous and is a cross-breed of wild and domestic varieties (Miles 1919: 387–90).

It is very likely that much of the trade east of Elam which was not sea-borne, was carried by the hardy donkey over long distances. Unfortunately we do not have more substantial evidence for its important role in transport. According to Raikes (1977) donkey caravans are able to travel even in the hottest regions of Iran and Baluchistan at a speed of about 30 km per day for periods of a week to ten days.

Land Transport: Carts

The use of carts is in evidence in the Harappa culture and in Mesopotamia. There are no cart models in the Gulf, southeast Iranian or Kulli sites,[14] and given the uneven nature of the terrain in these areas, it is not unreasonable to infer that transport by carts was not usual in Iran or Baluchistan. It appears that even in the mid-twentieth century wheeled transport is not much in use here.

Wheeled carts have been considered a Mesopotamian invention. The Uruk IV tablets contain pictograms of wheeled sleds. Pottery of the early Early Dynastic period from Khafaje and Susa bears representations of wheeled carts, in one case a four-wheeled vehicle drawn by four onagers, in the other a two-wheeled wagon drawn by two humped oxen (Salonen 1951: 155).

A few ED burials from the Ur Royal Cemetery, the Kish Y cemetery and a cemetery at Susa, contain actual wheeled vehicles. It should be noted, however, that these together with several representations on 'standards', stelae or seals, are as a rule representations of chariots for war or ceremonial purposes, and not goods wagons. Among the exceptions is what is probably a four-wheeled wagon from Grave V 237 at Kish (Watelin 1934: 30–4), with a wooden platform surrounded by a rail. It was drawn by two pairs of asses.

[14]To be accurate, a few cart models have been found at Mehi and Shahi Tump. But these are believed by Piggott (1950: 112) to be of Harappan origin.

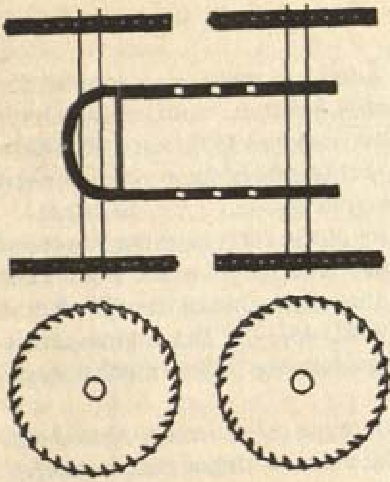


Fig. 17. Four-wheeled wagon from Kish (after Salonen 1951: pl. V)

The wheels on Mesopotamian vehicles were solid, but constructed of three pieces of wood clamped together by struts. The circumference of the wooden wheel was often studded with copper or bronze nails about 5 cm long, as a protection. These nails have survived at Kish, and in some instances terracotta wheel models are carefully cogged around the circumference to indicate nails. In Elam, metal tyres cast in separate segments were used (Childe 1951: 178 ff). The wheels of the wagon from Kish described above were 50 cm in diameter (Watelin 1934: 30–4). The base of the Mesopotamian cart was usually a solid plank, attached to the axle-tree by straps. The superstructure must have been of light wood or wickerwork (Childe 1954: 717)

The first draught animals were oxen. These are attested in the Royal Cemetery of Ur as well as in the Laws of Eshnunna and the Laws of Hammurapi (the wagon from Kish, however, was drawn by equids). Oxen continued to be used for heavy transport up to *c.* 1000 B.C. The faster onager was generally used for drawing passenger vehicles or war chariots. It is a more difficult animal to yoke as its shoulders are less prominent than those of the ox.

Goods carts (as against chariots) are known as *erqu*, *attartu* or *ṣumbu* in Akkadian (Salonen 1951). These carts were used for the transport of copper and wood (Kültepe texts), grain and other merchandise (Leemans 1960: 134). In ARM I 7 the people of

Qattunan are instructed to take their goods by *eriqqu* to Subat-Enlil.

In the texts several kinds of wood are mentioned as used for building carts. These include *esalim,haluppu, mesu, musukannu, taškarinnu, ušû, sarbatu* and other varieties (Salonen 1951: 137–51). In Chapter II, we had shown that several of these varieties were imported into Mesopotamia from overseas.

As regards the size and capacity of the carts carrying merchandise, there is only indirect evidence. The length of the axle of the wagon from Kish was 90 cm, and that of the chariot from PG 789 at Ur, almost one metre (Salonen 1951: 152–4). The contemporary literature should be searched for evidence as to how much a single cart could hold.

While almost every site of the Harappa culture has produced cart models in clay, why this particular element rather than any other was represented so frequently no one has explained. About six types of Harappan carts (or more precisely, cart frames), are in evidence. No types occur in the Gujarati sites which are not represented at Mohenjo-daro, Chanhu-daro and Harappa. Thus there is no evidence for regional variation of cart types.

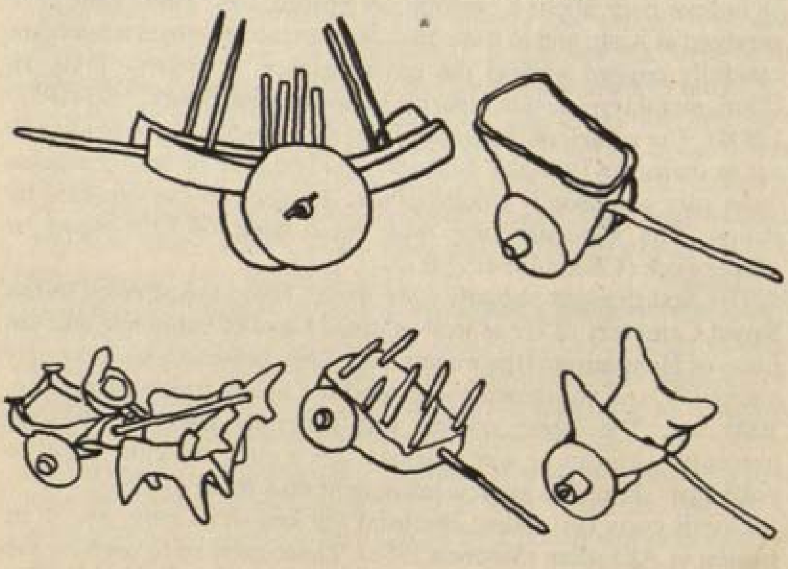


Fig. 18. Clay cart models from Harappan sites.

Five of the cart types are two-wheeled. The common type of cart frame consists of two parallel beams, straight or curving upwards, joined by two to six cross-pieces. The beams have holes into which vertical poles were set. These carried the canopy or sides of the cart, probably made of light material (Childe 1954: 717). Carts could also have a solid chassis, concave or flat (Rao 1973: 123).

Harappan carts also had tripartite disk wheels, the three pieces having been carefully indicated on some painted models (Childe 1951: 183). This parallelism with Mesopotamia, however, need not be considered too significant as no solid wheel can be cut from the circular section of a tree trunk: such a wheel would be too weak (Piggott 1968: 268). There is no evidence that Harappan cart wheels were cogged. Rao (1973: 124) refers to a clay model wheel from Lothal on which red diagonal lines have been painted, perhaps to represent spokes.

Harappan carts were probably comparable in size to their Mesopotamian counterparts: cart ruts at Harappa were found to be about 106 cm apart (Wheeler 1946: 85). A two-wheeled bullock cart as used today with a 126 cm distance between the wheels, has a body about 92 cm wide and 2.72 m long, and is capable of carrying a load over 1000 kg in weight. This weight however would be proportionately much reduced in Harappan and Mesopotamian carts of the third millennium which had wooden rather than iron axles, and solid rather than spoked wheels. These carts were in all probability pulled by pairs of oxen as humped cattle occur very frequently in Harappan glyptic.

The efficiency of the Harappan carts is indicated by the fact that their basic form has survived to the present day. In Sind, up to the mid-twentieth century carts made of roughly hewn pieces of wood mortised into each other, containing no iron, and having solid wheels, are constructed in all areas at low cost. They are capable of carrying heavy loads. In Gujarat all kinds of merchandise have been traditionally carried in bullock carts.

The cart is, however, clearly an instrument of only short to medium distance transport. In Sind, in spite of the level terrain, pack animals have traditionally been preferred to carts for long distance transport. It has also been pointed out by several scholars that the early Mesopotamian and Harappan carts were so built as to enable one to take them apart should the terrain become unsuitable. This also indicates that carts could not have been used for long distances but for shifting heavy loads from villages to the central city, or between neighbouring cities.

Many scholars have remarked on the contrast in street width and layout between the Harappan cities and their Mesopotamian counterparts. Perhaps this contrast is not so much a function of 'civic consciousness' as of the dependence on different means of transport in each case. Heavy cart traffic in a city requires wide and reasonably straight streets with negotiable bends and junctions, whereas pack animal traffic is equally efficient on narrow and winding streets.

River Transport

River transport assumes a special significance if we consider the cities of Mesopotamia and the Indus valley as redistributive and administrative centres. The key factor in the role of a city as a redistributive centre would be maximum access to all areas served, and transport mechanisms are thus all-important.

The growth of urbanization in Mesopotamia and the Indus Valley, therefore, can be attributed not only to the high productivity of the respective regions, but also to the ease with which produce could be moved along the large and navigable rivers. It has been observed that Asian urbanization, past and present, is heavily river-oriented (Murphey 1970).

We had indicated the importance of the waterways feeding the cities of Mohenjo-daro and Harappa. At Harappa the 'granary' was built not within the citadel, but further out towards the former course of the Ravi. A possible explanation for this is that the bulk of the grain came to Harappa by boat.

Mackay's trial excavations at a group of small mounds to the north of the citadel mound of Mohenjo-daro revealed a small 'fort'-like building with triangular projections, an exceptionally thick outer wall, and a 'ghat'-like outer staircase. Moreover, the silt in the area immediately west of this structure was 'of a different quality from the general alluvium in the neighbourhood' (Mackay 1938: 4). Thus it is likely that the Indus or one of its branches flowed close by the western periphery of Mohenjo-daro, giving access by water to the fort–ghat entrance, thence by foot to 'Central Street' and its probable khans and storehouses, and thus to 'First Street' or the main thoroughfare (Mackay 1938; D. Mackay 1945: 142–4).

Several Mesopotamian texts testify to the importance of rivers and canals as waterways. Much movement of goods and people by boat is attested for all periods. Divine images, kings, troops, groups of workmen, even a caged lion, as well as merchandise are evidenced as being transported by boat in various texts. There are numerous references, especially in the Mari letters (ARM III: Burke 1964), to the transport of barley in special grain boats (má.še).

In the ED period timber probably came down the Karun from Elam to Lagash (Leemans 1960: 133), but it was the Euphrates which appears to have been the busier trade route. From northern Syria wine came down the river to Mari and Sippar (ARM XIII. 99, etc.; TCL XVIII.133), and timber was shipped to Babylonia from Syria.

Boats carried cargos both upstream and downstream, although there are occasional references (e.g. ARM I 36) to boats being towed upstream. Besides barley, timber and wine, tin, grinding stones and other merchandise were also dispatched by river (Leemans 1960: 105–6; Burke 1964).

The size and capacity of river boats as given in texts has been referred to for comparative purposes in the section on sea transport. We had stated there that a single river boat could carry as many as 300 jars of wine.

Cities like Mari derived much of their 'income' from taxes levied on goods carried along the Euphrates through the kingdom. The control of the Euphrates traffic by Mari was an important factor in its political importance (Burke 1964: 102–3).

We had indicated in the section on sea-transport that the silver and bitumen boat models from Ur (UE II: 71, 145, etc.; pl. 169a etc.), and a boat on a stone relief from Ur (UE IV: 42, pl. 138) were probably river boats. The models represent long, flat-based craft, some very shallow (e.g. UE II: 154, fig. 34), and others deeper, with greatly upturned stem and stern (UE II: 145, pl. 169a). All are row boats. The latter type have almost exact counterparts on the marshes of southern Iraq in the twentieth century (ibid; Hodges 1970: figs. 82 & 83). These may be made of rush and matting, sealed with bitumen (Barnett 1958: 220–2).

Some fairly primitive devices for transporting cargo down the rivers have survived in Iraq. There is the *guffa*, a circular skin stretched over a frame and steered with paddles, the counterpart of

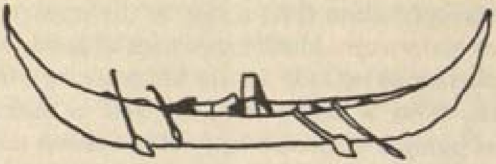


Fig. 19. River boat model from Ur (after Barnett 1958: pl. XXI. C)

which is depicted on the Assyrian reliefs, useful for short trips such as ferry crossings, which carries up to twenty passengers. There is also the *kelek*, a raft floated on a large number of inflated skins, very useful for floating cargo down rapidly flowing waters in the upper reaches of rivers. There is also the *bellem*, a simple, flat-bottomed dugout, rectangular in shape and decked at both ends, with an average capacity of 5 to 10 tons. Finally, the *safina* is a comparatively large craft 9 to 24 metres long with a capacity of about 50 tons, used in the lowest reaches of the rivers. It has a single mast carrying a lateen sail (*Iraq and the Persian Gulf*: 558–61).

At Mohenjo-daro are found representations of cabined punt-like boats with oars or paddles and upturned ends (Mackay 1938: 340–1, 657, pl. LXXXIX-A; Dales 1968 C: 39). These are probably to be identified as river boats on analogy with the present-day *battela*s of the lower Indus (Greenhill 1971: 178, 182).

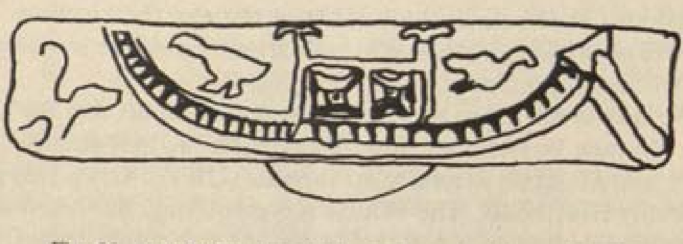


Fig. 20. Seal design from Mohenjo-daro showing a river (?) boat (after Dales 1968 C: 39)

The Indus is a major water route even in its upper reaches, whence timber rafts are floated down from mountain forests and much other merchandise is also carried. There is even a small but thriving boat-building industry in the Peshawar Valley (Greenhill 1971: 176, 140).

Indus River Board as observed in the Nineteenth Century (after Postans 1843:142).

Through the ages the rivers of the Indus system have seen much traffic in people and goods, in spite of the difficulties such as sand banks and unexpected floods to be encountered. The Indus is navigable all the way from Attock to Karachi down to its mouths, which afford a maze of sheltered waterways giving access to the sea. In ancient times Barbaricum was a port on a stream in the centre of the Indus distributaries (*Periplus*: § 38–9).

Except for the present course of the Ravi, the tributaries are also navigable once they enter the plains and are useful as a means of connecting the Punjab with Sind and the sea. Indus boats have traditionally been made of deodar wood (obtainable upstream of the rivers), although imported teak is sometimes used. Many types of craft have been used on these rivers—large, square and flat-based boats which sail downstream or are rowed upstream with long, heavy sweeps (Greenhill 1971: 140; 177–8), decked punts, flat-bottomed boats with pointed ends, large craft steered with a single oar over the stern and rowed with two oars from the foredeck (ibid: 170, etc.). These craft can have lateen sails (Greenhill 1971: 174), or square sails (Hamilton 1739: 122–3). Of particular interest is the *dundi* which has a slightly convex bottom so as to prevent it from becoming firmly lodged in sandbanks, and a greatly upturned stern. It carries a square sail on a mast placed far forward. It may well be a survival of the form roughly sketched on the sherd from Mohenjo-daro[15] (Mackay 1938: pl. LXIX. 4; T. Postans 1843: 124–8, 142).

Fig. 22. Sketch from Mohenjo-daro of a river (?) boat (after Mackay 1938: pl. LXIX-4).

When plying downstream, country craft can make almost a hundred kilometres per day. For sailing up the Indus rivers the southwest monsoon can be utilized in the summer months, but for the rest of the year boats going upstream are slowed down to about sixteen kilometres per day (T. Postans 1843: 127–33).

[15]Described earlier.

Containers and Packages

This study will have made it clear that pottery does not appear to have been transported over long distances, the sherds of one culture rarely being found in the debris of another. (The only exception to this generalization are the incised greyware pots imitating steatite containers).

It follows that traded goods were probably not carried in pots. This is not surprising given the nature of the traded items, as the metals, stones and timber would require no packaging at all.[16]

The impressions of cloth or reed mat containers on the backs of sealings especially from Lothal, would seem to indicate that beads, carved figurines, lapis lazuli, textiles, shells and small pieces of ivory were packaged in this manner. Only foodgrains, oils and pigments would perhaps be transported in pots, although foodgrains could also have been packed in sacks.

In Early Barbar levels at Ras al Qala'a, was found a rim sherd bearing a Sumerian capacity mark, published by Laessoe (1957). This was inscribed on the inner surface of the pot so that it could be read by tilting the pot forward. Laessoe has calculated, on the basis of Thureau-Dangin's evaluation of the sila as equivalent to 0.404 litre, that this inscription specified a quantity of 167 sila=67½ litres. Although the jar must have been fairly large (it had a rim diameter of about 28 cm), this quantity appears to have been excessive. The wine jars transported down the Euphrates to Mari appear to have had a capacity of 10 litres each (Burke 1964: 73). Laessoe admits that the calculation is tentative. Unfortunately no study on the values of the weights and measures of Mesopotamia has been undertaken since the work of Thureau-Dangin and Weissbach, and a reassessment of their calculations is urgently needed. It is also certain that the same weights and measures differed from region to region and time to time, in absolute value.

[16]The Cappadocian texs, however, indicate that even tin was invariably wrapped in cloth and then sealed, before being loaded on to donkeys. The phrase *subatū ša liwītim* referred to 'textiles for wrapping'. Each packet of about 65 minas of tin required two 'textiles for wrapping'. There is also a reference to '4 textiles for wrapping for each donkey load of tin'. Textiles, on the other hand, were frequently, but not so systematically, packed in leather sacks (*naruqqum*) (Veenhof 1972: 28–41).

Thus we can tentatively suggest that we have here a 'Dilmun' measure system (just as we have a 'Dilmun' weight standard), in which the sila was probably less than 0.404 litre.

The jar is of Barbar ridged ware—it therefore seems to have originated in Bahrain rather than in Sumer. Thus we cannot even assume that it contained foodgrains or oil, as these moved south-eastwards from Ur towards the upper Gulf. It is also a mystery why a Barbar pot was inscribed in cuneiform: can we presume the knowledge of cuneiform among the Dilmun people? Or was the inscription authorized by a Mesopotamian merchant seeing to the dispatch of goods to Mesopotamia?

If we had been sure of the actual capacity of the Barbar jar, it would have been interesting to compare this with the quantities of barley and oil specified in the Ur 'export' texts. But with the present state of our knowledge such calculations might only be misleading.

Weights

About 200 weights have been found at Mohenjo-daro and about 100 each at Harappa and Chanhu-daro. Weights have also been found at several other Harappan sites. At Chanhu-daro 22 examples were found in a stone-cutter's house (Mackay 1943: 43), but otherwise at the major sites the weights were not concentrated in particular areas (Marshall 1931: 461–4; Vats 1940: 360).

Detailed and exhaustive studies of the weights from Mohenjo-daro and Harappa having been carried out, the Harappan system is now clearly understood. The most frequently occurring weight has a mean value of 13.63 gm (Mackay 1943: 237); the other weights are either fractions or multiples of it; thus, taking the value of 13.63 gm as the ratio 1, we have a sequence 1/16, 1/8, 1/4, 1/2, 1, 2, 4, 10, 12.5, 20, 40, 100, 200, 400, 500 and 800.

The large majority of Harappan weights are chert cubes with bevelled corners. Very much less common are spherical weights with a flattened base and top, barrel-shaped weights, and conical pierced weights.

The evidence for the Mesopotamian weight system reflected in texts and the occurrence of hundreds of stone weights has in contrast, received little attention. Conspicuously absent are any attempts to correlate the archaeological and textual data. All that can be said is that the stone weights are usually made of black polished stone and are either duck-shaped or elongated barrel-shaped, and that in system too, the Mesopotamian weights are quite distinct from the Harappan.

The significance of weights for our study, however, lies in the fact that they represent one aspect of material culture which has clearly been subject to diffusion or dispersal: the Harappan weight system appears to have been borrowed by the Barbar culture, a Harappan weight has been found at Ur, and Mesopotamian weights are known at Mohenjo-daro and Harappa. The details are as follows.

As Ras al Qala'a were found seven stone weights, all except one having been clustered together with twelve Barbar seals in a building by the city gate. Two of these weights were cubical,[17] one a half-cube, and the rest spherical with flattened top and bottom (Bibby 1970). The cubical and flattened spherical shapes are known at Harappan sites, where the latter are, however, comparatively rare: twelve at Mohenjo-daro (Mackay 1938: 607 ff) one at Harappa (Vats 1940: 362–3), about five at Chanhu-daro (Mackay 1943: 236 ff), and at least five at Lothal (Rao 1973: 122). Once the Barbar weights had been weighed, it became clear that they conformed to the Harappan system. Again taking 13.63 gm as the unit, the Barbar weights were the following multiples or fractions of it: 1/8, 1, 2, 1, 12.5 and 100 (Bibby 1970) and one weight does not conform to the Harappan system.

Even more interesting is the reference in a Larsa period text from Ur (UET V 796, Leemans 1960: 38–9) to the 'Dilmun *mana*'. This text indicates that approximately 13100 Dilmun *manas* are equivalent to 611 gín 6.2/3 manas of the Ur standard. It has, therefore, been possible to calculate that the Dilmun mana was approximately 1371.5 to 1376.8 gm (Bibby 1970). This figure corresponds exactly to the multiple of hundred in the Harappan system, of which value a weight also exists at Ras al Qala'a, as shown above.

It is thus evident that the Dilmun standard was the Harappan standard, and that Dilmun is to be identified as the territory of the Barbar culture. Bibby (1970) explains the prevalence of the Harappan rather than the Mesopotamian system in the Gulf by suggesting that it was the Harappans who were the most important or perhaps the earliest trading partners of Bahrain.

Equally significant is the occurrence of a Harappan weight at Ur. In the catalogue of finds from the Ur III period at Ur (UE VI) this

[17] Of these only one is made of chert.

object (U 17673) is described as a 'cube of yellow carnelian', 'found 2.50 m below the offset of the SW outer wall of Bur-Sin's NW mausoleum'. I was able to study this object in the Iraq Museum. In shape it is a cube 1.85 × 1.85 × 1.80 cm, with slightly bevelled corners, weighing 13.5 gm, corresponding to the most frequently occurring value at Harappan sites. Its material, shape and weight leave no doubt that it is a Harappan weight, and, in fact, it has an almost exact counterpart (in dimensions and weight) at Chanhudaro (Mackay 1943: 247). In the light of the preceding discussion it becomes clear that this weight reveals the presence of either a Dilmunite or a Harappan merchant at Ur.[18]

It has usually escaped attention that at Harappa and Mohenjo-daro some Mesopotamian type weights (elongated barrel shaped weights in black polished stone[19]) also occur (Marshall 1931: 463–4; pl. CLIV 5, 8; Mackay 1938: 400 ff; 604; pl. CVI. 52, 53; CXI.75; Vats 1940: 361–2, pl. CXVII.47, 48). In weight these do not conform to the Harappan system, and have been classified as 'aberrant' weights. Eight have been found at Harappa, and about the same number at Mohenjo-daro.

Fig. 23. Mesopotamian-type weights from Mohenjo-daro.

The significance of the evidence of weights will be further taken up in Chapter V.

Seals and Sealings: Their Implications for Long-Distance Trade

In this section an attempt will be made to classify the different types of seals found in the various cultures, with a view to determining

[18]The Ur texts reveal that the following overseas trade items were quantified by weight: wool, red ochre, ivory, stones, copper, 'Magan onions', antimony, corals, and metals.

[19]Mackay (1938: 403–4) is not correct in his statement that the examples from Mohenjo-daro are different from Mesopotamian weights in having vertical or straight ends. The majority of Mesopotamian weights are, in fact, of the straight-ended type.

which of these were used for 'international' trade. We shall concentrate on those types found at the sites of more than one culture or at sites known to have been trade posts.

As yet no seals of the Umm an Nar and Kulli cultures are known. At Shahr-i Sokhta more than a hundred compartmented or step-pattern steatite and metal stamp seals have been recovered, but these are not known at any other site in southeast Iran except for one possible parallel at Yahya IV B (Lamberg-Karlovsky and Tosi 1973: 46; Lamberg-Karlovsky 1972b: 94, fig. 4). Thus there is no evidence that the Shahr-i Sokhta seals were connected in any way with the dispatch of merchandise over long distances.

At Tepe Yahya IV C about twenty-five sealings of typical Susa C ('proto-Elamite') vintage were found together with proto-Elamite tablets in a building which must have functioned as a storehouse or clearing-house (Lamberg-Karlovsky and Tosi 1973: 37). It has been pointed out earlier that Yahya was probably part of the 'greater Elamite' province and the sealings and tablets indicate the presence of Elamites at Yahya rather than inter-cultural trade. Moreover there is no indication in the published material available as to whether any Yahya IV B seal type is known.

We shall therefore in this chapter discuss the Harappan, Harappan-type, Mesopotamian and 'Persian Gulf' seals.

Seal Type I: Seals typical of the Harappa culture. These are square, steatite seals with a perforated boss, showing a line of pictographs and a picture. That these were seals for stamping and not amulets to be worn on the person is quite clear, as seal impressions have been found. The seals may also have been used as insignia of identity or authority.

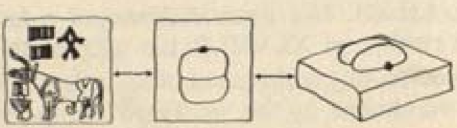


Fig. 24. Typical Harappan seal.

Hundreds of seals have been found at Mohenjo-daro, Harappa and Lothal. At all other Harappan sites including Allahdino, Kalibangan and Chanhu-daro, the numbers are appreciably smaller. Although a few seals occur at Surkotada, Desalpar, Rupar and Alamgirpur, none are known so far from any Kathiawari site except Lothal. This fact together with the nature of the settlement patterns, indicates that at Mohenjo-daro and Harappa goods were received, stored, processed and finally redistributed. We shall come to the case of Lothal presently.

In order to understand the function of these seals it is necessary to analyse the different kinds of seal impressions in evidence. In general we may say that both commodity sealings and message sealings occur at Harappan sites. By 'commodity sealings' we mean the mechanism by which the contents of jars, packages, baskets or any other type of container were protected and/or guaranteed by certain authorities. These sealings would be identified by the evidence of mat, cloth or string impressions on their reverse, or by the occurrence of impressions on jar stoppers. 'Message sealings', on the other hand, would not be attached to any container. Their function would be to convey or store some kind of information, for example, the identity of the sender of a certain message or piece of merchandise, or the authority allocated by an individual or state department to a particular agent who carried the seal impression. Message sealings could also be intended as a countercheck for commodity sealings, to be used for comparing with incoming sealed packages, or as 'bills of lading' for goods dispatched (Wright and Johnson 1975).

Commodity sealings would necessarily be of unbaked clay or bitumen, and might not survive in buried debris. Only seven such sealings have been found at Mohenjo-daro, all of which bear signs of having been affixed to cloth, string or matting (Mackay 1938: 349 ff, pl. XC. 17, pl. CII). At Harappa there are apparently no commodity sealings. Only one has been found at Chanhu-daro (Mackay 1943: 149, pl. LII no. 35). From Kalibangan a few have been reported (IAR 1960–1, pl. XLVIII.B; Lal 1975: pl. Ib). There is an abundance of commodity sealings at Lothal, at least 75 having been found in the 'warehouse' by the 'dockyard', and some containing more than one seal impression (Rao 1973: 119 ff).

Message sealings are much more numerous at the two large cities. These were usually made of baked clay or faience, and in moulds, several evidently in the same mould. They are of diverse shapes: rectangular, rectangular with triangular section, spherical, or cylindrical (Marshall 1931: 380, 393 ff; Mackay 1938: 349 ff; Vats 1940: 317 ff). That these were not intended for the actual sealing of merchandise is clear: there are no mat, cloth or string impressions on them, and the majority were cast in moulds. Whereas the message sealings from Harappa and Mohenjo-daro are numerous, there are very few at Chanhu-daro (Mackay 1943: 149), Kalibangan (IAR 1961–2: pl. LXIX A) and Desalpar (IAR 1963–4: pl. VIII. C). None from Lothal have as yet been published.

It is interesting to note that at Mohenjo-daro message sealings of different types occur in distinct localities. 'For instance, the scenes found on those found in the G Section of the DK area do not resemble those from other parts of the same area' (Mackay 1938: 350).

As a rule the commodity sealings are impressions of the standard Harappan seals, whereas the message sealings are only occasionally so. Message sealings more often contain a line of pictograms or a scene with human and animal figures on each face, the subjects being the same as those on the ordinary square seals. Sometimes animal and human figures and pictograms are set out on the same face of a message sealing, all being aligned along the length of the sealing rather than the pictograms occurring above the animal figure as on the seals.

The few seal impressions on pottery are confined to scored jars or goblets with tapering bases (Marshall pot type B). This is the most common type of pot at Mohenjo-daro and Harappa, roughly made, mass-produced, and probably cheap (Marshall 1931: 292, 298 ff). The tapering base makes it unlikely that the pots were placed upright on shelves or on the ground.[20] Their small size (generally no more than 12 to 15 cm in height) also precludes their having been used for storage unless valuable commodities such as good quality oil or precious stones were involved. But the pots are far too ubiquitous for such an explanation to hold. The grooved shoulders

Fig. 25. Harappan scored goblet with seal impression.

[20]There are no jar-stands extant which could have accommodated them (Marshall 1931: 192–3).

of the pots present a further enigma: the suggestion (Marshall 1931: 318) that they were used for raising water is unacceptable. For why should water pots be seal-impressed? Perhaps these pots were in some way analogous to the modern shop-keeper's paper bags, and occasionally were used for some expensive commodity and therefore bore seal impressions. They occur at most Harappan sites including Lothal (Rao 1973: 55, 61) and Surkotada (Joshi 1972b: 122, 131), but not at Chanhu-daro, Gumla, Rojdi or Bhagatrav, and apparently not at Rupar either. The impressions come from different types of seals, usually containing only a group of signs.

We had indicated that the explanation for the comparatively large number of seals at Mohenjo-daro and Harappa may be the fact that these were administrative and redistributive centres. There are, however, also many seals from Lothal. Lothal, moreover, has produced the largest number of commodity sealings so far. This reinforces the argument that Lothal was a transport centre, a town which owed its importance to its location on the Cambay coast at equal distance from the several Harappan sites of Kathiawar and coastal south Gujarat. Obviously, Lothal was not only a centre whence goods passed in transit, but where processing activities (such as the opening of packages, checking, repackaging or sorting) were carried out. In short, the seals and commodity sealings indicate that Lothal was largely a 'break-of-bulk' centre, though it was also a centre for the manufacture of carnelian beads, ivory and copper.[21]

The fact that very many message sealings come from Mohenjo-daro and Harappa and hardly any from the other sites, would also point to the redistributive function of the two sites, where commodities and messages were both received and dispatched.

It remains to ask if these seals were used in the processes of foreign trade. This would be the case if commodity or message sealings of the Harappan type were found in western Asia. So far only one piece of evidence is available: a commodity sealing, its reverse bearing the impression of some woven material, stamped with a square Harappan seal showing a unicorn in front of a 'brazier' and a line of pictographs above, from Jokha (Umma) (Scheil 1925).

[21] It may alternatively be argued that these clay sealings were the sole remnants of the accidental burning of entire sealed packages at Lothal. If so, the large number of sealings excavated here is a matter of pure chance.

As for Harappan seals themselves, none have been found in distant regions other than Mesopotamia.

At Kish, a Harappan seal of typical shape, design and script, was found in probably Early Dynastic context in a room within or close to the ziggurat complex (Mackay 1925a: 697–98, pl. X. 1).

From uncertain stratigraphic contexts at the same site came another typical Harappan seal (Langdon 1931: 593–6). Both examples from Kish bear the unicorn field-symbol. A Harappan seal is reported from Susa as well (Langdon 1931: 593–6).

From undatable levels at Ur came a seal of the standard Harappan shape bearing a short-horned bull, but with a cuneiform rather than a Harappan inscription on top (Gadd 1932: no. 1). The signs, according to Gadd, date the seal to the Early Dynastic period. Certain Harappan mannerisms such as the band across the animal's back are present, but the 'manger', almost invariably shown in front of bulls with lowered head, is missing on this seal. This seal is therefore somewhat enigmatic. Gadd suggests that it was a local imitation of an Indus type. It may have been made at Ur for a Harappan agent who had lost his own seal, and needed a replacement to use locally, and, therefore, could make do with a cuneiform inscription. Unforunately the inscription does not appear to be intelligible. A cylinder seal from Susa (Delaporte 1920: S. 299.45, pl. 25) bears the figures of two horned bulls (one with head lowered over a basin) and Harappan signs, and may also have been locally manufactured for a Harappan merchant. Three seals of'Harappan type' have been reported by de Genouillac from Telloh (1934: 86; 1936: 83). None of these have been illustrated. One of these, No. 2252, IM 21246, is of hard white stone, hemispherical in shape, and totally unlike Harappan seals except for three incised signs. These are only vaguely decipherable and cannot be said to be true Harappan characters. The other two were not available in the Iraq Museum in 1975. A square seal of Harappan type, allegedly from Telloh, bears five Harappan signs and the figure of a feline standing before a basin (Thureau-Dangin 1925).

As regards the interpretation of the findspots of the sealing and seals, one would infer that they imply the actual presence of a few Harappans in Mesopotamia (and Elam). Seals are personal possessions, marks of individual ownership or authority, and could not have been traded objects or imitations for fashion's sake. Perhaps a few Harappans had come abroad to see to the dispatch of goods to India.

The Harappan sealing at Jokha indicates that to a certain extent at least, Harappan goods were sent under contract or commercial partnership to Mesopotamia, and were not objects of incidental exchange. This point will be discussed further in Chapter V.

Seal Type II: Harappan in design and inscription, but of a different shape. Instead of being square or rectangular, seals of this class are round with a small high boss which has a single groove at right angles to the perforation. These have been found in the Indus valley as well as in Mesopotamia.

Fig. 26. Seal of type II.

The Harappan examples are: Mohenjo-daro: Mackay 1938: no. 500 (p. 343); Mohenjo-daro: Marshall 1931: no. 309 (pp. 375–6); Mohenjo-daro: Marshall 1931: no. 478, fragment (pp. 375–6); Chanhu-daro: Mackay 1943: no. 23 (p. 148).

Several examples come from Mesopotamia[22]: Ur: Gadd 1932: no. 2 (unstratified); Ur: Gadd 1932: nos. 3–5 (unstratified fragments); Ur: Gadd 1932: no. 16, UE II: 357, Seal no. 285, from PG 1847, Royal Cemetery. [This grave is Akkadian–Ur III in date (Buchanan 1954: 149 ff)]; Ur: Gadd 1932: no. 15, U. 8685. [This seal comes from PG 401, an Akkadian period grave. Details are not available and although it bears the symbol of a short-horned bull, it may belong to Type IV (below)]; Telloh: Marshall 1931: 375–6; Susa: *Catalogue des Cylindres Orientaux I*: pl. XXV. 15 (Akkadian levels).

One seal of this class has also been found in Luristan (Amiet 1974: 108–9, fig. 15). Unfortunately no details of provenance are available for either this or a round seal with double-grooved boss published by Delaporte (1920: T. 24: p. 23, pl. 2).

[22]Seals of unknown provenance, such as Gadd 1932: no. 17; JRAS 1932: 48; OIP XXII: pl. III. 23, are not discussed here.

All except the seal from Chanhu-daro depict a short-horned bull with lowered head on the lower part of the seal, and Harappan characters above. The Chanhu-daro seal shows a unicorn with raised head and a manger. The inscriptions are all different.

Unfortunately, nothing significant can be said about the findspots of the Harappan examples. They appear to have been found in unspectacular houses (Marshall 1931: 197, 225) or in streets. Only one Ur seal came from a significant context, as indicated above.

As the Harappan script is used, we may say that these seals were of Harappan authorship. At the same time, as they were also found outside India and are atypical in shape, it is possible that they were used in the process of overseas trade. This would mean that the seal inscriptions bore some kind of 'export' message such as the name of the dispatcher or the authority of a state agency and that trading partners abroad were able to read the Harappan script. Sign sequences and combinations of these round seals from Mesopotamia do not occur on seals of the square type. This could suggest either that they bore Mesopotamian—rather than Harappan—names (S. Parpola et al. 1977: 156 ff) or else titles, functions or agencies exclusively concerned with overseas trade.

Before we proceed to the following categories we may mention two seals which appear to be Harappan but do not fit into either category I or II. In the first place there is a fragmentary seal, 'thin and flat with a little high boss', on which the animal motif is damaged but the Harappan characters preserved, found at Failaka (Bibby 1972: 270 and text figure). An alleged impression of the miniature 'seal' type found in early Harappa was reported from Yahya IV A (Lamberg-Karlovsky and Tosi 1973: 34, figs. 137, 138) on a sherd of orange-buff ware.

Seal Type III: *Mesopotamian cylinder seals*. These were used as marks of ownership, for instance for sealing property or merchandise within containers, or for authenticating written documents such as contracts or loans. Sometimes the witnesses to a legal document also rolled their cylinders over the wet clay (Frankfort 1939b: 1–4).

The cylinder seals found at Mohenjo-daro (Mackay 1938: 344–5, nos. 78, 376, 488) and Harappa (Vats 1940: 327) do not appear to be Mesopotamian in origin. Similarly the curious main figure on the cylinder seal from Kalibangan (IAR 1963–4: pl. XXIII B), a combination of a human and a quadruped, is also probably Harappan as parallels are found in a couple of seals from Mohenjo-daro (Mackay 1938: no. 347, etc.) Cylinder seals have been found at Shahdad, two of which bear the figure of the goddess of vegetation (Amiet 1974: 105–6, figs. 9, 10), a well-known theme on Mesopotamian seals, especially in the Akkadian period (Frankfort 1939b: 116 ff, fig. 32, pl. XXe, XXj, etc.)

Given the Elamite affiliations of the culture of Yahya IV, any cylinder seals found here could be interpreted as local products.

Two cylinder seals of Mesopotamian origin, Akkadian in style, were found at Failaka and one possibly Babylonian seal from Ras al Qala'a City II. An Isin-Larsa date cylinder seal was also found at Thaj near Jubail (During Caspers 1972b: 171 n. 7).

Three sealings from cylinders at Shahr-i Sokhta I are vaguely reminiscent of the JN glyptic but are not of certain Mesopotamian origin (Lamberg-Karlovsky and Tosi 1973: 26, 38).

Seal Type IV: *'Persian Gulf' seals.* These can be subdivided into two categories based on chronology and shape (Porada 1971a). 'Early Persian Gulf' seals are round with a small high boss having a single groove at right angles to the perforation, whereas the 'Late' seals are round with a low and wide boss having triple grooves and four incised dots-with-circle.

The Early group is in shape exactly similar to category II described above, but different where designs are concerned, although the bull with lowered head does occur in both groups. In group IV, motifs include scorpions, the foot, long-horned goats and other naturalistic elements. More than one motif is usually depicted, and these are never placed on the same ground line. Animal bodies are carved out as large deep hollows (Porada 1971a: 333–4). Human figures are absent.

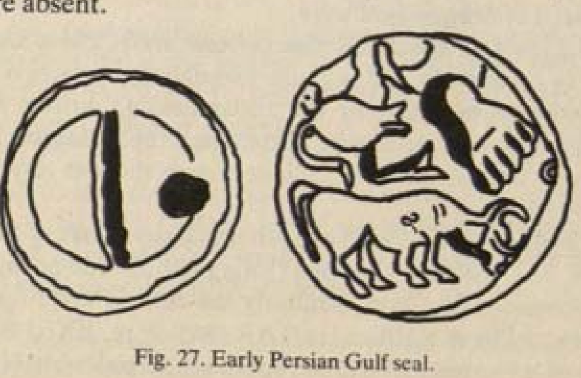


Fig. 27. Early Persian Gulf seal.

Seals of this group have been found in Early Barbar ('chain ridge') levels at Ras al Qala'a (Bibby 1957: fig. 13b; 1958: 244; 1965: fig. 3; 1966: fig. 4. b-d, ?e, ?g.). It is this securely stratified provenance from Ras al Qala'a which indicates the early date of Category IV. No seals of this group appear to have been found at Barbar or at Failaka.

Porada (1971a: 332–3) believes that some of the design elements of this group can be traced to the glyptic style of JN Susa and Mesopotamia.

A fragment of a round seal from Mohenjo-daro having a boss with a single groove and with a whorl of heads and necks of six different animals radiating from a (?) kidney-shaped central motif (Marshall 1931: 375–6, no. 383), might belong to this category, except that animals like the unicorn and tiger appear to be Indian. Such 'animal whorl' designs do not occur on Harappan seals, and a parallel to this seal may be noted from Barbar (Mortensen 1970: fig. 8) where the necks and heads of what may be six goats radiate from a central circle. Here as in the Mohenjo-daro example the animal bodies are striped. (It should, however, be noted that this parallel from Barbar is of the Late Persian Gulf shape, and that the animals are here more or less summarily depicted, whereas the seal from Mohenjo-daro has a boss of the Early type and the animal carving is detailed.) Other Persian Gulf seals with the whorl motif are also known (Bibby 1972: fig. 7b, fig. 20c, Porada 1971a: fig. 9).

At Yahya IVB an Early Gulf seal, showing a bull, an ibex and a crescent moon, has been found (Lamberg-Karlovsky 1970: 67).

Fig. 28

Fig. 29

28. Persian Gulf (?) seal from Mohenjo-daro (after Marshall 1931: pl. CXII. No. 383. **29.** Seal from Barbar (after Mortensen 1970: Fig. 8).

Amiet (1974: 109–10, fig. 16) reports an Early Persian Gulf seal impression depicting a number of seated animals on a fragmentary tablet from Susa which dates to the Ur III period. Another similar impression has also been found at Susa (ibid: fig. 17). This contains the figure of three animals as well as a central human figure. The identification of this latter seal impression as of Early Persian Gulf type is, however, doubtful.

I would suggest that the seal (Gadd 1932: no. 18) of unknown provenance is of this class. A possible Early Persian Gulf seal (ibid: no. 15, U. 8685) comes from PG 401, an Akkadian period grave at Ur.

It is not clear what relationship (if any) these seals had to seals of Category II. The latter appears to be a distinct group as the seals almost invariably bear the Harappan script and bull with lowered head. It may be, however, that the seals of groups II and IV comprised one large group (some originating at the Indus towns and others in the Gulf) used in long-distance trade.

Neither is it clear whether groups IV and V (to be described below) are really completely distinct. We may refer to the Mohenjo-daro seal with radiating animal necks and heads described above. The boss is of the Early type, but its design has analogies with the Late group. Similarly, two seals from Ur (Gadd 1932: nos. 10 and 11) have wide and low bosses with shallow grooves and concentric circles, but the motifs on them (two animals standing on different planes, and a scorpion with the eye motif, respectively) might well belong to type IV. The same may be said about a few seals from Ras al Qala'a (such as Bibby 1966: fig. 4.d, which is a good parallel to Gadd no. 10).

Seal Type V: Many seals of the Late Persian Gulf type—about 300 in all—have been found in Barbar levels at Ras al Qala'a (Bibby 1957: 143, 157; 1958: 244; 1966: 91–2, fig. 4; etc.), some of them by the city wall; at Barbar (Mortensen 1970); and at Failaka (Bibby 1972). At Barbar the majority come from the latest temple.

Designs on this group include human figures, animals rendered schematically or naturalistically, scorpions, religious scenes, drinking or erotic scenes, and other subjects. The seals are deeply and sharply engraved; rounded bodies are often exaggerated, human heads are summarily drawn with short lines or strokes. Much of the subject matter appears to have Mesopotamian affinities (Buchanan 1967: 104–7). The style is uniform and, according to Buchanan,

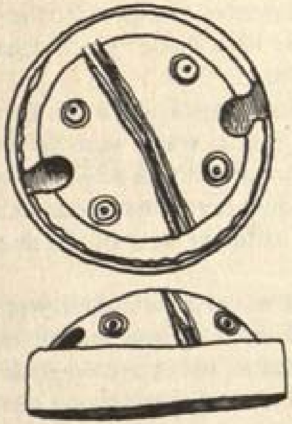


Fig. 30. Late Persian Gulf seal.

indicates the existence of a very small number of seal-carving workshops. A seal of this type with allegedly a two-necked dragon flanked by jumping goats is a surface find from Lothal (Rao 1963).

An unpublished blue limestone seal from Ishchali has a wide, low boss with triple groove, and a design consisting of a central sun and four cross-hatched squares. Unfortunately only a very rough sketch exists in the site register,[23] but it is quite possible that we have here a Late Gulf seal. The provenance of this seal, 'Q30/4, Floor II, East Bench', is a long narrow room behind the cella of the Ištar-Kititum temple. The latter is Larsa period in date. The room in question has been interpreted as the temple treasury or store for valuable objects used in the cult. It yielded an unusually large number of beads, seals and fragments of carved stone vessels (OIC 20: 85).

About five seals of this type have been found at Ur (Gadd 1932: nos. 8, 9, 12, 13 and 14) of which none occur in a securely stratified context.

The late date of this group is confirmed by the find of a sealing on a dated tablet from Larsa (Buchanan 1967), the design of which has a very close parallel to a 'late' seal from Ras al Qala'a (Bibby 1965: 147, fig. 3; Porada 1971a: fig. 4). The date of the tablet is the 10th year of Gungunum of Larsa, that is, about 1923 B.C. The document is a contract between an active agent or travelling merchant and his creditor. The creditor consigns specific quantities of wool, wheat and sesame oil to his active partner. These are all staple com-

[23]The seal is now in the Orienal Institute, Chicago, which has as yet not published a photograph. Reported in the Ischali Site Register for 1934–35 season: Isch. 134.

modities which are elsewhere evidenced as exports to the Gulf. The seal impression, then, could have been made by a merchant (probably the active partner here) from the Gulf.

The very large numbers of seals from Failaka can be explained perhaps by the hypothesis that Failaka was a westerly terminal on the existing trade route, where break-of-bulk activities took place, the India-originating circuit ending here, and goods being stored and re-exported (perhaps by different sets of mechanisms) to Mesopotamia subsequently.

About seven message sealings, as yet unpublished, were found in early levels of temple III at Barbar. These are all baked clay 'bullae', flattened spherical in shape, with an average diameter of two cm. An attempt to bore a hole is discernible on one of these. Some of them bear designs only on one side, others on both. Considering their findspot and the fact that the motifs recur on several of them (one motif occurs four times on the seven bullae), it is possible that these were marks of authorization by the Temple, to be carried by its messengers, or else marks of guarantee dispatched with consignments. Unfortunately no counterparts to these bullae have been found anywhere else except for one example reported from Diraz.

There is also an irregular lump of seal-impressed clay stuck on to a pot found at Barbar (Mortensen 1970: 396, fig. 1). As this was applied not to the mouth of the pot but to its sides, it appears that a cover such as a piece of cloth was stretched over the mouth of the pot and then affixed to the sides, or else that the seal impression was intended as a mark of ownership or a message concerning the identity of its sender.

In conclusion it is noted that there is no single category of 'international' seal which indicates by its distribution that several cultures were connected by a single all-embracing trade mechanism. However, the 'Persian Gulf' seals appear to have been reasonably widely spread, occurring not only in Bahrain and Failaka but also in not inconsiderable numbers in Mesopotamia, as well as sporadically at Yahya, at Lothal, and probably Mohenjo-daro. The impression on the Larsa tablet is a valuable piece of evidence indicating the use of these seals in the drawing up of contracts, presumably concerning trade with Dilmun.

We shall consider the further implications of the evidence of seals in Chapter V.

CHAPTER IV

Relative Chronology

Having discussed the nature and extent of the interaction between the various cultures, and the evidence for trade in each of several items, it is now pertinent to analyse the chronological position of each culture as determined by trade contacts. This is a difficult task, and the conclusions drawn here may well be subject to change or modification on the discovery of new data in the future. In this study preliminary investigations into a relative chronology were avoided; rather than establish at the outset a chronological framework into which the study may be structured, it was chosen to use all the available data for trade as the foundations for a relative chronology.

In the drawing up of a chronology the major problems lie in the correlation of archaeological and textual evidence, the apparent inconsistencies between relative dates (based on artefact associations) and C 14 dates, and the evaluation of the chronological significance of different kinds of synchronisms or parallels, especially where these may contradict each other.[1]

C 14 Dates and Associated Problems

This chronology is not based solely on the available carbon 14 dates for the various sites, for fairly obvious reasons. The risks of error in C 14 dating are too well known to be repeated here. Secondly, it is clear that we have widely disparate numbers of dates for the different cultures and sites under study. Thus while there is an appreciable run of dates for Kalibangan, there are no dates for the early

[1] For example the Barbar culture has produced pottery and temple architecture of JN–ED type. Yet the same culture also has links with Akkadian, Ur III and Larsa period Mesopotamia because of the occurrence of Persian Gulf seals and sealings at sites of these periods. We may interpret this evidence by positing a chronology of one thousand years for the duration of the Barbar culture, if we give equal weight to all these bits of evidence. Alternately, we may posit that seals and sealings are more reliable chronological indicators than pottery types or temple architecture and ritual. This would give the Barbar culture a shorter time-span.

part of the Harappa civilization in Sind, none for Bampur, and only a few for Umm an Nar and Barbar respectively. Finally, the problem of the need for corrections must also be taken into account. By now it has generally been accepted that C 14 dates for the third and second millennia B.C. are too low because of fluctuations in the radiocarbon reservoir. However, at least two methods of correction are in use (that of Ralph and Michael, and of Suess) so that, for example, a date of 2162±66 B.C. for Mohenjo-daro would be corrected to 2695 B.C. by the one method and 2510 B.C. by the other. Further refinements in correction will undoubtedly develop in the future.

Before these calibrations had been worked out, archaeologists were faced with the problem that Mesopotamian texts referred to trade with Mehluhha in a period much earlier than that indicated by C 14 dates from Mohenjo-daro, Lothal and Kalibangan. As the Mesopotamian chronology has been worked out on independent data and stands firm, scholars found themselves having to opt for one or other of the 'two' chronologies. Thus Agrawal (1964) and Allchin and Allchin (1968: 139–42) placed their faith in radiocarbon and accepted dates as low as 2250 B.C. for the beginnings of the Harappa civilization, believing that any trade before this date would have been conducted by towns of the Amri or Kot-Diji related horizon. During Caspers (1970b), Rao (1973) and others, however, better acquainted with the archaeological evidence for contacts, rejected such theories and opted for higher chronologies. Many writers also emphasised the fact that there were as yet some eighteen metres of untapped habitation deposit below the lowest excavated levels at Mohenjo-daro, and also that there were no C 14 dates for early mature Harappan levels in Sind.

Once the need for calibrations of C 14 dates was recognized, however, it became increasingly clear that (whatever the finer degrees of adjustment) there was no longer any wide discrepancy between absolute dates and the relative dates based on Mesopotamian chronology (Dales 1973; Brunswig 1973, 1975).

It is therefore clear that our chronology cannot be based on absolute dates but that these may well be used as secondary, corroborative evidence.

Correlations with the Mesopotamian Sequence (Table 4.1)

The Mesopotamian sequence has been dated on independent

TABLE 4.1 ARCHAEOLOGICAL SYNCHRONISMS WITH THE MESOPOTAMIAN SEQUENCE

	BARBAR	*UMM AN NAR*	*YAHYA IV C-B*	*HARAPPA*
JN (—SUSA-C) 3100-2900			IV C—Proto-Elamite script bevelled-rim bowls, Susa-C type seals, solid-foot goblets	
ED I 2900-2750	(Solid foot goblets in temple foundations)	Suspension jars with painted cross-hatched zones as at Agrab Seal impression on a sherd of red ware		
ED II 2750 2600	(Oval temples as at Khafaje)		IV B—1 Bell-shaped steatite bowls as at Ur 2 Steatite vessels	
ED III 2600-2370	1 (Oval temples as at Khafaje, Hiba, Ubaid) 2 Alabaster vases of Egyptian type as at Mari and Ur	1 Plain steatite vase as at Ur 2 Amphorae as at Ur and Ubaid		1 Square seal typically Harappan, from Kish 'Early Sumerian.' 2 Etched carnelian beads common 3 Shankh shells at Kish Y cemetery 4 Ivory at Ubaid, Mari, Kish 5 Die at Al-Hiba
AKKAD 2370-2100	Possible early PG seal from PG 401, Ur (Gadd No. 15)			1 Cylinder seal with elephant rhinoceros and gharial at Asmar 2 Harappan type round seal at Ur PG1847 (Gadd No. 16); perhaps Gadd No. 15 3 Etched carnelian beads common 4 Shankh shells at Ur Graves 5 Ivory at Asmar
UR III 2100-2000	Early PG seal impression on Ur III Tablet from Susa		Steatite vessels	1 Harappan weight at Ur 2 A few etched carnelian beads 3 Ivory at Ur and Nippur
ISIN LARSA 2000-1763	1 Sealing of late PG type on tablet dated 10th year of Gungunum (1923 B.C.) 2 Probable late PG seal in Istar Kititum Temple at Ischali			1 Cylinder seal with strong Indian influence at Ur (Gadd No. 6) 2 A few etched carnelian beads

grounds (see Sachs 1970) too well known to be repeated here, and has scope for numerous cross-checks. Thus errors are probably limited to about 75 years on the outside, and the Mesopotamian chronology is eminently reliable as far as archaeological chronologies go.[2] Moreover, the few C 14 dates available,[3] when corrected, support this chronology.

All synchronisms with the firmly established Mesopotamian chronology are set out in Table 4.1. These are of immense value as they enable us to relate numerous disparate bits of evidence with a single sequence and thus help towards achieving a unified chronological scheme. With this as the basic frame of reference, we shall in the following discussion also utilize C 14 dates and cross-synchronisms between the non-Mesopotamian cultures to further elaborate or refine our hypotheses.

There are no direct synchronisms between Mesopotamia on the one hand and the Helmand, Bampur or Kulli cultures on the other. It is the Barbar, Umm an Nar, Yahya and Harappa cultures which have direct contacts with Mesopotamia.

The Barbar culture has parallels with ED Mesopotamia mainly in religious architecture and ritual objects such as solid-foot goblets buried in temple foundations. This does not necessarily argue for contemporaneity, as forms of architecture and ritual objects could have come into use in the Gulf at a time when they ceased to be in vogue in Sumer.[4]

Seals, however, present much more secure evidence for chronology. As indicated in the table, a possible Early Persian Gulf seal at Ur came from Akkadian levels, whereas sealings from two Gulf seals appear on Ur III and Larsa period texts respectively. The Larsa period text is especially valuable evidence as it is dated to the 10th year of Gungunum, which makes it about 1923 B.C. Thus for the time being we can say that the more reliable artefact-

[2]It may be recapitulated that the dates for the Mesopotamian sequence are as follows:

ED I	: *c.* 2900–2750 B.C.	Post-Akkadian	:	*c.* 2230–2100 B.C.
ED II	: *c.* 2750–2600 B.C.	Ur III	:	*c.* 2100–2000 B.C.
ED III	: *c.* 2600–2370 B.C.	Larsa	:	*c.* 2000–1763 B.C.
Akkadian	: *c.* 2370–2230 B.C.			

[3]For example, ED I Nippur: 2253 ± 23 B.C., *ED II* Nippur: 2184 ± 41 B.C., Ur Royal Cemetery (ED IIIa): 2030 ± 150 B.C. (all uncorrected)

[4]Mortensen (1970: 395) is not very explicit about the context of the imported Jamdat Nasr sherd at Barbar: it was 'found in a layer north of the first temple'.

associations give dates of Akkadian to Larsa periods for the Barbar culture.

The C 14 dates support this argument. Two dates from Barbar Temple III are 1650±100 B.C. and 1680±100 B.C. (Mortensen 1970: 397). According to Mortensen (ibid: 398, n. 35) for calibration one must add 400 years to these dates, thus arriving at 2050 and 2080 B.C. respectively. These C 14 dates are from late levels, and the lack of chain-ridge ware at Barbar indicates that the earliest settlement at Ras al Qala'a must have been substantially earlier than Barbar I (it may be recalled that it is in these early levels at Ras al Qala'a that the weights and Sumerian capacity-marked sherd were found.)

The Umm an Nar culture also has synchronisms with ED Mesopotamia: the more significant of these include distinctive and striking parallels with—therefore probably imports of—plain steatite vases and 'amphorae' known in ED III Mesopotamia and, on an Umm an Nar ware sherd, a cylinder seal impression which stylistically would date to ED I (Amiet 1975).

It may be noted that cross-links between Barbar and Umm an Nar support the chronology based on Mesopotamian synchronisms. A few Umm an Nar sherds apparently appear at earliest Ras al Qala'a. This would imply that the Umm an Nar culture was at least as early as if not earlier than the Barbar, and the Mesopotamian synchronisms of Umm an Nar do belong to a date somewhat earlier than those of Barbar.

The chronology of period IV at Yahya may also be related with the Mesopotamian sequence.

Period IV C belongs to the proto-Elamite horizon during which were established urban centres as well as the limited use of writing (Wright and Johnson 1975: 270 ff) at Susa Cb, Sialk IV, Tal-i Ghazir, Tal-i Malyan earliest levels, and Yahya IV C. Artefacts of proto-Elamite vintage are bevelled-rim bowls, polychrome biconical jars, a distinctive glyptic style, solid-foot goblets, and proto-Elamite script. All these elements occur at Yahya IV C.

Now Susa Cb has several strong affinities with JN Mesopotamia (le Breton 1957). Can we then say that the proto-Elamite culture is JN in date? General contemporaneity is of course obvious, but there are indications that Sialk IV, for example, continued into ED times, perhaps ending in the beginning of ED II, 'although it may have been considerably later' (Dyson 1965: 226; also Ghirshman

1938: 83). The same might possibly apply to Yahya IV C, but even if it is as early as Susa Cb, it cannot be much earlier than 3100 B.C.

Mesopotamian synchronisms give Yahya IV B an ED II–III date. This accords with Lamberg-Karlovsky's chronology (1976: 172). The associations are bell-shaped steatite bowls (ED II–III in date at Ur) and carved steatite vessels. In Chapter II we had shown that the latter were to a large extent made at Yahya IV B, and that all the published Mesopotamian pieces date to ED II or III.[5]

It would be useful to know the terminal date for Yahya IV B. It may well be later than 2500 as proposed by Lamberg-Karlovsky and Tosi (1973: 30). This matter will be taken up subsequently.

The controversy regarding the chronology of the Harappa culture has been mentioned above. Trade synchronisms with Mesopotamia support the earlier chronology as will presently become clear.

Etched carnelian beads of Harappan manufacture are common in the ED III and Akkadian periods in Mesopotamia, but are also known in the Ur III and Larsa periods. Ivory, which in all probability came from India, is known in the ED III, Akkadian and Ur III periods. Shankh shells have been found in ED III and Akkadian graves. A die of Mohenjo-daro type comes from ED III Hiba, and the Harappan weight at Ur probably dates to Ur III.

The square typically Harappan seal at Kish is probably ED in date and the round seal of Type II from Ur comes from a grave of Akkadian or early Ur III date.

In other words, as Table 4.1 indicates, the archaeologically attested trade contacts of the Harappa and Mesopotamian civilizations are the most numerous in the ED III and Akkadian periods. During the Ur III period ivory and etched carnelian beads are still attested at Mesopotamian sites, and there is the evidence of the Harappan weight at Ur. For the Larsa period, however, the only archaeologically attested synchronisms are a few etched carnelian beads and what is commonly called Harappan-style carving on a cylinder seal.

Thus on solely archaeological grounds the terminal date for the Harappan overseas trade would extend at least up to Ur III, say 2050 B.C., if not later.

This hypothesis is at variance with Brunswig's theory (1975: 142–4) that direct trade ended with the fall of the Akkadian dynasty

[5]Two pieces with dot-and-circle motifs from Ur III may not have been made at Yahya as to the best of my knowledge this motif does not occur there.

c. 2200 B.C. and that after this the Harappa civilization was on the decline and the remaining trade passed into the hands of the Dilmunites. In other words Brunswig believes that the mature Harappa period, the period of foreign trade, came to an end *c.* 2200 B.C. Brunswig's hypothesis is mainly based on the lack of references to Meluhha after the Akkad period, the occurrence of seals, and the corrected C 14 dates for the Harappan sites.

If his theory were accepted, it would be inferred that the intrusive objects in the Ur III period in Mesopotamia were brought in by Dilmunites. We had indicated in Chapter III that cubical weights of the Harappan system were in use in Bahrain, and the carnelian beads and ivory could also have been brought from Late Harappan sites by Dilmunite merchants.

The major criterion on which this theory is based is the corrected C 14 dating for what is known as the Late Harappa period. According to these dates as given by Brunswig (1975: 135–42), the 'late' levels at Kalibangan, the strata below the 'squatter' levels at Mohenjo-daro, and Lothal VB and Rojdi IB all date *c.* 2200 B.C. to 2100–2000 B.C. if not 1950 B.C.

One may, however, object to such a ready acceptance of a chronology based on only a handful of dates. In the second place, even if the chronology were acceptable, there is very slender evidence to indicate that no overseas trade was handled in this period, or even that the urban system had universally disintegrated by then. The greater part of the excavations at Mohenjo-daro were not based on stratigraphic principles and it is not possible to deny the existence of seals, or trade materials or evidence of state organization in the so-called late levels here.[6] The only evidence for decline and ceasure of trade comes from Lothal V B, for which there is only one C 14 date. In this period at Lothal there were apparently no seals, and the dockyard was not in use (Rao 1973: 54, 61, 73). It must be admitted that Lothal need not be typical of the chronology of all Harappan sites and that there is no indication that it was the major Harappan port, much less the only one. Thus it cannot yet be

[6]In fact Marshall (1931: 9–10, 103) makes it clear that the distinction Early, Intermediate and Late at Mohenjo-daro is based solely on successive building phases, and not on the differences in objects found. The uniformity of artefacts through the strata is instead constantly pointed out. The only difference between Late and other levels is that houses are smaller and poorly built. But copper tablets, at least two etched carnelian beads, a jewellery hoard, ivory pieces and, most important, seals, are all known from Late levels.

assumed that after *c.* 2200 B.C. there was no overseas trade under Harappan organization just because Lothal had ceased to trade.

The evidence of the Larsa period texts from Ur also must be considered. These texts (Leemans 1960: 23–35) admittedly refer to trade only with Dilmun. But we had mentioned before the historical role of the people of Bahrain as merchant middlemen. It is clear that *all* the imports from Dilmun in this period could not possibly have originated in the Gulf. These imports are copper, lapis lazuli, carnelian, ivory, multicoloured stones, pearls, gold and *mesu*-wood. Whereas pearls came from the Gulf and copper and *mesu*-wood could have originated in Magan, we had argued in Chapter II that lapis lazuli, carnelian, ivory and gold were Harappan exports to Sumer. Furthermore, we had also argued in Chapter II for Mesopotamia as the source of Harappan silver, and the maximum textual evidence for exports of silver seawards from Ur comes from the Larsa period (Leemans 1960: 36–8).

Thus we may be certain that Indian products continued to come into Mesopotamia in the Larsa period. The lack of references to Meluhha may simply signify that the Dilmunites had now come into their own as sea-faring middlemen, and that the Harappans had direct dealings with the Dilmunites rather than with the Mesopotamians. It does not necessarily mean that Harappan trade had come to an end. Moreover, it is argued subsequently that the Ur III references to 'Magan' denote the Harappan ports of Makran. (At the same time it must be noted that so far there is only one Harappan C 14 date for the period after 2000 B.C.)

We should not, however, forget the existence of possible post-Harappan occupation at the sites of Kathiawar and coastal south Gujarat. In fact, as noted by Allchin and Allchin (1968: 182–3) the post-Harappan period saw a proliferation of coastal settlements in the Bharuch and Surat regions. One cannot therefore dismiss the possibility that the people of Gujarat continued to trade after the disintegration of the Harappan system, and that the handling of the trade went into Dilmunite hands because of the lack of state organization for long-distance expeditions from India. This suggestion is at best tentative due to the paucity of excavations at post-Harappan levels and the lack of substantial evidence for lapis, gold or ivory in them. Until we have such evidence it may not be unreasonable to assume that the Harappans continued to trade well into the Larsa period.

To sum up,

1. There is no evidence except at Lothal to indicate that trade and state organization had ceased before the so-called 'Late Harappan period'.

2. The available C 14 dates indicate that the Harappa civilization came to an end between 2100 and 2000 B.C., although there is one (corrected) sample from Late Kalibangan for *c.* 1950 B.C.

3. Indian artefacts are to be found in Mesopotamia in the Ur III period (2100–2000), and there are sporadic occurrences in the Larsa period (2000–1760 B.C.) as well.

4. Until post-Harappan sites in coastal Gujarat are systematically excavated, we cannot prove that it was the successors of the Harappans who provided the materials which the Dilmunites traded with Ur in the Larsa period.

5. It is, therefore, argued that organized trade of the urban Harappan system continued into some part of the Larsa period.

Therefore the dates for the end of the Harappa civilization and its overseas trade may well be later than 2000 B.C., perhaps around 1800 B.C.

The Chronology of Southeast Iran, Afghanistan and Baluchistan

The Shahr-i Sokhta, Bampur and Kulli cultures have produced no artefacts which can directly link them with the chronology of Mesopotamia. However, as was pointed out in Chapters I and II, we have evidence for much cultural interaction between the cultures of Oman, southeast Iran, Afghanistan and Baluchistan. Thus it is possible to tie in the chronologies of these cultures with that of Yahya, which has been dated on the basis of its Mesopotamian–Elamite synchronisms.

The artefact associations beween Yahya, Bampur, Umm an Nar, Shahr-i Sokhta and Kulli are set out in Table 4.2. These artefacts are steatite vessels, incised greyware, black-on-grey pottery especially including distinctive canisters, large vessels with snake-head ridge decoration, the humped bull motif on pottery, all discussed in Chapters I and II, as well as the occurrence of Bampur sherds and a proto-Elamite tablet at Shahr-i Sokhta IV and I respectively. As is clear from Table 4.2, all these elements corroborate that Bampur V–VI, Umm an Nar, Shahr-i Sokhta IV (and perhaps II–III?) and Kullı were approximately contemporary with Yahya IV B.

TABLE 4.2 ARTEFACT ASSOCIATIONS BETWEEN THE MAGAN CULTURES

	YAHYA	*BAMPUR*	*UMM AN NAR*	*SHAHR-I-SOKHTA*	*KULLI*	*SHAHDAD*
*STEATITE VESSELS	IVB	IV-VI	✓		✓	✓
*INCISED GREYWARE		IV-VI	✓	IV	Mehi	✓
BLACK ON GREYWARE POTTERY	VA-IVB Lamberg-Karlovsky & Tosi 1973 : 39-42	IV-VI Lamberg-Karlovsky & Tosi 1973 : 39-42	Lamberg-Karlovsky & Tosi 1973 : 39-42	II-III Lamberg-Karlovsky & Tosi 1973 : 39-42		
CANISTERS		V2-VI De Cardi 1970 : 268, Fig. 43	During Caspers 1970 b : 212, n . 11, Fig. 4	IV Lamberg-Karlovsky & Tosi 1973 : 43	Kulli Piggot 1950 : 103 Fig. 6	
LARGE VESSELS W. SNAKE-HEAD RIDGES	IVB Lamberg-Karlovsky 1970 : 71 Fig. 32 G		Frifelt 1970 : 376 Fig. 7			
HUMPED BULL POTTERY MOTIF			Thorvildsen 1962: 218-19		De Cardi 1970 : 268	
		VI Type Sherds at Shahr-i-Sokhta IV		IV Bampur VI Sherds (Tosi 1974a : 33)		
	IVC Proto Elamite tablets (Lamberg-Karlovsky 1970 : 81)			I Proto Elamite tablet (Tosi 1976 : 168)		

*All references in Chapter II

Yahya IV C appears to have been at least partly contemporary with earliest Shahr-i Sokhta on the criterion of the occurrence of proto-Elamite tablets and sealings. The occurrence of a few Nal jars in graves of probably II–III date at Shahr-i Sokhta (Tucci et al., 1978: 28) confirm the early date of this horizon.

Earlier in this discussion we had concluded that Yahya IV C must be anything between 3100 and 2750 B.C. in date, and IV B, ED II–III (2750–2370 B.C.) and possibly continuing later.

This means that Shahr-i Sokhta I would be some time between 3100 and 2750 B.C., and Shahr-i Sokhta IV, partly contemporary with ED II–III or somewhat later. The later date might be more acceptable as between I and IV are periods II–III at Shahr-i Sokhta (the time of the maximum lapis lazuli production).

Similarly Bampur V–VI, Umm an Nar and Kulli must also be 2750–2370 B.C., possibly continuing later. The Kulli culture may well have continued to exist later than the others. We refer here to Chapter II where it was indicated that the steatite at Mohenjo-daro may well have come from two sources, Yahya and a source in the Kulli region. The piece from Yahya occurs in earliest levels at Mohenjo-daro whereas those from the possible Kulli source occur in higher levels. Moreover, Kulli-Harappan contemporaneity is also indicated by the Harappan weight and pottery at Mehi (Piggott 1950: 115) and two Harappan seals at Nindowari (Casal 1966: 15–16).

The chronology of the 'Magan' sites thus having been fairly securely established, certain problems[7] regarding the trade in lapis lazuli become clearer.

It is now evident that Period II–III at Shahr-i Sokhta, the period of major lapis production, is much earlier than ED III, and, therefore, earlier than the Harappa civilization, although some overlap is possible. Shahr-i Sokhta IV, the period when lapis production came to an end, is contemporary with the earlier part of the Harappan period.

Thus the following pattern emerges. In an early period (II–III), Shahr-i Sokhta was probably a major supplier of lapis lazuli by overland routes, as may be reflected by the epic of 'Enmerkar and the EN of Aratta'.

In the late ED II–III period which follows, there is no production at Shahr-i Sokhta (IV), but the Harappans evidently used lapis

[7]Mentioned in Chapter II.

lazuli and traded it over the Gulf sea route. Thus the Gudea and UET V references to lapis from Meluhha and Dilmun.

If Shahr-i Sokhta did supply this material to southern Mesopotamia, it did so only before ED III, perhaps ED II, and this explains why Magan is not mentioned as a source in available texts.

Why this change in trade patterns took place is not clear. It may be that Shahdad took over a 'monopoly' of the Seistan lapis lazuli route, blocking supplies to Sumer. The Enmerkar epic may reflect such a time of crisis when Mesopotamia's supplies were being threatened. Until the habitation site related to the Shahdad cemetery is excavated this cannot be proved, but it is worthy of note that some pottery at Shahdad has clear parallels with Yahya IV A ceramics (Lamberg-Karlovsky 1973: 41), and thus by inference the settlement here must have continued to flourish after period IV at Shahr-i Sokhta.

Textual Evidence and Chronology

For easy reference, the chronology of textual references to Dilmun, Magan and Meluhha is given in Table 4.3. Does this chronology support that based on archaeological evidence? For Dilmun and Mehluhha there is general agreement between archaeological and textual chronology, but for Magan there is none.

Dilmun: In a preceding section we had stated that Mesopotamian synchronisms for the Barbar culture date from the Akkadian to Larsa periods, but that the beginnings of the culture at Ras al Qala'a would have been earlier.

The chart shows that written evidence corroborates the archaeological: boats and trade with Dilmun are explicitly mentioned in ED III. We may thus take the beginnings of the Barbar culture to *c.* 2600 B.C.

Meluhha: On archaeological evidence the Harappa civilization was dated (above) from ED III to at least Ur III.

Textual evidence corroborates this for the Akkad, post-Akkad and Ur III periods.

We had indicated in a preceding section that the Larsa texts, as they refer to Indian merchandise being traded in Dilmun, may indicate that the Harappa civilization continued into the Larsa period, but that its trade was now handled by middlemen.

TABLE 4.3 TEXTUAL REFERENCES TO DILMUN, MAGAN AND MELUHHA AS TRADE PARTNERS OR PRODUCERS OF MATERIALS

		Dilmun	*Magan*	*Meluhha*
ED III a	Ur-Nanšē of Lagash (Sollberger & Kupper 1971 = 1C3)	boats brought cargos of wood		
ED III b	Lugalanda (Lagash) (Lambert 1953)	copper trade		
AKKAD	Sargon (Hirsch 1963: 37–8)	boats at his quay	boats at his quay	boats at his quay
	Naramsin (Thureau-Dangin 1907: 164–7)		political conquest	
	Manishtusu (Gadd 1971:439)		? conquest	? conquest
	'Curse of Akkad' (Kramer 1970:62–6)			people brought wares to Akkad
POST AKKAD	Gudea (Thureau-Dangin 1907: 66 ff)	several products	several products	several products
UR III	Temple accounts (UET III) (Leemans 1960: 18–22)	trade	trade	
	'Enki & the World Order' (Falkenstein 1964)		several products	"
	Ur Nammu cones, laws (Sollberger & Kupper 1971: III A 1 f; Jacobsen 1960)		rendered the trade safe and reinstated the boats	
	HAR.ra = *hubullu* & *lipšur* (Leemans 1960: 5–10)		several products	"
LARSA	Temple accounts (UET V) Oppenheim 1954; Leemans 1960: 23–36)	trade		
	Contracts (UET V, Leemans 1960: 36–55; Oppenheim 1954)	trade		

Archaeological synchronisms between India and Mesopotamia are most numerous in ED III, but there are no textual references to Meluhha in this period. The textual evidence however imposes no modifications on the archaeologically established Harappan chronology.

Magan: Yahya IV B, Shahr-i Sokhta IV, Bampur V–VI, the Umm an Nar culture and the Kulli culture, on the basis of archaeological evidence, were given the dates of ED II–III as the most secure, although we had indicated above that they might extend into the Akkad period. Yahya IV C and Shahr-i Sokhta II–III are even earlier.

Thus it is somewhat disconcerting to note that the first references to Magan are no earlier than the Akkad period and that direct trade with Magan is mentioned as late as Ur III.

One possible explanation for this is that the Mesopotamians perhaps included the Harappan ports of Makran in the land of Magan, and that they perhaps sailed up to Sutkagen-dor in the Ur III period.[8]

The implications of the correlations between archaeological and textual chronology are discussed in the concluding section.

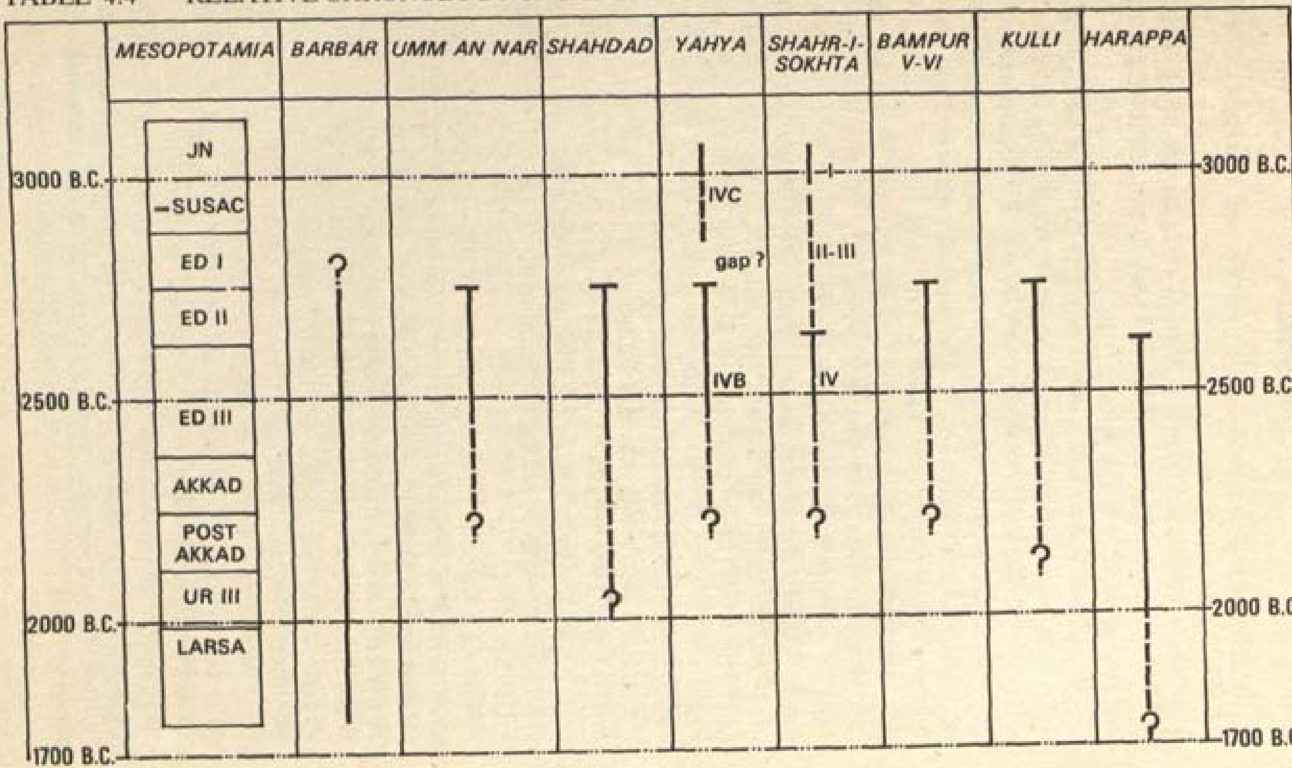
Concluding Remarks

It has become clear that both archaeological and textual evidence are necessary for drawing up a final chronology, as given in Table 4.4. This chronology gives dates generally earlier for the Magan sites than for the Barbar or Harappan. The Barbar chronology is the most firmly established, and probably the longest: ED III to Larsa (i.e. *c.* 2600–1760 B.C.) The Harappa civilization also is as early as ED III and perhaps ended as late as the Larsa period. In contrast, the Magan sites reached the period of maximum external contacts and prosperity substantially earlier (ED II–III or 2750–2370 B.C.), possibly continuing into the Akkad period.

This would explain the paucity of Harappan finds at Yahya IV B and the absence of Harappan links with Shahr-i Sokhta. The shankh shells at Shahr-i Sokhta were surface finds, and it was in level IV A at Yahya in which the etched beads were found. In contrast there

[8]It is not impossible that post Umm an Nar cultures in Oman were exporting copper to Mesopotamia. But there is no evidence yet for this.

TABLE 4.4 RELATIVE CHRONOLOGY OF THE THIRD MILLENIUM



are numerous parallels between the Barbar and Harappa cultures which were contemporary.

However, certain difficulties arise in the interpretation of the chronological occurrences of Dilmun, Magan and Meluhha as producers of goods in Mesopotamian texts.

That Dilmun was a trade partner from ED III to the Larsa period requires no explanation. Magan ~~is~~ not mentioned in the ED period although Yahya IV B produced much steatite for Mesopotamia in this period. Trade with Magan (i.e. Mesopotamian sailings to Magan) is only mentioned in Ur III. The explanation may be that while coastal stations may have existed in southeast Iran or Oman, the Maganites themselves were never seafarers, and relied on the Dilmunites to carry their products westwards. Alternatively their produce may have been carried overland to Elam and thence to Sumer. We had mentioned earlier that Lothal in period V B (*c.* 2100 B.C.) had ceased to trade, but that in the contemporary so-called 'Late Harappa' period at Mohenjo-daro there is evidence for continued access to materials. It may therefore be that the ports of Makran now came into full use because competition and political threat from southeast Iran and Baluchistan were well out of the way. As monsoon weather would not have to be braved to reach these ports, the merchants of Ur were probably able in Ur III to undertake their own sailing expeditions to this coast which they called 'Magan'.

Although there is evidence of trade contacts with Harappa in numerous kinds of artefacts, Meluhha is mentioned in no commercial text, early or late. Direct contacts are only mentioned in the Akkadian period and these appear to have taken the form of tribute (boats coming to Sargon's quay, Meluhhans bringing their wares to Akkad) rather than trade. We know from the occurrence of seals and other evidence that direct dealings could never have been limited to tribute alone. The silence of texts regarding trade with Meluhha in ED III (when so much trade is archaeologically documented) is indeed difficult to explain. For the post-Akkad and later period the explanation may be that with the establishment of Harappan ports in Makran (in about Ur III) out of the reach of the southwest monsoon, the handling of the trade fell increasingly in the hands of the Mesopotamians and Dilmunites.

CHAPTER V

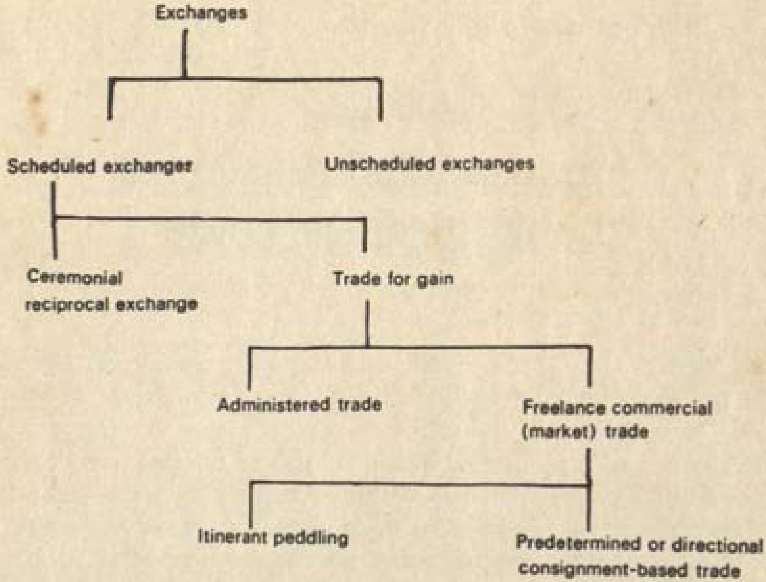
Organizational Aspects of Long-Distance Trade

In Chapters I and II the evidence for trade was considered. Given the ultimate aims of this study set out in the Introduction, we now need to consider the impact of external trade on the Harappan economy: was it peripheral or did it form an integral part of the economy? This question may yet be premature. Nevertheless, we can investigate the nature of the trade. Was it, for example, a matter of unplanned exchanges, or was it scheduled trade? What part, if any, did reciprocal gifts play in the interchange of goods and materials? If the exchanges can be described as trade for gain, was this state-administered, specific trade, or were the exchanges handled by professional agents under some kind of market system?

It cannot be too greatly emphasized that the discussion which ensues is largely hypothetical because of the fragmentary nature of the evidence. Yet it would not be a totally useless exercise to ask certain theoretical questions of our data. As stated by French (1973: 105), 'It is essential and (?) obligatory to define the problems before developing or choosing the means used to collect the data necessary to examine these problems and the hypotheses explicit in them. In other words, the questions asked dictate the methods of recovery; one selects the recovery technique to suit the method in hand. There is, however, an additional aspect; since the techniques of recovering data are ... becoming increasingly sophisticated, it is now possible that the questions asked should be of an order of sophistication equal to that of the available recovery techniques.'

We may begin by distinguishing the possible exchange processes shown on p. 216, emphasizing, however, that they need not be, as categorizations, mutually exclusive.

Lamberg-Karlovsky (1972a) and other archaeologists (as for example Fairservis 1971: 297–8) believe that any exchanges which



may have taken place between the Harappans and their contemporaries to the west were of an incidental nature. In such exchanges, called 'trickle trade' (Beale 1973: 141 ff) or 'down-the-line-exchange' (Renfrew 1972: 465–6), numerous small transactions occur over short distances, either randomly or in a consecutive chain, and are not necessarily motivated by desire for gain. Evidence for such exchanges would be the random occurrence of exchanged artefacts, with no regular pattern of distribution in the sense of a preferential transfer of goods to particular sites. In general the objects would occur with greater frequency nearer the source than at substantial distances away.

That the exchanges between Harappans and Mesopotamians did not take place in this manner is clear from the fact that many items of Harappan origin, such as ivory or etched carnelian beads as the most striking examples, do not occur in any 'chain', more commonly, say, in the Kulli culture and southern Iran than further west. Instead, outside India they occur almost exclusively in Mesopotamia. Also, we have ample textual evidence for scheduled trade handled by the Mesopotamians.

In Chapter II we had referred to certain items of Indian origin, such as dice, bird figurines and monkey figurines, as probably not being the chief objects of the trade with Mesopotamia. It is interesting to note that these items are also found only in Mesopotamia and not at sites in closer proximity to the Indus valley. These trinkets, perhaps in some cases the property of merchants or sailors, may therefore have been exchanged as a by-product of trade in more important materials.

We may be justified in interpreting the exchanges between the Harappans and the Kulli people as unscheduled transfers. ~~In Chapter I we had seen that~~ the Kulli culture does not appear to have been basically mercantile. The occurrence of Harappan pottery, seals, weights and terracotta objects as well as lapis lazuli and gold at Kulli sites could have been caused by the proximity of Kulli and Harappan territories, or perhaps the existence of overland routes between Sind and the ports of Makran, or perhaps by any nomadic or transhumant patterns of subsistence the Kullis may have followed.

We may tentatively suggest that several other stray exchanges of this type took place between cultures: the two etched carnelian beads at Yahya IV A may have been diverted off the sea route up the Gulf; the steatite vessel from the early stratum at Mohenjo-daro may well have come from Mesopotamia rather than directly from Yahya where it was probably made; the Umm an Nar sherds at Barbar may have been transported by sailors; the grey ware, canisters and 'snake-ridge' jars could have moved within the Magan sphere of interaction; and the Mesopotamian pottery in Oman was possibly brought by traders or metal prospectors.

The instances cited above are of marginal importance, and in the ensuing discussion it will become clear that the greater part of the interaction between cultures, especially the trade which fed Mesopotamia, was regular, direct and organized, though to some extent in the hands of middlemen.

Organized exchange involves the transfer of commodities preferentially to specific places. Archaeologically this would mean that certain sites will yield substantial quantities of certain artefacts, but that the distribution pattern will have no relation to the distance of such sites from the source of the materials (Renfrew 1972: 470–1).

Among deliberate exchanges, however, we must distinguish between those in which the goods were valued for their own sake, and those in which goods may or may not be valued for their intrinsic worth, but more important, symbolise or reinforce certain social values or relationships. We thus come to a distinction between 'ceremonial exchange' and trade carried on devoid of social obligations and based exclusively on desire for gain.

Theoretically it is possible that many 'scheduled' transfers of goods were made with a view to reinforcing or instituting social relationships. Gift exchange, as understood in the classic sense, can take place between members or leaders of two distinct social groups, but is usually an internal phenomenon. Sahlins (1968) in fact predicts a model wherein the closer the social relationship, the greater are the considerations of generosity and social obligation, and the more distant the relationship, the weaker are these considerations and the greater the motives of profit or gain.

Dales (1971: 160) believes that the inscriptions of Ur-Nanshe and Sargon (see Chapter I) refer not to commerce, but to tribute, a form of reciprocity (Sahlins 1968).

It may be argued that those items which are mentioned in the Ur 'commercial' texts would be items of commerce rather than gift exchange. Those not mentioned in these texts are etched carnelian beads, steatite containers, shankh shells, miscellaneous figurines and dice. Of these, shankh shells, steatite containers and etched beads were probably precious enough to be considered valuable gifts. We must also consider the evidence in Sumerian epics for the peculiar case of lapis lazuli.

It may be significant that shankh shells of Indian origin have so far occurred only in graves at Kish and Ur, and that copies of these were made in metal or other materials in Mesopotamia. This might indicate that they were rare and considered valuable, perhaps of religious significance, in Mesopotamia.

Lamberg-Karlovsky (1970: 66–7) has suggested that the steatite containers were ceremonially exchanged between Yahya, Elam and Mesopotamia. Before such a hypothesis can be accepted it is essential to know how the steatite containers were used, or what they contained. Gift exchange symbolises or reinforces existing relationships between individuals or groups, or serves as mutual guarantees of safety or law-and-order. Ceremonial presentations may forge a chain of links between contiguous communities and function as a mechanism for stabilization of social relations in situations where economic competition or political rivalry may otherwise threaten the autonomy or integrity of local groups. Sometimes gift exchange can be the precursor of more intensive contacts such as regular trade (Belshaw 1965: 18–20). It can also create obligations, such as the obligation to extend help or co-operation in times of crisis (Belshaw 1965: 38–48; Polanyi 1957: 252; Adams 1974: 241–2). This in turn implies the existence of a degree of mutual interdependence among the cultures involved, even if they are located at great distances from each other.

The steatite containers are found at sites of almost all the cultures under study, and it does not appear that they were made at a single centre. If we are to consider ceremonial exchange between groups separated by long distances and barriers of language and culture, we would expect this exchange to be materially different from that of, say, the Trobriand 'ring', in the kinds of goods involved and the individuals involved. The steatite containers are too numerous in Mesopotamia and too widely distributed in the rest of the area under study to allow an inference that they were presents exchanged by chiefs. For the same reasons it would be of little use to consider the possibility of gifts of etched carnelian beads between Harappans and Mesopotamians.

The case of the early movement of lapis lazuli, however, appears to have been different. ED texts indicate that this stone, highly prized for socio-religious (prestige) reasons in Sumer, was acquired from a distant region called Aratta, which in turn acquired the material from a neighbouring mountain region. Enmerkar, ruler of Uruk, sends a threatening message to the ruler of Aratta demanding supplies of lapis (and gold and silver). The latter does not submit, demands that certain contests be held to decide whose will shall prevail, and finally agrees to submit if Enmerkar will despatch to him large quantities of grain. Although historical veracity was probably the last concern of the ancient authors of the epics, it may not be unreasonable to see in them evidence for the prevalence of some kind of reciprocity between Uruk and Aratta (namely the ceremonial presentation of precious materials in return for help during famines). Alternately this could be a case of 'negative reciprocity' (Sahlins 1965, 1968), where goods are acquired by threats or guile, for it is clear that Enmerkar starts dealings with a demand for the submission of the ruler of Aratta. It has been pointed out that in ancient times raiding was often not distinguished from trade

(McNeill, commenting on Adams (1974: 251–2). Moreover the text implies that such activities were the precursors of regular trade (Alster 1973: 106): '([In those days] trade was not employed.') In fact, in the later periods lapis appears in the 'commercial' texts as an item of regular trade. This would support Dales' view (1971) that in some fields reciprocity preceded trade.

It thus appears that there is very little evidence for ceremonial exchange and that the majority of exchanges fall into the category of trade itself. The Ur texts indicate quite clearly that ivory, pearls, gold, stones, copper, wood, pigments, cloth and edible items were subject to 'commercial' exchanges.

This accepted, it nevertheless becomes necessary to ask whether the evidence supports Polanyi's theory that all trade in pre-monetary societies was 'administered trade' or whether market conditions could have prevailed.

Administered trade usually takes the form of specific trade expeditions. It takes place when the economy is integrated under patterns of redistribution.[1]

The redistributive nature of the early Mesopotamian economy has often been discussed (Polanyi 1957; Oppenheim 1957; Leemans 1960: 143–58). In the Harappan civilization, a high degree of centralized redistribution is indicated by the extremely large area of Mohenjo-daro and Harappa as compared to other contemporary settlements, the concentration here of seals, message sealings and the maximum range of materials including all the metals, shell species and semi-precious stones known to the Harappans, not to speak of the public storage buildings at the two cities.

According to Polanyi, administered trade by definition is organized through government channels, and all aspects of it such as storage, safe-keeping, prices, quality and weighing are matters of state control. This means that demand and supply do not regulate prices, and there is no haggling. Prices are fixed for long periods and if adjustments are necessary they are made to quality, measures, or

[1]In such a system wealth, both staple commodities and luxuries, would be accumulated in public stores. Production and exchange of goods would be cycled through this store: payments to workers and state officials would be made from temples or palaces or other central institutions, and so also raw materials for manufacture or merchandise for exchange. Under such systems, the state authority would regulate the prices of commodities, the rates of interest and hire, and wages.

means of payment rather than to equivalency ratios themselves. Such trade is often the subject of treaty relationships (Polanyi 1957: 262–3). Administered trade is necessarily specific, involving concrete undertakings in respect of particular goods, and there is a stress on prestige items (Polanyi 1975: 101 ff).

Writers since Polanyi (Bohannan and Dalton 1962; Dalton 1964; Humphreys 1969) have discounted the original emphasis on the absence of demand–supply price-regulating mechanisms in administered trade. They have pointed out the existence of 'multicentric' economies where different types of exchange operate in different spheres. External trade, forming one sphere of economic activity, *can* be controlled by market mechanisms, but if so the prices have no feedback on the subsistence sphere (that is, on the allocation of basic factors of production such as land and labour). Externally exchanged goods do not compete with local production, and their 'exchange-value is not reducible to the whole of the means of production' (Meillassoux 1971: 67). The external market is 'local, specific and contained' (Dalton 1964: 157).

Did such mechanisms prevail over the exchanges covered in this study? The archaeological evidence that goods, mainly utilitarian commodities, were transferred from the source preferentially to specific centres, does not preclude such a possibility. However we must also consider the evidence for the involvement of states in long-distance trade, and the nature of the overseas expeditions as described in the Ur texts.

ED texts from Lagash show that trade with Elam and Dilmun took the form of individual expeditions by special merchants on behalf of the palace. Thus copper brought from Dilmun by a certain merchant was weighed in the palace by Lugalanda (Lambert 1953b: 61).

The Ur III trade texts (Leemans 1960: 18–22) state clearly that definite, quantified commodities were handed out by the temple of Nanna from its stores, as merchandise for buying copper on different expeditions to Dilmun. The laws of Ur-Nammu (§ 87–96, 117–22) refer to the control of the 'maritime trade' by the 'seafarers' overseer' (Finkelstein 1968: 67).

It thus appears that up to the Ur III period Mesopotamian external trade was indeed state administered. In the Larsa period, however, there seems to have been a change. The temple and palace appear not to have played the key role in external trade: the texts (Leemans 1960: 23 ff) state that 'single persons' went on Dilmun trade expeditions 'on their own', and paid tithes on their imports to the Ningal temple. Thus the state seems no longer to have sponsored particular ventures but only collected taxes on the proceeds of the trade. There are nevertheless indications that the palace was to some extent involved in the Dilmun trade in this period (Weitemeyer 1964–5: 207–8; Leemans 1968: 215).[2]

The apparent stabilization of prices of (imported) metals within Mesopotamia, especially in the Ur III period (Limet 1960: 99 ff) may speak for administered trade: that is, for the fact that internal prices of imported goods were not subject to demand and supply fluctuations. But it is considered by some writers (Hallo 1963b: 137; Curtis and Hallo 1959: 110–11) that prices were subject to greater fluctuations than has been hitherto recognized. Unfortunately it has not been possible for the present writer to go into this problem.

It is much harder to elicit evidence for the existence of state administration of the Harappan external trade. One phenomenon which might point to this is that two materials found in the Harappa culture which are definitely imports—namely steatite containers and silver—are found almost exclusively at the two major cities and not in greater numbers at sites nearer the sea route than further inland. There is also the evidence of—albeit few—seals of Type II (see chapter III) at Harappan and Sumerian sites. These contain different inscriptions in Harappan script, but a fairly standardized symbol. Could they have been seals of a Harappan authority which had dealings with its own agents stationed abroad? Finally, we may refer to settlement patterns in Makran. As the settlement at Sutkagen-dor comprises a fortified citadel and a lower town, one would infer that this port was deliberately established by the Harappan administration, that is, that its involvement in the sea trade was not simply a local phenomenon.

These factors however need not indicate that trade was exclusively a matter of a treaty-based system of exchanges, consignment for consignment, between state administrations. It is equally possible that trade was in the hands of private merchants and subject to profit and loss.

Freelance commercial trade, in contrast to administered trade, involves professional merchants who derive their living from profits

[2] A much-damaged letter from Rim Sin to a resident of Ur mentions a Dilmun ship.

(and not salaried or commissioned state agents), often the prevalence of middlemen, and the lack of long-standing arrangements or obligations to exchange specific items.

The merchant involved must be regularly supplied with information and must have mobility and the ability to organize and speedily despatch consignments. Hence he must be a professional (Meillassoux 1971: 70–1). The merchant may produce the goods himself, or act solely as transporter. He may not belong to any particular economic network, but by providing transport, helps articulate different economic systems (Rowlands 1973: 592). Such trade is stimulated by a situation wherein there is substantial disparity in the availability and hence evaluation of goods in different areas or where specialist traders can flourish in strategically located areas.

Under such a pattern, traded objects will be found in those areas where demand is the highest, and not necessarily in areas nearest to their source.

Within the category of market trade we may distinguish itinerant peddling where buying and selling takes place at only those places and times where prices are favourable, from trade expeditions involving the predetermined flow of merchandise between two or more specific centres.[3]

Ethnographic records concerning trade in the Arabian Sea (Villiers 1940; Bowen 1951a; Prins 1965–6) are relevant in this context. Prins has drawn an important distinction between 'cross-trading' dhows and 'home fleets' of the Gulf. 'Home fleets' feed the local economy of a particular port, importing what is locally scarce and exporting surpluses. This may be termed as a form of predetermined, directional trade. The 'cross-trading' dhows are, however, peddlars, buying and selling wherever there is a market, and not necessarily at the home port. Their crews tend to be heterogeneous, and they sail to ports where prices are favourable, going home only for repairs and festive occasions. The trading fleets of Bushire, Ganaveh and Bahrain were such 'cross-traders' in the early part of this century (Prins 1965–6: 13–14).

Traditionally, the Arab cross-trading dhow sailor has been both transporter and peddlar, carrying consignment goods on a freight basis as well as seeing to his own profits and bearing his own losses.

[3]Itinerant peddling may be distinguished from unscheduled exchanges in that it is (a) necessarily motivated by desire for gain; (b) a sustained and continuous process rather than sporadic; and (c) involves full-time personnel.

His cargo can comprise both freight goods as well as goods to be peddled on the way. Often his return journey after delivery of a consignment will carry cargo acquired at various ports by him and his crew, individually, for independent sale at ports where prices are favourable(Villiers 1940: 400–2: Bowen 1951a: 13–17; 41).

In spite of the absence of monetary economies, it is clear that in the bronze age much trade was regulated by market conditions and was not a matter of exchange of luxury items alone or items traded directly between ruling classes. The prime example of such 'commercial' trade in the bronze age is the Cappadocian–Assyrian system, amply documented by texts. In this system, tin and textiles were transported from Assur to Cappadocia in return for silver and gold. The trade was handled by Assyrian merchants resident in Anatolia, their transporters, and their agents stationed at Assur. Veenhof (1972) has successfully refuted the applicability of the Polanyist model of 'administered trade' in this case by demonstrating that the trade was based on the fact that materials cheap in Assur were scarce and costly in Anatolia, and vice versa; that prices fluctuated; that risks of loss were borne by individual merchants; that market places existed; and that the concepts of 'price' and 'market' were prevalent.

It appears that the trade system under study here involved peddling only marginally, and that contractual trade of the Assyrian type was more important, specially as regards relations between Harappans and Mesopotamians. Itinerant peddling may have been the means whereby etched carnelian beads came to Yahya or Harappan objects to the Kulli region or canisters and greyware to the Magan sites, or Harappan figurines and dice to the Sumerian cities. (As indicated above it is equally likely that these were not transferred commercially but as the by-products of other types of social interaction).

But the large numbers of Barbar seals in existence, the evidence of weights and the distribution of Harappan seals hardly speak for extensive peddling. It was mentioned in previous chapters that a Harappan weight was found at Ur, Mesopotamian weights at Harappa and Mohenjo-daro, a Harappan sealing at Umma, Harappan seals in Mesopotamia, and seals of Type II in India and Mesopotamia. Thus it is reasonable to conclude that the trade was a contractual trade with a scheduled and predetermined movement of merchandise, of the Assyrian type. It was probably partly under state control and partly in the hands of professional merchants, subject to price-regulating market conditions.

The latter situation appears to have prevailed from the Larsa period onwards when merchants ceased to be temple or palace agents and undertook independent ventures, though subject to state taxation. Often merchants going to Dilmun took loans from private moneylenders (Hallo 1965; Leemans 1960: 36 ff; Oppenheim 1954: 6–11; Šasson 1966a: 162). A merchant of Ur writes a letter (Leemans 1960: 39–40) to a colleague who was making trips to Dilmun, complaining of the neglect of his interests and his rights to personally select his share of the copper.

We had described previously the proto-Elamite and Elamite affiliations of Yahya. The nature of Yahya's relationship to Elam is not well understood. A tentative interpretation that Yahya was an Elamite merchant outpost is not borne out by the indications that the texts here refer to subsistence activities alone (Lamberg-Karlovsky 1978). Contractual trade may have prevailed over other, smaller trade circuits as well: we have two Persian Gulf seals at Yahya as well as a proto-Elamite tablet at Shahr-i Sokhta.

Finally, as regards the Barbar people, it is clear that they were not simply peddlars or transporters. Otherwise (considering the fact that they handled goods which they did not produce themselves) they would not have had need for such large numbers of seals.

Having discussed the applicability of the models and decided that certain of these may well apply to our situation, we may now consider the areas through which the trade was channeled. According to the Polanyist school, ports-of-trade were often the locale of early long-distance exchanges. These were situated on coasts or on islands or in transitional areas between distinct ecological zones. They were devices which ensured neutrality and the safety of merchants and cargos, and were thus often located in politically weak or independent states (Polanyi 1963). The neutrality aspect, however, should not be overemphasised. More important, ports-of-trade provide meeting places for traders from different cultures or political units, and also provide the place for interaction of different types of economic systems such as market and non-market economies (Humphreys 1969: 191–6).

It is now felt that the absence of price-regulating market mechanisms at ports-of-trade should not be exaggerated either. The market principle can prevail in the exchanges. But the local market is always a distinct sphere of exchange and the port-of-trade is a means of shielding the local market from disruptive influences. Thus at ports-of-trade it often happens that a special area (sometimes outside the precincts of the settlement) is reserved for trading activities, having its own harbour, quay, warehouses and accommodation for foreign merchants. In other words the foreign trade establishment is physically separated from the local market.

At Ras al Qala'a it appears that the area where overseas commercial transactions were conducted was located near one of the gates in the city wall facing the sea shore (Bibby 1957).

Can we, then, infer the existence of ports-of-trade in the third millennium? A port-of-trade could be the organ of a small independent state, or under the control of a hinterland empire, and could itself trade, though if it did not, its interest in trade was confined to taxes, customs dues, tolls and port fees.

It is thus not impossible that in the third millennium Bahrain and/or Failaka functioned as ports-of-trade. It appears that whereas the Dilmunites handled much of the trade between Mesopotamia and India (this being indicated by the occurrence of Gulf seals in Sumer, Elam and India), their ports were also politically neutral buffer zones away from the arm of the large state systems, where foreign merchants could converge to exchange wares from several regions. Much evidence, albeit fragmentary, can be cited in support of this suggestion: the textual references to commerce with Dilmun although the objects imported were Indian; the presence of the Barbar ware jar sherd with the Sumerian capacity mark; the Mesopotamian influence on Dilmunite art and religion; and the occurrence in the Barbar culture of lapis lazuli, ivory, Harappan gamesmen and other items. At the same time, however, this model would not explain the paucity of Harappan, Type II and Mesopotamian seals at Barbar sites.

While it is possible that Harappans and Mesopotamians had trade encounters in Dilmun, it is also clear that from the Larsa period onwards the Dilmunites were playing an increasingly active role in the trade. In an Ur text (Leemans 1960: 24) two traders who, judging from their names, appear to be Dilmunites, pay tithes to the Ningal temple after the completion of a trade expedition. In UET V 548 one Iddin-Ilum, 'the Dilmunite', pays a tax. In a Susa text (MDP X 124, Muhly 1973: 226) a merchant with a Dilmun-type name receives certain goods. A Larsa period contract (YBC 5447) concerns a consignment received by a Dilmunite (Chapter III). A Mari letter (ARM I 21) refers to a Dilmunite messenger at Shubat-Enlil.[4]

While we may therefore admit to the importance of the Dilmunites and their ports in the trade process, it is not possible to ignore evidence which speaks for direct, consignment-based exchanges between Harappans and Mesopotamians. This in itself would mean that no protective or 'buffer' devices were required in the process of exchange.

We had mentioned above the evidence of the seals, sealing and weights. Although Meluhha is not mentioned in the Ur trade texts, there is evidence for the presence of Meluhhans in Mesopotamia: the Harappan and Type II seals, the Harappan weight, the numerous borrowings of Harappan art motifs evident on Mesopotamian objects, and an early Akkadian seal inscription[5] which mentions a 'dragoman of Meluhha' (Gelb 1968: 93–5). We had also suggested in Chapter IV that the Ur III textual references to trips to Magan may in fact have referred to the Harappan ports of Makran: it may be recalled that Ur-Nammu mentions that sea-traders of Magan docked in the 'registry-place' at Ur.

There is also evidence that some Mesopotamian weights were found at Harappa and Mohenjo-daro. Moreover, in Cemetery R 37 at Harappa occurred the burial of a woman 18–25 years of age, wrapped in a reed-shroud and interred in a wooden coffin. This burial ritual, unknown in the Harappa civilization, is well attested in ED and Akkadian times at Ur and Kish (Wheeler 1947: 87–8). This would therefore indicate that a Sumerian lady had died in India.

So far we have only enumerated the various possible patterns of long-distance trade and the evidence for or against each of these. We have indicated that unscheduled and ceremonial exchanges and itinerant peddling are only of marginal importance. Clearly the major question concerning the trade between the Harappans, Dilmunites and Mesopotamians involves the alternatives of state-sponsored trade expeditions and the activities of individual

[4]Edzard's cautionary note to the paper by Parpola et al. (1977) may well apply here also. Every mention of Dilmun or Meluhha need not actually refer to the people of those lands or those cultures.

[5]On a regular Akkadian-style cylinder-seal.

merchants. Probably both systems co-existed, and it may have been that the state reserved its rights to trade in certain commodities, leaving other merchandise to private merchants—but it is not possible to suggest exactly which commodities fell under the province of each.

This partly administered partly free-lance trade may have taken place directly between India and Mesopotamia, especially in the earlier period, but equally early Dilmun appears to have developed as a trade area handling cargo, as well as providing facilities for direct encounters between Harappans and Mesopotamians. Later on it appears that the Dilmunites handled an increasing proportion of the trade.

The Harappans appear to have functioned mainly as suppliers of goods to the western 'markets'. Other than this we can say little about the internal organization of their trade. We know little about the status and functions of the Harappan trader. Was he a state agent making his living on commissions received on the quantities of goods exchanged? Or was he a wealthy individual dependent solely on profits, albeit subject to state taxation? We have suggested in the preceding discussion that probably both situations prevailed. But in order to have more explicit answers we need to know the exact relationships between the various Harappan urban centres, as well as the nature of the interactions between say the Harappans of Sind on the one hand and those of Kathiawar on the other. Were there a number of autonomous city-states here as in Sumer? The settlement patterns point to a greater degree of centralization in western India. Did Mohenjo-daro and Harappa function as the chief redistributive centres for the entire Harappan region where the acquisition of non-subsistence goods was concerned? Are we really justified in assuming that the major towns and cities were in fact contemporary?

We also need to admit that no developmental picture emerges from this analysis. We cannot categorically state that incidental encounters, ceremonial gifts or peddling preceded trade organized through state machineries or merchant bodies of the Assyrian *karum* type. It is evident that in some spheres tribute and incidental exchanges or peddling were certainly relatively early in date. At the same time it is equally clear that these forms of exchange could have persisted into the later periods as well, often parallel with consignment-based trade. It is also evident that organized, predetermined trade was probably predominant, but was neither the sole mode of exchange nor did it demonstrably evolve from and replace reciprocity, peddling or down-the-line exchanges.

We must therefore come to terms with a fairly complex network of exchanges co-existent in this area in the third millennium. In some spheres one type of exchange may have predominated over others, but it is certain that our varied and patchy data cannot be manoeuvred to fit one model to the exclusion of others, much less in a chronological sequence. Thus, in the Harappa–Dilmun–Mesopotamian network, consignment-based private trade and state-administered trade are the most fitting models, although peddling, gift-exchanges or accidental encounters may have worked peripherally. It is not too unreasonable to suggest that in period IVC at least Yahya functioned as some kind of outpost for Elam, also extending its activities to Shahr-i Sokhta, and in period IVA occasionally to the merchandise travelling by the sea route between India and Sumer. Within the relatively small circuit of the Magan horizon, objects could have been transferred as a byproduct of social encounters or the existence of a peddling circuit. At the same time the Kulli people on the eastern fringes of the Magan horizon, due to their proximity to the Harappans, also saw the visits of Harappan peddlars or exchanges resulting from the traversing of Kulli territory by cargos from Sind destined for the Harappan ports. Finally we may mention the encounters between the Umm an Nar people and the Dilmunites as well as the Mesopotamians—so far the evidence indicates that these encounters were too sporadic to be attributed to any phenomenon other than 'unscheduled exchanges'.

CHAPTER VI

Conclusion

Summary Findings

Given a situation wherein several cultures were involved, directly or indirectly, in long-distance trade, it is essential to view the movement of goods in the context of the geographic setting, resources and economic organization of each of the participating societies.

It is clear that we are dealing with diverse culture regions having varying environmental conditions such as soils and water resources, means of access to other regions, mineral supplies, and marine, forest or animal products, and, equally important, varying degrees of environmental diversification. This means that some regions showed immensely higher subsistence productivity or wealth than others, and were therefore more densely populated. These cultures were obviously in a stronger position for interregional trade than others. Another factor which can increase potential for trade, often independent of those mentioned above, is simple physical location in relation to major trade routes. We are also dealing with societies at different levels of social organization. This further influenced the flow of goods and the degree of participation in trade, as will be demonstrated below.

In the Introduction it was indicated that almost the entire region under discussion was characterized by arid or semi-arid climatic conditions. Nevertheless, the presence of good soils and plentiful ground water supplies made high subsistence productivity possible in lower Mesopotamia, in Seistan, and in the Indus plains. The settlements of southeast Iran and Baluchistan were located in zones where soils and water were available only on a small scale, and the Gulf cultures were limited by more slender natural resources. Lower Mesopotamia, Elam, Seistan and Sind were therefore the most densely populated zones in the third millennium.

Metals, stone, wood, and animal and marine products were also more abundant in some regions than in others. The Elamites, Harappans and the Helmand people had access to varieties of resources, but the Barbar people had only pearls, and the Yahya people steatite and copper. It appears that the Kulli, Bampur and Umm an Nar cultures had access to copper mines, but Mesopotamia had no such mineral products.

Thus, whereas Seistan and Sind would be in a stronger position for trade both as regards prosperity and availability of materials for exchange, Mesopotamia was at an advantage simply by virtue of its exceptionally high subsistence productivity.

Because of its location on the Gulf route the Barbar culture, in spite of its slender subsistence potential and lack of all materials except pearls was also in an advantageous trading position. The trading activities of the Barbar people would have been based on the disparities in evaluation of goods available easily in one area (say India) and totally lacking in another (say Sumer). Thus for the Barbar people trade would have been concerned with the exchange-value rather than the use-value of goods.

It is also clear that the trading network embraced both urban societies as well as non-urban and non-state societies. Given an urban system capable by definition of appropriating a proportion of the subsistence produce of the population, this surplus could be utilized for the support of non-subsistence producers or (as in the case of Mesopotamia) for trade. More important, given the incapacity of the individual household to engage in long-distance trade, a state administration would be necessary for the organization of foreign expeditions as regards transport, provisions, leadership organization, and arrangements for security. Moreover, traders must have merchandise with exchange potential—either locally tapped raw materials or manufactured goods or subsistence goods.

Obviously we cannot expect miners or quarriers to have travelled long distances to market their own wares abroad. These goods would necessarily have to be made available from the public store for specialist caravan leaders or captains of ships. Finally, it would be to the state agency or ruling elites that imported merchandise would be handed over for subsequent redistribution to manufacturers or in exchange for other produce, or consumption by the elite.

Thus to a large extent the process of foreign trade would have been cycled through the public redistributive system, as is abundantly evident in the case of early Mesopotamia. Literacy, which often accompanies the urban development of a society, also had its uses in the development of foreign trade. With the use of writing, transactions would be permanently recorded, and therefore staggered over time: it would now be possible to accumulate assets, and discharge debts, over time. This would be a great advance on localized and immediate exchanges, lot for lot, necessitated by the absence of recording facilities (Adams 1974: 243). Finally, urban systems often participate more fully in external trade when exotic materials are necessary for public conspicuous consumption or the 'luxury paraphernalia' necessary to reinforce the social position of the ruling classes (see Rathje 1973: 735–7 fig. 3).

It therefore appears that without a state system of administration and economic integration, and a permanent 'class' of full-time traders, it would be difficult for a society to enter into external trade on an extensive scale. This study has dealt with societies at disparate levels of social and economic complexity: and it is understandable that the bulk of the trade flowed between Mesopotamia, Elam and India. On the other hand, regarding the Kulli, Bampur and Umm an Nar, until we have evidence to the contrary we can assume that they were organized under some form of tribal leadership, and it is not surprising that their participation in trade is evidently very limited.

Thus the interregional trade flowed between unequals, and transactions were unbalanced, the movement of goods being heavily weighted in certain directions. It becomes clear from the analyses in Chapter II that metals, stone, timber, pearls, ivory and other commodities moved preferentially to the Mesopotamian cities, the 'strongest' trading partners where prosperity and organizational ability were concerned.

The cultures of Magan, except for Yahya, appear not to have been actively engaged in trade, either as consumers or as middlemen. In Chapter IV it was suggested that the explanation for this may be the comparatively early date of these cultures. Another reason for the low level of involvement in trade partnership with the Harappans may be the fact that land transport over the rugged and arid terrain of Makran and Baluchistan is not a viable alternative to sea transport. The early date of the cultures of Magan also explains why there is so little chronological concordance between archaeological and textual evidence where trade with Mesopotamia is concerned. According to textual evidence, up to the post-Akkad period Magan was a supplier of diorite, copper and stone vases; the dispersal of steatite vases from Yahya and other Magan centres is archaeologically documented for the ED period. Nevertheless, it was in the Ur III period that Ur fleets sailed to Magan. It has been suggested that this referred to trips to the Harappan outposts in Makran, conveniently situated outside the reach of the worst monsoon weather, and now flourishing because political or economic threats to Harappan commerce in this area had diminished. This can in turn explain why it was 'Magan' whence bamboo appears to have come to Mesopotamia.

In the Magan region the Umm an Nar culture shows early connexions with Sumer, which may have resulted from its having supplied copper and diorite to Sumer. But there are few links with the Indian subcontinent. This would be due mainly to the location of sea routes along the Gulf. It has been shown that all known sailing routes have bypassed the Abu Dhabi region because of its extreme aridity, the treacherously shallow waters, and the lack of water and food on the off-shore islands.

In Chapter I it was also mentioned that in history the Bahrain archipelago has been the key region of the Gulf littoral because of its proximity to the large oases of the Eastern Province, and because of the local availability of springs, natural harbours and potential for agriculture. Thus Bahrain has seen much seaborne commerce through the ages. The distribution of Ubaid sites in the Gulf would speak for an early mastery of sailing by the people of this region. Thus the Barbar culture emerges as an actively mercantile culture, although it produced only pearls and dates for exchange itself. It appears to have handled an onward trade in practically all documented items of trade except perhaps etched carnelian beads and steatite containers. The Barbar culture flourished over the entire period under study, as inferred in Chapter IV. But it was towards the later part of this period that it seems to have assumed a more important role. Whether this was due to the increased handling of trade by the Makran ports we cannot tell. It is clear that the Barbar people were never merely sea pedlars, but what proportion of the sea trade they handled at any one time, and what proportion was handled directly by Mesopotamians and Harappans themselves, we cannot tell. Moreover, it is hard to assess how much of the trade was physically channelled through the Barbar ports.

The Kulli culture lies on the eastern fringe of the 'Magan' province, as far as ceramic evidence indicates. There are no known ports or seals of the Kulli culture. Yet at Kulli sites there are intrusive Harappan elements which seem to indicate that Harappan agents traversed Kulli territory either in search of metals or in order to reach their ports in Makran. The Kullis themselves may also have engaged in overland transport work to the ports. The evidence for the occurrence of steatite objects indicates that some types may well have been produced in Baluchistan after the period of the Yahya IVB workshops. G. Possehl (personal communication) suggests that the Kulli people may not have been culturally or politically autonomous, but subject to strong cultural influence and political control from Sind.

As regards traded merchandise, the majority of items appear to have moved from India to Sumer, the exceptions being food, textiles, silver and steatite vessels. Whereas silver appears to have come into India from Mesopotamia (ultimately perhaps from Cappadocia), it seems that appreciable quantities of gold and copper went to Mesopotamia from India. It was suggested that the Harappan settlements in southeast Sind, northern Kutch and northeastern Gujarat indicate the existence of an overland route skirting the Thar desert from Sind to the southern extremities of the Aravalli copper belt. The textual references to Magan copper in the Ur III period may in part have covered copper obtained by the Harappans from Rajasthan or Baluchistan, and shipped from Makran. As regards bronze, it has been argued that this was imported by the Harappans.

It was suggested that Lothal, a port and centre for the manufacture of carnelian beads, probably ceased to function as a port appreciably earlier than the time when the interregional sea trade came to an end. If this is true it will explain why etched carnelian beads are so plentiful in ED Mesopotamia, so much more scarce in the Larsa period, and unknown at any Barbar site.

It is clear that Shahr-i Sokhta in periods II–III was an important exporter of lapis lazuli, but it ceased to have this function in Period IV. Periods II–III are somewhat earlier than Yahya IV B and certainly earlier than the mature Harappa period. It is likely that the 'crisis' reflected in 'Enmerkar and the EN of Aratta' reveals a situation wherein an established source of Mesopotamian lapis was in danger of coming to an end. We may refer here to the large-scale consumption of lapis lazuli at Shahdad after the period of Shahr-i Sokhta II–III, and the ceasure of lapis production at the latter site in period IV. These two phenomena may well have had something to do with the Sumerian 'crisis'. But from the ED III period onwards the Harappans were providing an alternative source of lapis lazuli. This explains the references in the Ur texts to lapis from Dilmun, and also explains why Magan was never mentioned as a source of lapis in the texts.

As regards the Harappa civilization, most of its westerly export connexions were maintained over southern routes by sea and land. The location of Harappan sites indicates the use of several minor Kirthar passes as well as the Bolan and Gomal passes (perhaps for trade in copper, gold and lapis lazuli), but not the Khyber pass. The Harappan occupation of Gujarat may be explained as an expansion in search of raw materials (copper, timber, carnelian, ivory) and ports. At several of these sites non-Harappan pottery is in evidence. The controversy over Lothal is not yet resolved but it is certainly likely to have been a port. It would, however, be mistaken to consider it the sole or even the major coastal trading station. It is unlikely that there were no ports in Sind, and Lothal could have been superceded in importance by the ports of Makran about 2100 B.C.

The chronology of the Harappa civilization is now less problematic. Trade synchronisms with Mesopotamia show that it was certainly flourishing as early as the ED III period (*c.* 2600 B.C). The terminal date is somewhat more uncertain but it was argued in Chapter IV that it may be as late as *c.* 1760 B.C. or the Larsa period.

The list of 'visible' Harappan imports (bronze, silver, woollen cloths, steatite vessels) is certainly not impressive. Moreover, it was argued in Chapter II that Harappan agriculture and craft production were not exclusively dependent on bronze technology. Thus it is clear that the Harappans emerge as exporters (of timber, copper, gold, ivory, stones and beads) rather than importers. Romila Thapar (personal communication) has pointed out that this is in keeping with patterns of trade existing in the ancient period when Indian enterprise across the seas was limited to the sale of Indian goods where there was demand, and not involved to any large extent in acquiring vital commodities unobtainable on the subcontinent.

The nature and intensity of the contacts between the different trading societies would have depended on the efficiency of sea transport. Even if fleets could make only one round trip each year, it appears that they were able to carry substantial cargos.

It is now apparent that the evidence so far available to archaeologists is not sufficient to give entirely satisfactory answers to the questions raised. Such answers would require problem-oriented excavation and detailed studies of artefacts. We need to know more about Harappan ports, to ascertain whether the coastal sites of Kathiawar were engaged in external trade, and to derive a comparative chronology of Sutkagen-dor and Lothal. We need more information on the post Umm an Nar cultures of the Oman peninsula. More attention must be paid to Harappan interconnexions with contemporary cultures on the Indian subcontinent.

While it appears that laboratory analyses cannot finally solve the problems of the sources of, and trade in, metal, it would be useful to compile a corpus of copper and bronze tool types and technology for the entire region covered by mercantile or other interactions, so as to make a relative assessment of the development of metallurgy and its role in the growth of the various cultures.

The nature and intensity of contacts between Turkmenia and the Indus valley in the mature Harappan period requires fuller investigation. Did the Harappan turquoise come from Turkmenia? Could the Harappan outposts on the Oxus have maintained relations with the communities of the Kopet Dag zone? If so, it is strange that lapis lazuli was not used in the latter area until after the onset of the Namazga V period, about 2000 B.C. (Masson and Sarianidi 1972: 115). Or else did the Harappans on the Oxus come by pieces of turquoise matrix only incidentally by virtue of their proximity to the turquoise-producing zone? The problem of Turkmenian contacts has of course to be considered in the context of contacts in the preceding period. Is there any causal connexion between movements southward from Turkmenia and the onset of social and economic differentiation at sites such as Mehrgarh?

One would ask why the seemingly flourishing maritime trade came to an end. Jacobsen and Adams (1958) have shown that silting and salinization had caused a marked fall in agricultural production in southern Mesopotamia so that productivity at the end of the

Larsa period had fallen to about thirty-five per cent of output in the ED period.[1] This must have been a major factor in the decline in political eminence of those southern cities which had actively participated in the trade up to this period, severely reducing their capacity to import goods from long distances away. At the same time there also appears to have been an increased reliance in the second millennium on Syria and Anatolia as sources of metals and timber. (Even in the third millennium copper, gold and timber came to Mesopotamia not only from the southeast but also from the northwest). Perhaps the Euphrates became a more economic trade route for the newly important cities of central Mesopotamia than the long sea route from India (with the destruction of Ebla by Naram Sin).

The question then arises whether the eclipse of the sea trade can explain the collapse of the Harappan urban system. It is suggested here that it may well have been a significant factor.[2]

We had compared the Harappan external trade to the maritime trade of later periods as regards the role of India as a supplier of goods rather than a consumer heavily dependent on imported materials. Nevertheless, there are important differences between the Harappan maritime trade and that of later periods. More often than not in later periods the Indian sea trader appears to have been little more than a transporter or itinerant pedlar of goods in the Gulf, Red Sea or African waters. In the Roman period it appears that Indian merchants peddled their wares as far west as Socotra, and later in the Roman period it was the Romans who were active in the trade with India. But the analysis in Chapter V shows that the Harappans were neither passive partners nor merely itinerant peddlars. Whether their trade was state administered or in the hands of private merchants (and the two are not mutually exclusive) it cannot be doubted that it involved the predetermined flow of goods to specific markets, and, considering the evidence of the seals and weights, contractual partners stationed abroad. Thus if the nature of involvement in trade was qualitatively different in the Harappan

[1]Maekawa's figures (1974), though not identical, generally confirm the calculations of Jacobsen and Adams.

[2]The relation of the cities to the countryside, an aspect that has rarely been discussed, could have been an important factor in that a concentration of wealth and opportunity for political office in the cities would have drained surpluses off from country to city, leading to the gradual impoverishment of farmers.

as against later periods, it is not unreasonable to infer that a disruption of the trade would have more serious consequences on the local economy in the Harappan rather than in later periods.

It is also apposite to ask under what circumstances this trade began.

There are several possible answers. The movements of nomadic or transhumant groups may have triggered off the transport of goods from one region to another. Thus lapis lazuli may have first been brought into the northwestern plains of the Indian subcontinent by sheep and goat pastoralists who moved regularly between uplands and lowlands. But regions as greatly distant from each other as the Tigris-Euphrates valley and the Indus valley could hardly have been brought into a trading circuit by the movements of herdsmen. Initial gift exchanges between settled groups could be the precursors of trade, but there is no evidence of far-reaching gift exchanges involving the Early Indus communities, nor would we be in a position to explain the political and economic context of any such prestations. In any case prestations themselves presuppose the initiation or existence of some manner of social relations. It is not impossible that the Dilmunites, finding themselves favourably situated between the Mesopotamian coast and northwestern India, and having early mastery over sailing, took advantage of the fact that several materials available in India were much in demand in Mesopotamia. Finally it is also possible that the Mesopotamian requirements of lapis lazuli brought the Harappans into a trading network. The argument is as follows.

Shahr-i Sokhta in periods II–III (which , as argued in Chapter IV, was earlier than Yahya IVB which in turn dates approximately to ED II–III) was a major lapis lazuli exporter. Shahr-i Sokhta IV, contemporary with Yahya IVB and therefore approximately ED II–III in date, did not export lapis lazuli, but in the contemporary Shahdad cemetery, large quantities of lapis objects occur as mortuary artefacts. In the ED II period there was a crisis in Mesopotamia due to the non-availability of this valuable stone, as reflected in 'Enmerkar and the EN of Aratta'. This crisis may have been caused by the disruption of existing trade patterns with the appearance of Shahdad as a large-scale consumer.

It is significant that lapis lazuli is known in the period before the appearance of cities in the Indus plains. This 'early Indus' period as suggested before would be approximately contemporary with Shahr-i Sokhta III–IV. Could the Indus people then have stepped in as suppliers of lapis lazuli to Sumer? Considering the evidence for the colonization of part of the upper Oxus valley by bearers of the Harappan material culture, this is a strong possibility. However, a prerequisite condition would be for the Mesopotamians to know that lapis lazuli could be acquired from northwestern India, or that the Harappans were aware of the great demand for lapis in Sumer.

Is there any evidence for long-distance contacts between cultures before the period of the fully-fledged trade? The existence of a series of overlapping interaction spheres extending from the Euphrates to the Indus is by now well known, the major interaction spheres being the Mesopotamian–proto-Elamite, with outposts as far east as eastern Iran; the eastern Iranian horizon; and the 'Quetta' horizon, the latter showing contacts with the Early Indus sites of the Indus plains (Mughal 1970).

Thus it is not impossible that when the Sumerian lapis 'crisis' occurred, northwest India gradually became inducted into a wide-reaching network of exchange. Gradually a marked complexity and increase in trading relations would have developed when it was found that ivory, gold, carnelian, timber and other materials could also be exported from India.

Anthropological literature often cites the essential connexion between urbanization or social stratification and trade (Parsons and Price 1971; Tourtellot and Sabloff 1972; Rathje 1973). To suggest such a connexion for the urbanization of northwestern India would therefore be nothing new but we must explore the theoretical possibilities of exactly how trade on the one hand and social differentiation and urbanization on the other were linked.

The aggregate benefits of spatial clustering in a society which engaged in trade on an extensive scale and needed the services of full-time prospectors, miners, quarriers, wood-cutters, transporters and craftsmen are obvious, but the growth of redistributive institutions cannot be cited as both 'cause' and characteristic of the urban period.

The following discussion then investigates how such an explanation may be theoretically derived, without suggesting that it actually describes as historical fact the process of trade-oriented urbanization in northwestern India.

Trade and Social Change in Northwestern India: a Tentative Hypothesis

The argument stresses the significance of the circulation of lapis lazuli as a 'primitive valuable' in the pre-urban period which the evidence appears to indicate saw the rise of chiefdoms. In chiefdoms the intensification of power is constrained unless chiefs have access to means of control or wealth external to the network of kinship ties and obligations. It is argued that in the Early Indus period the circulation of lapis lazuli in northwestern India was followed by its export to Mesopotamia and a subsequent widening of the range of trade enabled economic power to accrue to chiefs and effected the emergence of the 'state'.

The hypothesis suggests that the pattern of occurrence of various field symbols on the Harappan seals may reflect this process of extension of political power. Also, the spatial organization of economic activities reflected by the location and relative size of the Harappan cities may point to the external trade orientation of the civilization.

We may infer that the Early Indus period[3] saw the emergence of chiefdoms in the plains and northern Baluchistan. This was a period of widespread colonization of the fertile plains, the first attested use of the plough, and of cultural interaction over a wide area (Mughal 1970). Kot Dijian influence extends as far as the Gomal valley and the Potwár plateau, Amrian influence into the hills of central and southern Baluchistan, and Sothi connexions with the Jhelum valley may be indicated by the find of a jar of Sothi fabric at Burzahom II. It is in this period that we see the beginnings of social differentiation with evidence of mass production of pottery at Mehrgarh (Audouze and Jarrige 1977); the use of non-local resources such as steatite, lazuli and copper; public architecture in the form of a massive platform at Damb Sadaat and an elaborate building on a large platform fronted by a row of mudbrick columns at Mehrgarh (Jarrige and Lechevallier 1977); and fortifications at Amri, Kothras Buthi, Kot Diji, Kalibangan and perhaps Harappa. The settlement at Mehrgarh was by this period some 75 hectares in extent.

Information on mortuary practices is unfortunately scarce. But at

[3]The relative chronology of Mughal (1970) is followed here.

Nal in southern Baluchistan (Hargreaves 1929) the burial practices may indicate a degree of social ranking by ascriptive status. Together with fractional burials of adults and children, and complete burials without articulated graves of adults and children, occur three complete burials in defined graves, of which two most significantly are burials of infants. One of the latter is accompanied by a string of beads (see Tainter and Cordy 1977; Peebles and Kus 1977).

What led to systems of social ranking within the various regions of the northwestern subcontinent is not our concern here. We can only surmise, following Friedman and Rowlands (1977) that in the plains groups which were more successful in agricultural production were able to convert surplus food into feasts and gifts and thus achieve prestige and genealogical seniority. In the isolated valleys of Baluchistan or in the Kachhi, however, opportunities for productivity increase would have been strictly limited. But Shaffer (1978) has rightly emphasised the importance of pastoralism as an alternative adaptation in Baluchistan. In spite of increasing specialization and the use of distinct ecological niches by agriculturalists on the one hand and pastoralists on the other, each would be dependent on access to the produce of the other. Salzman (1967, 1971, 1978) suggests that in Baluchistan under certain conditions the need to articulate relations between farmers and herdsmen is a crucial variable behind the institution of the chief.[4] In other words, we have to explore the possibility of the connexion between increasing subsistence specialization and the emergence of chiefdoms.

The subsequent period saw a sociocultural organization markedly more complex than that of these chiefdoms. Considering the extent of the Harappan culture area, the stability of the system over several centuries, the wide-reaching trade network, the quantum leap from the preceding period in the variety of materials used and the degree of specialized craft production, not to speak of the skilled professions of architects, planners and sanitation engineers who must have been responsible for the maintenance of the physical infrastrucure of the cities, we conclude that the Harappan period saw the development of a state in which power was not

[4]Note, however, that it need not necessarily be the chiefship which provides the point of contact between farmers and herdsmen. Pehrson (1966) describes the institution of the 'village friend' as the nomadic Marri Baluch's political, economic and social entrée into sedentary society.

connected simply with genealogical rank, and the relations of production were not simply reducible to kinship relations.[5]

Let us return to lapis lazuli, one of the earliest items of long-distance trade in northwestern India. It is not a material which can directly or indirectly satisfy the needs of sustenance, clothing or shelter. Its function would have been 'sociotechnic' or 'ideotechnic' rather than 'technomic' in the terminology of Binford (1972). The importance of the circulation of primitive valuables in tribal societies is well known. In different cultures different kinds of objects can take on the function of primitive valuables. In general these are prized not for the satisfaction of biological needs, but for their exchange or symbolic value, and often form a class of materials distinct from and not exchangeable with items of household production and consumption. They may originally be acquired by barter, trade or tribute, but once acquired they circulate within the society not as commodities but as objects of prestation (Dalton 1975: 97–9; Godelier 1977: 127–51). They are gifted and counter-gifted at ceremonial occasions such as marriages, payment for religious services, offerings to ancestors, compensation, and so on. Their circulation helps initiate or maintain social relationships or alliances, and in many societies the acquisition or generous gifting of primitive valuables enables individuals to acquire status and a following.

In cultures with simple technologies labour is the most important factor of production. Matrimonial alliances and exchanges are therefore important in that they not only create future funds of labour and ensure the continuity of production, but regulate the distribution of the labour force. It is hardly necessary to stress the

[5]Any controversy of 'chiefdom *vs* state' may well be misplaced when dealing with real situations. Yet one cannot agree with Service (1975) or Cohen (1978) that, *vis-á-vis* the chiefdom the state merely represents more centralized and institutionalized control backed by the legitimate use of force. This would imply that states are a natural outgrowth of chiefdoms, just 'more of the same'. Instead I would adhere to a commonly accepted view that, whereas in a chiefdom the concept of the inherent superiority of a lineage is not reflected in access to basic resources such as land, in a state society is divided into classes with differing access to basic resources, differing roles in production, and unequal shares in the total social product. The archaeological distinction between the two is admittedly difficult, and we should by no means assume that the Early Indus and Mature Harappan phases are neatly divided by a clear distinction of chiefdom and state. When the long span of the mature Harappan period has not been internally periodized, we are in danger of viewing it as a static 'block'. Indeed, one of the serious limitations of this study is that few changes in trade patterns or any other phenomena have been discerned within the Harappan period.

importance of marriage in tribal societies where kinship determines not only how individuals trace their descent or form alliances, but also the access of individuals to land or livestock or other resources, and the distribution of the products of labour, not to speak of the roles of obligations or rights which individuals play *vis-à-vis* each other. However self-sufficient the basic household economy, for their biological reproduction households are dependent on social relationships within a much wider social sphere (Friedman and Rowlands 1977: 206). If senior members or lineage elders, though lacking special privileges regarding access to land or the produce of other households, can control the circulation of prestige goods, these not being convertible to items of household production and consumption, younger members who require valuables at the time of marriage will become dependent on senior members. Thus elders can control the reproduction of the group by controlling the exchanges of women (Meillassoux 1972; also Ekholm 1977).

Much of the anthropological literature on chiefdoms impresses us with the contradictions inherent in this type of social organization. Chiefs need to utilize tribute or ceremonial payments to support their own establishments and ritual paraphernalia, but at the same time are obliged to show generosity to their (albeit subordinate) kinsmen. Therefore there are opposing pulls on the institution of the chief: morally incumbent kinship obligations as against the need to strengthen the chiefly office and accumulate wealth. This contradiction is especially marked as chiefly power does not accrue from ownership of property, as chiefs have no monopoly of the legal use of any coercive institution, and as commoners can repudiate ties with the chief if they so wish. Lineage rivalry, conflict of interest between local groups and the chief's centre, rebellion, aggression and expansion are pandemic, often leading to fission and the dissolution of the chiefship (Cohen 1978; Goldman 1970; Leach 1954; Sahlins 1972). Ambiguity between the ideal of senior birth and practical considerations may also prevail. A chief must be born into the right descent group, but he must also be capable of exercising leadership: a lazy, cowardly or incompetent individual is unacceptable as chief, whatever his descent. More significant is the ambiguity of rank inherent in the system, especially in the higher echelons: there may be conflict between alternate lines, between the principles of patriliny and primogeniture, and so on (Goldman 1970: 7–8; 24–6; Friedman and Rowlands 1977: 220 ff). A way out of this contradictory situation would be a chief's access to new or independent means of establishing absolute rank or accumulating wealth (see especially Leach 1954: 188; Kaeppler 1978; Friedman and Rowlands 1977: 220 ff).[6]

If the concept of the inherent superiority of some lines over others is established in society, the system of marital exchanges will be assymetric, whether the descent system is matrilineal or patrilineal. Rather than women being exchanged as wives between two lineages, women will be given in one direction only, so that some variation of the matrilateral cross-cousin marriage will prevail. This reinforces the relative ranking of the descent groups. Marital payments, however, may flow in the opposite direction. Whether wife givers are considered superior to wife takers or vice versa will depend on the culture in question (Leach 1951).

Ekholm (1977) suggests that where the possession or gifting of primitive valuables is important and these circulate in marriage payments, wife takers will rank superior to wife givers. Higher ranking lineages seize on the control of the flow of primitive valuables or external goods as a means of accumulating wives and therefore labour and affinal kin from subordinate lineages; or of placing increasing numbers of individuals in their permanent debt, thereby acquiring an appreciable circle of non-kin dependents.

The transformation to urban society may have come about in the Harappan period as locally superordinate lineages of the plains, able to reproduce their social form only by competition or expansion, seized the opportunity to engage in external relations with other contemporary chiefships, and the 'political arena' expanded to encompass the larger part of the Indus plains area. Each of the archaeologically defined spheres, the Sothian, Kot Dijian and Amrian, may have represented one or more local level chiefships with ranked lineages. As is typical of chiefdoms, there would have been internal checks on the ability of chiefs to accumulate wealth. We have also suggested that lapis lazuli constituted one kind of

[6]Kaeppler in a discussion of social interaction between the chiefdoms of Fiji, Tonga and Samoa, shows how Tongans of high rank take male spouses from Fiji and female spouses from Samoa. The gifting of valuables accompanies these marriages, but inter-island exchange is not brought about by ecological necessity. Instead, 'Tongas need both Fiji and Samoa as part of their social system in order to perpetuate their culture system' (Kaeppler 1978: 249). Ambiguity of rank and conflict over succession necessitate these marriages.

primitive valuable. (In this period it is attested at Sarai Khola, at Mehrgarh, in the Gomal valley and at Jalilpur, all belonging to the Kot Dijian cultural horizon, and at Amri and Pandi Wahi, at Balakot, and also at Nal.) It there were competition between chiefdoms for access to lapis lazuli, certain communities by virtue of geographic location on or near routes from the western hills, or by virtue of successful relationships with mobile pastoralists who perhaps transported this material to the plains, would have an advantage over others. Lapis iazuli and its gifting and countergifting would, then, represent the external and independent factor which could bring other lineages into the debt of particular chiefs, and enable them to acquire a circle of personal dependents.[7] The chiefship would gradually be able to dissociate itself from obligations of generosity to its own kinsmen, and thus begin to accumulate true wealth in wives or labour or agricultural produce. The chiefly lineage would thus come into a position where it could take wives from subordinate lineages and also enter into marital alliances with several other high-ranking chiefs. Friedman and Rowlands (1977: 244 ff) posit that under such conditions heads of subordinate lineages would be drawn towards the chiefly centre, that local groups of the hinterland would begin to lose their autonomy, and that subsequently dependent clan members would also move towards the centre. That the appearance of Harappan assemblages at several sites in the greater Indus valley coincides with a marked expansion in the area of individual settlements is well known and there are several Early Indus sites which were not occupied by the Harappans. This in turn would create situations of artificial land scarcity, leading to the increasing value of land as a commodity.

Hitherto, lapis lazuli would perhaps have been transported by mobile herdsmen on their annual movements between hills and plains. Whether this exchange involved a symbiosis between agriculturalists and herdsmen, whether lapis was gifted in return for seasonal grazing rights, we cannot tell. What is of the greatest significance, however, is that with the emergence of the Harappan

[7]It is surely significant that the exceptionally prosperous site of Mehrgarh, where lapis lazuli is attested from the sixth millennium onwards, and which in the fourth millennium grew to be a very large settlement with a public building and ceramic and stone workshops, is located at the foot of the Bolan Pass. The Kachhi is not agriculturally attractive territory, but the region is annually visited by pastoralists from the Kalat as well as the Marri hills.

state the acquisition of lapis lazuli was left neither to chance nor to middlemen: Harappan colonies were established in the vicinity of the mines. This would be because now this material had assumed additional importance: it had become an export to Sumer, in exchange for which imports other than primitive valuables came under the control of the new political powers—items which could be converted to land as the property of the chiefs, or to labour or other goods. Alternately, rights to trade could have been given out by the dominant power to affinal groups in exchange for tax, tribute, or land rights. Thus the conversion of genealogical rank to absolute power would be achieved.

Two kinds of evidence may be cited as possible support for this hypothesis. The first is the evidence of the seals, and the second the evidence of locational patterns.

Let us begin with the seals. As stated in a previous chapter, the obvious interpretation of the seals is that, if not used exclusively for sealing, they functioned as marks of individual identity. A glance at the combinations of signs *vis-à-vis* field symbols on the seals (Mahadevan 1977) shows that the inscriptions vary independently of the field symbols, and that no pattern of correlation between the two elements emerges. If the inscription gave the name, title or office of the owner of the seal, the field symbol, then, would have had nothing to do with the various bureaucratic institutions that may have existed, or else we would expect distinctive combinations of signs to occur with each field symbol. In other words, it is not likely that the field symbols were the insignia of professional groups or guilds. And given the great variety of field symbols we cannot assume that they were the emblems of cities.

Of the total of 1755 occurrences of field symbols on seals and sealings, 1627 (92 per cent) represent single animals, either naturalistic, composite, or 'fabulous' (Mahadevan: Table LX). The rest comprise groups of animals, cult, mythological or everyday scenes, trees, or single objects.

A reasonable guess therefore is that the preponderant use of animals as field symbols speaks for a custom of indicating the totemic symbol of the owner on his personal seal. In other words the various animals may have represented the non-human ancestors or honorary emblems of the various lineages that existed. This hypothesis appears plausible when it is noted that there are two seals (Mahadevan 1977: 795, no. 58) on which are depicted persons carrying standards in procession, in one case a unicorn being depicted on top of a standard.[8]

Totems are phenomena of nature (animals, plants, birds) or occasionally artefacts which 'serve as material objects by reference to which segments of a society express their respective unity and individuality, on the one hand, and their interdependence on a wider structure on the other, in terms of ritual attitudes, observances and myths' (Fortes 1966). Totemism is, in other words, a means of classifying social phenomena (individual descent groups) by reference to an objective scheme of natural phenomena. Fortes has pointed out that such a scheme is especially functional when lineages are exogamous. Totemic insignia symbolise the corporate entity of a descent group which transcends its individual members at any one point of time. Even though this 'totem' interpretation of the field symbols cannot be proved, their function may well have been to make social identification possible by reference to lineage distinctions.

If we are correct in this interpretation, we would expect that over the vast Harappan area we would find a very wide range of lineage emblems on the seals and sealings. And this is indeed so (Mahadevan 1977: Appendix II). But what is highly significant is that these do not occur with the same frequency. In fact, the 'unicorn' occurs on 1161 seals and sealings out of a total of 1755 (Mahadevan 1977: Table IX). That is to say, of all the occurrences of field symbols on seals and sealings, 60 per cent represent the 'unicorn' alone.

In the light of the preceding discussion we would therefore infer that the 'unicorn' was the symbol of the dominant lineage which had expanded or was expanding by assimilation or alliance at the expense of other lineages,[9] and administrative office and lineage

[8]A few seals depict several animals, either separately or as parts of a hybrid animal (Mahadevan 1977: appendix II nos. 18–35). One of these shows a procession of animals led by a unicorn.

The widespread use of totemic insignia in an early state need not be anachronistic. Several centuries after the appearance of kingdoms in Mesopotamia we find references to kin groups: Gudea 'called up his population behind the emblems of their im.ru.a [meaning 'clan' or 'lineage'] to perform specialized services in connexion with the rebuilding of the temple of Ningirsu' (Adams 1966: 84–5) Some im.ru.a were named after animals, some after deities.

[9]See Friedman and Rowlands (1977: 218 and note 20): 'There is a tendency for allies (affines) to become agnates since the submission to the central ruler entails submission to the patrilineal gods of that ruler, and in a conical clan situation such submission is equivalent to a change of name.'

affiliation would be closely connected. In other words, we may interpret the unicorn as the religious expression of a system of political control operating through lineage connexions.

The field symbol occurring with the next highest frequency on seals is the short-horned bull with head lowered over a trough. But this occurs on only 92 (5.2 per cent) of the seals and sealings. Thus the unicorn emblem outnumbers the second most frequent symbol twelve times over. The elephant on 48 examples, the *gharial* on 36 and the rhinoceros on 33, each represent a percentage of less than three.

If the 'unicorn' represents the ruling lineage, it should be found mainly at Mohenjo-daro and Harappa, but should also occur over most Harappan territory into which the lineage would have spread by allegiance and alliance systems. Of 1159 total occurrences of the unicorn on all kinds of inscribed artefacts, 747 or 64 per cent were found at Mohenjo-daro and 239 or 20 per cent at Harappa. Thus 84 per cent of all 'unicorn' occurrences are to be found at the two cities. (Mahadevan 1977: Table VIII). Moreover 'unicorn' seals also occur in Kathiawar, Kuch and the Sarasvati valley.[10] At Mohenjo-daro, Harappa, Chanhu-daro, Lothal and Kalibangan, the sites which have produced substantial quantities of seals, this field symbol is found on the majority of seals.

In the preceding section we had suggested that as the ruling lineage increased its power, several subordinate chiefs and their dependents would gravitate towards the cities. Thus we would expect to find the maximum range of field symbols of the totem type at Mohenjo-daro and Harappa. At Mohenjo-daro occur some 31 different totem-type symbols, and at Harappà about 18, and in contrast only 6 and 5 respectively at Chanhu-daro and Lothal (Mahadevan 1977: Table VIII).

The most important question, however, is whether the 'unicorn' lineage engaged in external trade. Of a total of about five rectangular Harappan seals and sealings found in Mesopotamia and Elam, four bear the 'unicorn' motif. The fifth carries the short-horned bull and an inscription in cuneiform. Of a total of some eleven round seals of Type II found in western Asia, nine bear the short-horned bull (the symbol on the remaining two is damaged).

[10]This symbol is not found at Rupar, Amri, Kot Diji, Desalpar or Rakhi Garhi. (We discuss here only those sites where at least one seal has been found).

One question immediately comes to mind. Could it be that the 'unicorn' lineage initiated the trade with lands overseas, and only subsequently gave trading rights to the 'short-horned bull' lineage in return for tax or tribute? This may well be so, although the evidence is slender: of the rectangular 'unicorn' seals found overseas, the only stratigraphically dated example comes from an Early Dynastic context, whereas the three datable round seals with 'short-horned bull' are all Akkadian to Ur III in date.

While this interpretation of the seals is totally hypothetical, more concrete support for the hypothesis may be found in the settlement patterns of the greater Indus valley. We refer especially to the disproportionately large size of Mohenjo-daro and Harappa and their location on the known Harappan map.

Judging from the location and comparative sizes of known sites in this region it does not appear as if the Central Place model of urban location characterizes the Harappan system. Available data on site location reveal no pattern of interstitially placed centres within progressively larger hinterlands. Neither are the largest cities, Mohenjo-daro and Harappa, located in the centres of polygonal or circular fields. True, Mohenjo-daro is located in the most fertile district of Sind, but it is not supported by a cluster of contemporary settlements in the Larkhana area. Its hinterland appears to be confined to the Indus banks downstream, as there are few settlements to its north. That is to say, Mohenjo-daro does not appear to have been located in a position of maximum accessibility to all the settlements in Sind. As for Harappa, there are only two known sites in its vicinity, both downstream, and the nearest cluster of sites lies in the lowest reaches of the Sarasvati system in Cholistan, at a distance of approximately 175 km as the crow flies. Unless several sites along the lower courses of the Ravi, the former Beas channel and the Sutlej have been washed away or lie as yet undiscovered, this is surely significant.

Moreover, in Chapter I we had briefly referred to the 'primate type' settlement size hierarchy of the Indus valley: the existence of a couple of cities of almost 500 acres (by one reckoning [Wheeler 1968: 26] both cities are more than three miles—or five kilometres—in circuit), immensely larger than the average contemporary settlement (of less than 30 acres usually). In contemporary ED Mesopotamia, incidentally, Adams and Nissen (1972: 16 ff) have plotted in the Uruk–Fara–Umma–Larsa region a large proportion of medium-sized settlements of anything from 25 to 300 acres in extent, aside from the two large cities.[11]

Geographers believe that the 'primate type' of settlement size hierarchy reflects qualitative differences in economic and spatial processes compared to the lognormal or 'rank size' hierarchy of settlements. Berry and Horton (1970: 64 ff) have shown that hierarchies of the primate type are connected not with the degree of economic development or degree of urbanization of a region, but with the interaction of relatively fewer and simpler economic and political factors. Haggett et al. (1977: 118–23) point out that several primate cities of Europe served not only their local hinterlands but their overseas empires as well. Elsewhere, primate-type hierarchies are connected with the rapid growth of a primary export sector superimposed on the peasant economy.

Thus in the case of Harappan urbanization we must consider processes of urban growth which cannot be simply explained by increasing rural productivity and the proliferation of local exchange systems, as in classic Central Place theory. Some settlement patterns are characterized not by centrality and the interstitial placing of sites but by dendritic patterns where lower level centres are tributary to only one higher level centre (and not to two or more as in Central Place systems). The networks connecting the nodes in a dendritic pattern are like elongated fans radiating from the primate city, the centres being linked to the latter rather than to each other except along a route. Such dendritic patterns tend to be associated not with local exchange or retail networks, but with long-distance trade or wholesaling (Burghardt 1971; Kelley 1976).

Dendritic systems can grow in regions whose economies have a strong external orientation. The primate city sees the convergence of commodity flows and the redistribution or bulking of goods. It is the ultimate destination of goods procured by way of nodes aong the 'fan'. In such a situation the primate city will be located at a point where it can control the movements of goods: at an important river

[11]One hastens to add here that the two regions are comparable only to a limited extent. Although the lower Tigris-Euphrates basin is a region smaller than the Harappan plains region, in the former we have a number of small channels and artificial canals leading off the rivers whereas in Sind the available arable land was strictly restricted to the width of the new alluvium deposited annually on either side of the river channel.

crossing, at the junction of several natural routes, or at a break-of-bulk point along a route.

Thus the primate city in such a case will be located not in the centre of the most populated region but to one side of it and can, as a 'gateway city' (Burghardt 1971), form a link between the core territory and the peripheral region or external world, thus often being located at the boundary between two ecologically distinct zones.

Although much detailed work remains to be done, it appears that the primate city of Harappa, with its great size, paucity of feeder settlements, and marked distance from the core regions of Sind and the lower Sarasvati valley, together with its position at the cross-roads of several natural routes, functioned as a 'gateway city'. In the case of Mohenjo-daro, locational factors must have included not only accessibility to routes from Baluchistan along the Bolan pass[12] but also local productivity. But the size of the settlement at Harappa may not be reducible to the factor of agricultural productivity alone. In Sind the Indus is aggrading and flows on a ridge higher than the level of the surrounding plain so that flood waters flow out to an appreciable distance on both banks of the river. In southwestern Punjab, however, the strip of new alluvium available to farmers along the entrenched rivers is significantly narrower than in Sind. Thus at the regional level there would be significant contrasts in land utilization between the lower Indus valley and lower Punjab.[13] Nineteenth-century reports of Montgomery district describe, between the annually flooded tracts of the Ravi and Sutlej, vast tracts of land which could not be cultivated and were seasonally occupied by pastoralists. Thus 'village communities as such did not exist in the arid "bars" of southern Punjab until the introduction of canal irrigation during British rule. Only in the fertile riverine tracts, which benefit from annual flooding, did compact villages with joint

[12] In the historical period some important cities of Sind such as Alor and Shikarpur have been located somewhat upstream of Mohenjo-daro. Where Shikarpur is concerned, control of trade over the Bolan pass was an important locational factor.

[13] Vats (1940: 1 ff) noticed the existence in Montgomery district of several old channels: two branches of the Ravi, the Beas, and two minor streams as well as the Sutlej. He believed that the region of Harappa was therefore much richer in ground water resources than it is today. Even if these channels did contain water in the third millennium (and there is no proof of this), Harappa would have been situated in the northern extremity of the zone of high agricultural productivity.

claims over land develop. Nomadic occupation remained a dominant occupation in the harsh environment of the "bars" ' (O.P. Bharadwaj 1961: 157). I also consider it significant that in the later 'Painted Grey Ware' period, for example, southwestern Punjab did not attract rural settlements as did regions to its northeast, east and south.

Harappa therefore appears to conform to the 'gateway city' locational pattern in standing near the frontier between two ecological zones (the zone of high agricultural productivity and the pastoral zone).[14] Even more important is the fact that several routes of historical importance converge on Harappa. The Chenab, Ravi, Beas and Sutlej provided natural waterways. Pakpattan on the Sutlej some 60 km southeast of Harappa has been the principal ferry point of the lower Sutlej for centuries. Traditionally traffic between Afghanistan and the plains has flowed through either Dera Ghazi Khan or Dera Ismail Khan. Multan, a frontier city of the medieval period, is connected to both places by easy routes, the Chenab being fordable in its vicinity. From Multan routes move up the Ravi to Harappa and then east to Pakpattan, and across the Sutlej to gain the Sarasvati valley. Alternately, much caravan traffic has moved in winter from Dera Ismail Khan to Jhang, Kamalia, Harappa, Pakpattan, and thence to Delhi. Thus we may conceptualize a dendritic fan with its apex at Harappa, spreading out to the Gomal valley sites, to Manda, and to Rupar, and in turn feeding the Sind and lower Sarasvati nuclear zones.

Such a dendritic pattern emphasises the fact that the acquiring of raw materials was a complex process involving an initial collection and bulking of goods from several peripheral or distant regions before these could either be put to local use or exported westwards.

Admittedly the proposed connexion between external trade and social change is speculative, and we lack documentation for the actual process of social transformation. At the same time it raises intriguing questions concerning the organization of the Harappan system. How was control maintained over such a vast area?

[14]Incidentally it may be of significance that Harappa lies near the 25 cm isohyet (Naqvi and Rahmatullah 1962: 16; Ahmad 1963: maps 1 and 2), which swings southeast from just above Harappa to incorporate the lower Sarasvati valley. It would be useful to explore the significance of this isohyet in terms of the original forest cover and problems of land clearance.

Perhaps, in the Indus plains core area, tax was extracted from the peasants in the form of food produce. But in peripheral regions the authority of the state may not have impinged directly on the individual producer: subjection to the Harappan state may have been limited to periodic tribute in raw materials or manufactures incumbent on local chiefs. The latter would in turn benefit not so much in respect of access to commodities but because they would find a means of external support for their position in their own societies. In this early heterogeneous state the theocratic origins of power may still have been apparent. The symbolic manifestation of its varied system of controls may have assumed a religious form, the mystical unicorn being the symbol of power, and allegiance to the unicorn symbolic of acceptance of its authority.

If the efficient and wide-reaching urban system of the Harappans was generated by trade mechanisms and dominated by a merchant class become powerful by its successful participation in an extensive trade network, and if the 'markets' for this mercantile urban system dwindled, as has been argued before, the wealth and power of the rulers would have been seriously affected. Repercussions of a fall in the quantum of trade could also have been felt by the rural population. Given the substantial degree of population nucleation in the Harappan period and conditions approaching land scarcity, a dwindling of external trade could have led to increasing numbers of urban dwellers being unemployed. A move back to the countryside could have brought in its wake impoverishment of the rural sector, accompanied by drastic changes in patterns of land tenure or land utilization. In such a case it is not hard to visualize how the Harappan cultural style as an overarching system, together with its impressive cities, was phased into oblivion.

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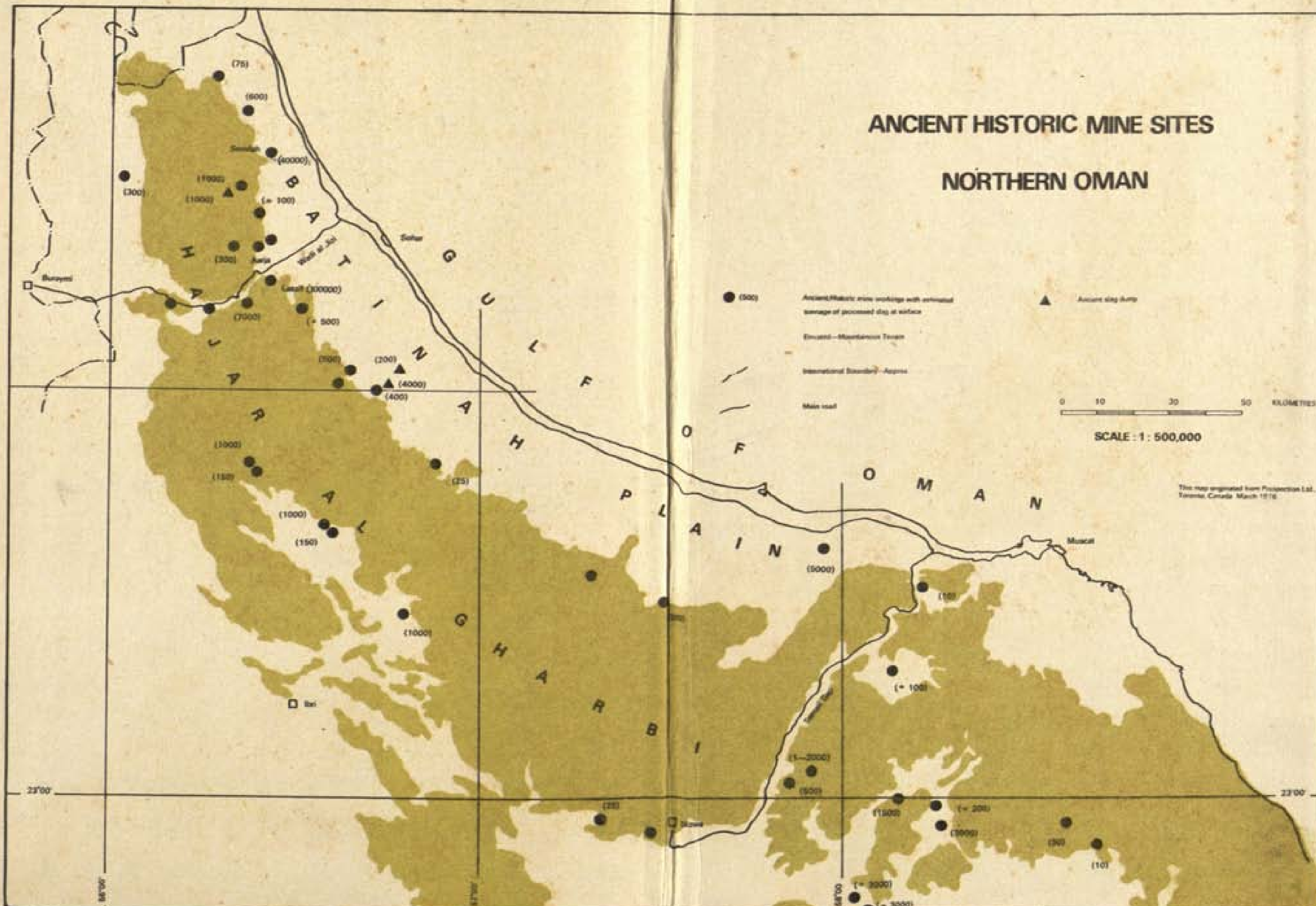

ANCIENT HISTORIC MINE SITES
NORTHERN OMAN
GULF OF OMAN
BATINAH PLAIN
HAJAR AL GHARBI
Main road
0 10 30 50
SCALE : 1 : 500,000
23°00'