THE ARABIAN PENINSULA AND PREHISTORIC POPULATIONS

by

HAROLD A. McCLURE
Dhahran, Saudi Arabia

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CONTENTS

ILLUSTRATIONS

PREFACE

This Thesis presented to the American University, Beirut by Mr. Harold A. MacClure of Aramco is the first study devoted to the paleoclimate, paleogeography and Prehistoric populations of Saudi Arabia and adjoining areas.

Last year Mr. MacClure came to Coconut Grove to discuss his manuscript. He returned to Beirut and Dhahran to make revisions and additions.

To outline the Prehistory of the Arabian Peninsula, attention must be called to the first discovery of typologically Lower Paleolithic implements by Doughty (Vol. 1, p. 74) who wrote:

> Walking in the torrent bed at Maan [S. W. Jordan] my eyes lighted upon, -- and I took up, moved and astonished, one after another, seven flints chipped to an edge; we must suppose them of rational, that is of human labour. But what was that old human kindred which inhabited the land so long before the Semitic race?

In another passage he writes (Vol. 1, p. 68): "I have found in it [the gravel bed near Mt. Seir or Jebel Sherra] such wrought flint instruments as we have from some river and lake gravels and loams of Europe."

These specimens are in the University Museum at Oxford.

Philby collected surface flint implements during many of his traverses in Saudi Arabia; these are in the British Museum.

During March, 1928 as leader of Field Museum North Arabian Desert Expedition I accompanied an Iraq Petroleum Company Survey Party under Lieutenant-Colonel W. E. Browne. We made a broad 150-mile sweep from R. A. F. Landing Grounds "K" and "R", halting at Umm Wual ("the Mother of Ibexes") and passing well south of Jebel Enaze (Anaze, or Anaiza) for which we were searching. At that time the Jordan-Saudi Arabian boundary was not demarcated, so that we presumed we were still inside Jordan and Iraq. Here on and around Umm Wual I found typologically Mousterian heavily patinated flint implements. In addition, on Jebel Enaze, the tri-focal point of Saudi Arabia, Jordan and Iraq, I found a fine series of Paleolithic implements.

Bertram Thomas in 1932 as he made the first crossing by camel of the Rub'al-Khali was given "a perfect flint arrowhead and spearhead from the white and rolling sands of Sanam northwest of Umm Quraiyin (approx. Lat. 21° N., Long. 51°20'E.).

Peter Cornwall in 1945 was given a large Paleolithic handaxe from Duwadami (24° N. and 44° E.) in Central Arabia.

During the past 25 years dozens of surface sites have been located within the rough triangle with its apex at Tell el-Hibr northwest of Turaif (Tapline Station VI) and its base from Nejran-Jabrin-Qatar.

In December, 1948 Mr. O. A. Seager, Manager, Exploration Department, and leader of an Aramco Survey Party collected Neolithic flint, quartzite and obsidian implements at Irq el-Kudnah (Lat. 19°51' N. and Long. 45°24' E.) and in the Wadi el-Fau area from Qaryah (19°47' N. and 45°09' E.) northwest of Jebel Tuwaiq.

The finest specimen I have seen from Saudi Arabia was found in 1949 by Don Holm of Aramco 65 km. east of Sulaiyil (20°30' N. and 46°16' E.). This superb quartzite spearpoint (24.0 x 7.5 x 0.75 cm.) has broad pressure flakes on one side. The workmanship compares favorably with the techniques developed in Ancient Egypt and exemplified by the famed Fünen dagger in the National Museum, Copenhagen.

During my traverse along Tapline from June 7-17, 1950 as a guest of Aramco I collected surface flint implements at 15 sites from Hafar al-Batin to Tell el-Hibr ranging from Middle Paleolithic to Neolithic or later. This was during the Peabody Museum-Harvard Near East Expedition (see Field, 1951).

In 1960 Mr. Edward J. Francis sent to me at the Peabody Museum, Harvard, a fine series of Lower Paleolithic handaxes from Al-Qawnasat ibn Ghudayyan (Nuhaydayn al-Qawnasah) located on the northern fringe of the Rub' al-Khali at Lat. 20°25' N. and Long. 46°32' E. (See Field, AMMSA, Vol. 2, pl. I-XX).

On March 17, 1969 as a guest of Aramco I was flown to Seismo Camp No. 3 (22°10' 10" N. and 54°20'35" E.) This camp is in the central eastern area of the Rub' al-Khali. No archaeological objects were found.

Since 1955 many surface sites have been mapped. As McClure writes we are approaching the time when a second distribution map (see first large map of archaeological sites in Arabian Peninsula in my AMMSA, Vol. 1, 1956) should be compiled. The excavation of a stratified site would solve many problems.

To return to this manuscript, we have made minor editorial changes. Miss Deborah Hingston and Miss Morwenna Murrell in Coconut Grove also read the text. The style in the Bibliography and footnotes have been retained. The majority of the diacritical marks have been deleted.

We are pleased to include this elaborated Thesis under the imprint of Field Research Projects.

HENRY FIELD

September 26, 1971
FIELD RESEARCH PROJECTS
Coconut Grove, Miami
Florida, 33133

I. INTRODUCTION

The Arabian Peninsula, because it is presently one of the world's most forbidding desert areas, has remained until rather recently largely terra incognita. While history can generally be said to begin about 3,000 B.C. in the Near East, when the civilizations of Mesopotamia and Egypt come into full bloom, the Arabian Peninsula does not really enter written history until well into the first millennium.

About this time, its northern fringes are mentioned in Biblical and Neo-Babylonian sources and contact with Greco-Roman civilization begins.[1] Strabo's "lost" Greek trading post of Gherra is located somewhere on the eastern littoral of Arabia.

Failaka, a small island with a Greek temple off the coast of modern Kuwait, and Thāj, a city of Hellenistic times located some 100 kilometers inland from the eastern littoral, are other examples from Greek sources.[2]

The South Arabian kingdomes of Saba, Ma'in, Qataban, and the Hadhramaut, the centers of the spice trade in Greco-Roman times, are examples from the southwest coast of the peninsula.

The Nabatean kingdom in the northwest, with the capital city of Petra in Jordan, and the southern outpost city of Medā' in Sālih in North Arabia, is an example. Nabonidus, one of the Babylonian kings (555-539 B.C.), is known to have taken up residence in the city of Tayma in North Arabia.[3] Arabia Felix of the Romans skirted the fringes of northwest and southwest Arabia.[4] However, none of these above mentioned examples represent areas that extend any distance into the real interior of the peninsula proper.

While the African continent and other unknown regions of the world began to give up their secrets to Western explorers in the last several centuries, the Arabian Peninsula has largely remained marked "unexplored," "unknown," or worse still, simply left blank on geographic, geologic, ethnographic, and archaeological maps.

Although a small number of explorers penetrated the fringes of Arabia in the latter part of the nineteenth and first part of the twentieth century, H. St. John Philby, after World War I, was the first outsider to travel to any extent in the interior of Arabia.[5] It was he who first reported aspects of the general geology and geography of the interior and picked up and recorded the first implements of man-made Stone Age artifacts from the desert.[6]

During the 1930's, when oil exploration commenced, geologic and geographic mapping of the peninsula began for the first time. The result of this work is that today Saudi Arabia is perhaps geologically and geographically the best mapped area of the Asian continent. Detailed geologic and geographic maps (scale 1:500,000) of most of the peninsula are now available. One example of an indirect contribution to the Prehistory of the area that has resulted from this work is that mineral sites in the Western Shield area, some showing signs of

very ancient working, have been located on these maps.[7] The possibility exists that these mineral sources may have been a reason for late Neolithic or early Bronze Age cultural contacts across the peninsula. This subject is presented in more detail in a subsequent portion of the main body of this thesis.

Another event of great interest and significance is the discovery, first by Philby as indicated above, then by Aramco personnel working in the area, of a large quantity of Stone Age flint tools scattered about the desert and its fringes, proof of very ancient man's sometime occupation of the peninsula. Except for a few scattered notes in several journals, no significant study has yet been made of these artifacts. What small amount of this material has reached the hands of competent authorities has to date been mainly recorded and classified only in broad typological terms.[8] Unfortunately, no stratified sites have yet been found to put these tools in proper chronological context.

Mention must also be made here of ancient rock drawings which have been found scattered over the peninsula and which serve as substantiating evidence to back up the flint implements. This important evidence is discussed in detail later.

Geographically, the Arabian Peninsula is part of the Asian continent constituting the southernmost extension of what is usually referred to as Southwest Asia. Bounded on the east and west by the Persian Gulf and Red Sea, respectively, and on the south by the Arabian Sea, it is broadly attached on the north to the rest of the continent. Except for fringing hills and mountains that border the west, south and east, the peninsula is a gently northeast dipping plateau that is climatically largely low altitude desert.[9]

Geologically, Arabia consists of a Western Shield made up of a complex of igneous (extrusive and intrusive) and metamorphic rocks, commonly referred to as the Western Shield, and representing a relatively stable block that is as old as the formation of the various continental masses themselves. This portion of the peninsula is, in fact, geologically part of the East African basement shield area, having been separated physically from the continent of Africa by Red Sea rifting only in late Tertiary (probably Miocene) times -- fairly recently geologically speaking, but considerably before the emergence of man in the Pleistocene. The Arabian Peninsula has, therefore, been physically part of the continent of Africa throughout most of geologic time.

Fig. 1 illustrates relative chronologies of various more important periods (geologic and climatic) and cultures that are mentioned throughout this thesis.

The eastern half of the peninsula consists of sedimentary rocks laid down in a succession of seas that from early geologic time (Cambrian — about 600 million years ago) lapped onto the shield from the east, depositing successive thick beds of sedimentary material eroded from the old land mass of Pre-Cambrian igneous and metamorphic mountains.

The western portion is thus composed of rocks such as granites, gabbros, diorites, basalts, schists, and related rocks. The eastern half consists of sandstones, limestones, shales, and evaporites. Chert, the source for

the flint tools that the ancient occupants of the peninsula made in profusion, occurs in nodules and thin-bedded lenses as a minor constituent of many of the limestones, especially those of the Tertiary.

Tectonically speaking, and in the terminology of the recently revitalized continental drift (or tectonic plate) theory, the peninsula represents a "crustal plate", gently tilted to the northeast, that is actively separating from its parent African landmass and drifting into (colliding with) the more stable mass of the rest of Asia. The Tauros-Zagros mountain chain marks the zone of abutment.[10]

Most of the peninsula lies in the same general latitude and broad climatic belt as North Africa. The great Sahara desert and the deserts of Arabia (the Rub' al Khāli to the south and Great Nafud to the north, with subsidiary sand bodies in between) are a result of the same climatic regime. It is logical to assume that, allowing for minor local variations and differences in topography, the climate of the two areas is now and has been, probably at least since the Tertiary, quite similar. It is reasonable, therefore, to speak of a "Saharo-Arabian" climatic belt.[11]

Thus, while the Arabian Peninsula possesses strong geologic and geographic affinities with land masses bordering it, it seems logical that ancient cultural affinities of some kind might also be expected.[12] That this is, in fact, true and that the peninsula played a far more important role in the overall cultural picture of the prehistoric African-Asian land masses than has been previously suspected, is the principal theme developed in subsequent portions of this thesis.

There are a number of recently emerging clues that afford testimony to the active and important role of the Arabian Peninsula in the cultural past of the ancient Near East and call for total reassessment of the presently known picture. These clues are presented briefly below, then discussed in more pertinent detail in context within the main body of the thesis.

(1) Discovery of Ubaid Pottery. This important discovery, made only quite recently, may turn out to be one of the most significant for the Archaeology and Prehistory of the ancient Near East in many years.[13] Basically, the discovery consists of a series of sites, more than 25 so far, of surface pottery finds which are authentic Al-Ubaid pottery. These sites are scattered up and down the coast of eastern Arabia almost as far south as the base of the Qatar Peninsula. Several sites are, significantly, 40-50 km. inland. One site (Tarut Island) affords good stratigraphic context in a mound of some height. These finds have not been published yet, although they receive mention in Bibby's recent book, Looking for Dilmun, and are discussed in an informal paper delivered at the recent (March, 1970) Third International Conference on Asian Archaeology, held on the island of Bahrein.[14] One might not be too surprised to find a few more Ubaid sites at the head of the Persian Gulf and perhaps a little to the south, toward Kuwait, but the occurrence along more than half the length of the western Persian Gulf littoral and the two inland sites present us with a substantially expanded geographic horizon for this important pottery that poses new questions

concerning relationships between Arabia and Mesopotamia in ancient times and provenance of the important people who made this pottery. Indeed, a possible answer to one of the most vexing problems in the area, the origin of the Sumerians, could be at hand.

(2) The Dilmun Civilization. For approximately fifteen years, a Danish archaeological team under Professor P. V. Glob of the Prehistoric Museum of Aarhus has been excavating on Bahrein, approximately twenty-five km. off the eastern coast of Saudi Arabia. The result of the sum total of this work has been the discovery of a very active existence for this small island since about 3,000 B. C., including what the excavators are sure (and present with considerable convincing proof) is the site of the Sumerian Dilmun. The excavators feel that the site gives evidence for Bahrein having been more than just a way station on Sumerian trading routes to the south. The architectural remains are impressive (temples, buildings, walls standing several meters high), and a type of stamp seal is distinctive, as is the pottery. Of further interest is the implication that at least part of the eastern coast of Arabia may have been a part of the Dilmun "empire." Failaka, the small island off the coast of Kuwait, was also apparently in Dilmun's sphere of influence.

(3) Possible Site of Magan. Another site situated further along the Persian Gulf to the south has turned up a culture (the "Umm an-Nahr") different from that of the Dilmun culture of Bahrein but, nevertheless, apparently contemporaneous. This site is located on the Trucial Coast of Arabia in the vicinity of the Sheikhdom of Abu Dhabi, on the coast and inland near the oasis of Buraimi. Much more work needs to be done in the area to arrive at any real conclusions, for the work to date has consisted mostly of a preliminary reconnaisance. From the proximity of the site to the copper and mineral areas of the Oman Mountains, there is already a strong suggestion, however, that the kingdom of Magan, from where the Sumerians brought copper and with which they carried on a lively trade industry, may be indicated.[15]

(4) Paleolithic and Neolithic Artifacts in the Saudi Arabian Desert. Philby was the first to pick up examples of these artifacts, which consist of handaxes, scrapers, arrowheads, and other such tools, in his early wanderings in Saudi Arabia. However, Doughty was the first to report flint or chert implements of Stone Age types east of the Jordan. Since that time, collections have been made by various persons, especially by Field. None of this material has been studied systematically, and unfortunately, as noted above, no stratified sites are yet known. There are indications that such sites might turn up in the future, however, perhaps in ancient lakebeds or wadi terraces. Little publication on this important evidence has been done so far, except for a series of "notes" in Man, by Field and several others, and a few scattered brief articles and references elsewhere. A great deal of the material collected so far is in custody of, or recorded in, the Peabody Museum, Harvard University, where in due time a systematic study hopefully will be undertaken.[16] Field has, during the past forty-five years, been recording occurrences from Southwestern Asia.[17] Broad typological classification and several tentative affinities with various other

established Stone Age cultures elsewhere in the Near East and Africa have been suggested. These are discussed in a later portion of this thesis.

Basically, it seems that the artifacts, from a broad typological standpoint, cover the range from easily recognizable Lower and Middle Paleolithic handaxes of a somewhat crude nature to beautifully worked bifacial tools in a "Solutrean" tradition or late Neolithic style such as the rippled flint knives of Naqada times of Predynastic Egypt. It is interesting and informative, especially from a paleoclimatic standpoint, that occurrence of these tools in considerable abundance is not only on the fringes of the Arabian Desert, but also is well inside what is now almost totally uninhabitable sand desert. The conclusion is inescapable, therefore, that for the better part of the history of man, the Arabian Peninsula, including present desert areas, was inhabited by substantial human populations.[18] This evidence can no longer be ignored if the full history of mankind is ever to be understood, for the Arabian Peninsula is the bridge between the very important continents of Africa and Asia, the one where man may have been born, the other where civilization probably began.

Fig. 2 indicates geographic locations of flint tool sites in the Arabian Peninsula, as known to date. (See also Field, AMMSA, 1956 archeological map of Arabian Peninsula.) The extensive distribution of sites in the Rub' al-Khāli and eastern Arabia is largely due to the fact that most of the oil exploration has been in these areas and most of the finds so far have been casual finds, leaving one to wonder what might be discovered in other areas if a deliberate systematic search for such evidence was undertaken. The total number of these sites is impressive, but the really significant point is the number located in the sand desert of the Rub' al-Khāli. New sites are being periodically reported, and it seems evident already that the general distribution is virtually "everywhere." In fact, there seems hardly any point in recording further sites indicated merely as "Stone Age tools." Further recordings should perhaps be more meaningfully directed toward location of different typologies in relation to paleogeography (as suggested on Ch. III, fn. 14).

(5) Anati's "Oval Headed" and "Realistic-Dynamic Style" People. In 1952, an expedition into southwest Arabia in search of pre-Islamic inscriptions (in the vicinity of Najrān) was led by H. St. John Philby accompanied by H. Ryckmans and P. J. Lippens. Photographed and recorded together with many inscriptions were several thousand rock drawings. These drawings, eventually passed on to Anati for study and analysis, and showing human populations in association with various animals, cultural implements, and social activities, were recently published.[19] Anati has been able to demonstrate that various populations, two of which he analyzes and refers to as "oval headed" (because of the stylistic depiction of the head — no anthropometric affinity intended) and "realistic-dynamic style" people, lived and apparently thrived in the Arabian Peninsula from about the late fourth millennium to perhaps the late second or early first millennium B. C. The two groups together represent the "herding-hunting" phase of the Arabian drawings. Various accoutrements of their culture — the dagger with semi-lunate pommel for one, dateable to about the mid-third to mid-second millennium B. C. — show that these people may very well have been in

contact in some as yet undetermined fashion with both Mesopotamian and Egyptian cultures during some period. Depicted weapons such as the boomerang (or throwing-stick) and dagger with semi-lunate pommel, feathered headdresses, articles of clothing, musical instruments, shields, trapezoid (transverse) arrowheads, and double-convex bows furnish possible evidence for connection and chronology. What the particulars of this cultural connection may have been and the reliability of Anati's suggested chronology is discussed in subsequent portions of this thesis. It is sufficient to state here that these rock drawings constitute another very important piece of recent new evidence of the role of the Arabian Peninsula in the cultural history of the Near East that must be given due consideration.

(6) Geologic Mapping of the Peninsula. Brief mention has already been made of this subject. Several general aspects that elucidate the paleoclimate and paleogeography of the area, two very important and connected factors that greatly affected the ecology and demography of ancient man, are discussed here. The various specific geologic and paleoclimatic features are then discussed and analyzed in more pertinent detail in Chapter II.[20]

The rock sequence of the Arabian Peninsula that was deposited concurrently with the presence of ancient man and the associated geomorphic features have been mapped as "Quaternary undifferentiated", a geological period approximately equivalent to the Pleistocene (from about 1,500,000 to 10,000 B.C., and Holocene to the present).[21]

Division into finer units of geologic time is not yet practicable because of lack of detailed study of these features and the largely unconsolidated and unstratified nature of the rocks, which are mostly sands and gravels of various types, including the large expanse of aeolian sand and gravel that makes up the Rub' al-Khāli and Great Nafud Deserts and the great sheet gravel plains.[22] These unconsolidated sediments are somewhat erratically superimposed upon the last well-stratified beds of the Tertiary, those of the Miocene and Pliocene, and in some places they blanket other older rocks.

Of special interest are the ancient lacustrine beds that occur in various places. Vertebrate teeth and bones occurring at one of these sites date it paleontologically to "probably late Pleistocene to early Recent." Another known lake bed site (As Shalfa—recently reported, but not recorded on published maps as lacustrine beds), is located in the Rub' al-Khali approximately 170 km. southeast of Jabrin (see map, Fig. 2). This site has Stone Age artifacts and freshwater molluscs associated with it. An additional interesting and possibly significant occurrence at this site is the presence of grinding stones (but no pottery), which suggests gathering of wild grains.[23] Field records several other sites, and Philby reports similar deposits and gravel beds on the northern fringes of the Rub' al-Khali that contain fossils of freshwater molluscs and "Neolithic" type implements.[24] Cornwall reports a "Chalcolithic" site located near an old lake bed in Al-Hasā Province, near Al-Uqair, with abundant remains of freshwater molluscs.[25]

Elsewhere, several great ancient wadi systems with their numerous attendant tributaries and associated outwash plains, now virtually bone-dry,

attest to a period of substantial water runoff within the history of man. These various features of the Quaternary geology of the Arabian Peninsula all point to a paleoclimate with considerably more rainfall than today. In addition to these inland features, marine terraces and raised beach deposits occur along the western Persian Gulf littoral, attesting to sea level oscillations and shoreline variations within the history of man. (Some Ubaid pottery sites seem associated with these ancient shorelines. The evidence for this association and the significance of this fact is discussed later.)

As is obvious from the above discussion of the Quaternary geology of Arabia, water, as an agent of erosion, transportation, and deposition, played a large part. Such a condition could only have resulted from a climate with substantially more rainfall than exists today. The Stone Age artifacts mentioned above indirectly substantiate this, as do other significant lines of evidence, direct or indirect, that are discussed in a subsequent Chapter. It is obvious that the implied climatic change from more moist to arid conditions within the history of man on the peninsula has had a very important influence on the paleodemography and cultural relationships of the area. This influence has also affected to a very large extent the cultural fabric of the two great and important continents, Africa and Asia, between which Arabia is strategically located. The nature of this influence, one of the most important parts of this thesis, is also discussed later.

Arabia has not always been a peninsula, as noted above. Until fairly late in the Tertiary, it formed part of the African continent, probably separated from the rest of Africa by an incipient rift valley in the early Tertiary. This valley, part of the Great Rift system that continues on down into East Africa, then subsequently widened with major rifting in the later Tertiary (Miocene) and was then subjected to flooding from the Indian Ocean, to become the Red Sea.[26] (All of this occurred before the advent of man in the area). The Red Sea at its southern end, the Bab el-Mandab, is still very narrow today, only about 30 km. wide. Visibility across to the opposite side is possible on a clear day.

A long, narrow, central deep, running the length of the Red Sea, but becoming more shallow at the southern end, marks the old rifting axis.[27] Except for this narrow deep, the Red Sea is a rather shallow body of water. The present narrowness of the entrance to the Red Sea is the result of Tertiary (Late) lava flows that filled the Danakil area of the Horn of Africa after the Arabian crustal block had been pulled away from Somalia and the rest of the parent African continent. The Danakil basalts, extrusive rocks of the Tertiary to Holocene (Recent), may possibly have sealed off the Red Sea from the Gulf of Aden at one time, thus forming a natural land bridge between Arabia and Africa within the history of man.[28] A number of small volcanic islands and coral reefs presently occur in the Bab el-Mandab, forming, as it were, effective stepping stones. Such a passage, impractical for animals, would hardly be prohibitive for man, even with the crudest of boats. Eustatic lowering of sea level, which could have taken place sporadically during the history of man, could have further increased the possibility of a land bridge in the vicinity of the present Bab el-Mandab. There is no indication of such a cutoff from the Indian Ocean having occurred any time

after the initial flooding of the rift, but the area is notoriously geologically unstable, and such an incident could have been so brief as to leave no readily obvious geologic record. Detailed study of the area from this standpoint could possibly be informative.

The northern part of the Sinai Peninsula, i.e., across the Suez Isthmus, seems to have been a permanent land bridge throughout most of the history of man. (See Field, Sinai, 1952). There is, however, evidence that flooding did occur several times in very early Pleistocene during the Milazzian and Sicilian periods.[29] The straits of Suez represent a northwest branch of the main Red Sea rift, the other branch to the northeast continuing on up to form the Jordan River—Dead Sea-Wadi Arabah rift. Elevation across the isthmus is very low, and again, as in the case of Bab el-Mandab, it is possible that conditions across this narrow piece of land have been variable enough for short periods of time to affect the ecology of man, but not of sufficient duration or magnitude to leave good geological evidence. A slight eustatic rise in sea level, increase in Nile flow and consequent discharge into, and a widening of the delta system could theoretically make the isthmus almost impassable swamp, marsh land, or lagoon — perhaps not impenetrable to man's passage but certainly forbidding. Regardless of what may have been the actual situation in the isthmus during the history of man, the narrow Gulf of Aqaba would surely have been no barrier to his passage, even with crude boats. In general, therefore, it seems safe to conclude that no effective physical barrier to the passage of man of any significant duration of time has existed between the Arabian Peninsula and the continent of Africa.[30]

In view of the fact that Arabia is a stepping-stone, geographically and geologically speaking, between the continents of Asia and Africa, and given the fact that ancient man lived and hunted over the peninsula throughout most of the history of mankind, it would not be at all surprising if it may not also have served in some respects as a cultural stepping-stone.

This thesis attempts to demonstrate that there is some firm basis for concluding that the Arabian Peninsula is not a blank page in the history of mankind in the ancient Near East and that it has, very possibly, played a significant role in the cultural composition of the area. New evidence (touched upon in above paragraphs) is presented and discussed in more detail in the following Chapters. Chapter II is devoted to demonstrating that a paleoclimate much more moist than today's climate existed during Paleolithic and most of Neolithic times. Chapter III summarizes what is known, what can logically be deduced, and what is reasonable speculation about prehistoric populations of Arabia. Chapter III includes an attempt to find possible meaningful affinities and connections with neighboring ancient cultures, the main point being that some sort of cultural continuum (however vaguely defineable at present) extended from Southwest Asia, across the Red Sea, and up into North Africa, with the Arabian Peninsula being the important link in between.

Butzer writes: "Arabia plays a key role in numerous archaeological, cultural and ethnological theories of relationship between Asia and Africa, but its archaeology and its prehistoric ecology are virtually unexplored."[31]

This thesis is an attempt to determine, by analyzing and synthesizing clues from the recently emerging evidence discussed above, what the nature of these relationships were. It is an attempt to explore the archaeology and prehistoric ecology of Arabia and relate them in a meaningful perspective to the rest of the history of mankind in the ancient Near East.

FOOTNOTES

[1]However, see Ch. III, footnote 96, for a possible reference to the east coast of Arabia in Akkadian sources.

[2]The transliteration system utilized throughout this thesis for local Arabic place names and names for topographic and geographic features of the Arabian Peninsula is the "BGN/PCGN" system recommended by the U.S. Geological Survey and used in its series of publications and geologic and geographic maps of the peninsula.

[3]J. Dayton, Illustrated London News, August 19, 1967, p. 26. See also F. V. Winnett and W. L. Reed, Ancient Records from North Arabia (Toronto: University Press, 1970), p. 88.

A number of other references to North Arabian towns appear in historical sources of the first millennium. Assyrian sources (records of Sennacharib and Ashurbanipal) refer to Adumattu (present day al Jauf) as a seat of early North Arabian queens. (Winnett and Reed, ibid., p. 71.) Tiglath-Pileser III (747-727 B. C.) claims to have received tribute from the town of Taymā. Biblical sources mention it also. The modern town of al Ula (near Medāin Salih) is referred to several times in Biblical sources as Dedan. A good (though slightly dated) reference is: J. A. Montgomery, Arabia and the Bible (Philadelphia: University of Pennsylvania Press, 1934).

[4]A penetration into South Arabia of the Romans in 24 B. C. is perhaps worthy of mention in passing. At this time, Aelius Gallus, with 10, 000 men, captured a town in the vicinity of Najran; and a Roman penetration still further south into the former West Aden Protectorate also occurred. Testimony to the forbidding nature of most of the peninsula, however, is evident in the fact that neither Babylonians, Greeks, Romans, nor any other subsequent conquerors were ever able to establish hegemony over any significant portion.

[5]For a brief summary of early explorers of Arabia and their contributions to the knowledge of the peninsula prior to and during the twentieth century, see Winnett and Reed, ibid., p. vii - viii.

[6]According to Henry Field, Peabody Museum, Harvard University, (personal communication), these artifacts are now in the British Museum.

[7]A mineral reconnaissance had been made by K. S. Twitchell in the early 1930's. H. Field, Ancient and Modern Man in Southwest Asia, Vol. I (Coral Gables: University of Miami Press, 1956), p. 100-101, mentions location of several ancient mining sites selected from Twitchell's notebooks.

[8]However, for an exception, see Holger Kapel, Atlas of the Stone Age Cultures of Qatar (Denmark: Aarhus University Press, 1967). This publication is discussed later.

[9]The highest elevation is Jabal Akhdar in Oman Mountains (10, 000 feet).

[10]See footnote 28 for more on this aspect of the geology of Arabia.

[11]Evidence exists for assuming that this climatic belt is, in fact, a segment of a much broader belt that includes at least the Baluchistan-Indus Valley area. Various workers, such as Wheeler, Piggott, Field, and Spate, have found evidence to conclude that climate change (onset of aridity) has also occurred in this area. For example, Sir Mortimer Wheeler, Cambridge History of India (Cambridge: University Press, 1953), p. 6, states: ".... a certain degree of climate change is beyond dispute...." R. L. Raikes and R. H. Dyson, American Anthropologist, Vol. 63 (1961), p. 265, however, sum up the lines of evidence given by these various authors and conclude to the contrary that there is no valid reason for assuming significant change of climate. However, here, as in Raikes' book, Water, Weather and Prehistory (London: John Baker, 1967), the ecological effects and complex activity of man and his domesticated animals have been greatly overstressed, while geological factors of a perhaps more overwhelming and convincing nature have not been adequately considered. (See page 33, footnote 35, for further remarks on the merits of this approach to paleoclimate.) M. B. Pithawalla, An Introduction to Sind: Its Wealth and Welfare (Karachi: Sind Observer Press, 1951), describes salt areas in the plain adjacent to Mohenjo-Daro that may be analogous to and contemporary with the Arabian sabkhas.

An excellent example of a proper study of the paleoclimate and paleoenvironment based on sound geological analysis is K. W. Butzer and C. L. Hansen, Desert and River in Nubia (Milwaukee: University of Wisconsin, 1968).

[12]Sir Arthur Keith, in Bertram Thomas, Arabia Felix (New York: Charles Scribner's Sons, 1932), p. 301, discusses modern anthropological affinities of the South Arabians with peoples from the Horn of Africa and Iraq. See also C. S. Coon, The Living Races of Man, (New York: Alfred A. Knopf, 1965), p. 82 and 118. An excellent summary also is H. Field, Ancient and Modern Man in Southwestern Asia, Vol. II (Coral Gables: University of Miami Press, 1961), p. 113-14.

[13]At the time of the writing of this thesis, an article on this find is scheduled to be published in Archaeology during 1971.

[14] See T. G. Bibby, Looking for Dilmun (New York: Alfred A. Knopf, 1969), Plate XXXII, for photograph of some of this pottery, and the map on p. 314 for location of two of the sites. The paper, entitled "A Surface Survey of Al Ubaid Sites in the Eastern Province of Saudi Arabia," was presented by G. Burkholder and M. Golding at the Bahrain Conference, 1970.

[15] This site was also worked by the Danish team. See T. G. Bibby, ibid., p. 219-22, and p. 273-81, where a fairly good argument that this site represents Magan is presented. The author also reasons rather convincingly that the Indus Valley was the site of Meluhha, thus substantiating Leemans' excellent earlier argument to this effect. W. F. Leemans, Foreign Trade in the Old Babylonian Period (Leiden: E. J. Brill, 1960), p. 159-66.

[16] Part of the material collected by Philby on his various traverses is in Riyadh in the custody of the Antiquities Department of the Ministry of Education. This should furnish an additional important source for future study. Some specimens are also reported to have been sent to the University of Pennsylvania. The author of this thesis is attempting to keep records of current finds, as is Field.

The new method of studying and dating flint tools emphasizes statistical analysis based on a significant number of specimens. Until such a study of the Arabian material can be undertaken, although logical tentative affinities can certainly be postulated, no really firm conclusions can be made.

[17] Dr. Henry Field, of Peabody Museum, Harvard University, has made many significant contributions since 1925 to the study of both ancient and modern man in Southwest Asia. In addition to numerous anthropological and archaeological investigations, his current series of comprehensive Bibliographies I - VII on the area are of particular value. Although not on the Committee for this thesis, he has been kind enough to read it and offer encouragement and valuable suggestions, for which grateful appreciation is herein tendered.

[18] The Syrian Desert can be considered a northward extension of the Arabian Desert from a geographic standpoint. S. Passagre, cited in K. W. Butzer, Quaternary Stratigraphy and Climate in the Near East (Bonn: Fred Dummlers Verlag, 1958), p. 115, reports evidence to show that there was a numerous Neolithic population living in the Syrian Desert with an apparent abundance of water, pasture and game. See also North Arabian Desert Survey by Henry Field, 1960.

Mention must also be made of recently published and very important work on the flint tools of Qatar by Holger Kapel, Atlas of the Stone Age Cultures of Qatar (Denmark: Aarhus University Press, 1967). This subsidiary peninsula of the Arabian Peninsula contains artifacts undoubtedly derived from the

peninsula proper. Two types, the leaf-shaped point and the triangular (in cross section) tanged point are potentially very significant. (See Appendix B for details and discussion.)

[19]E. Anati, Rock Art in Central Arabia. Vol. I: The Oval Headed People of Arabia. Vol. II: Pt. 1, Fat-tailed Sheep in Arabia; Pt. 2, The Realistic-dynamic Style of Rock Art in Jebel Qara. (Louvain: Université de Louvain, Institut Orientaliste, 1968.) Other Vols. in preparation.

[20]The most complete and accurate sources on the geology are: "Geological Map of the Arabian Peninsula," U.S. Geological Survey and Arabian American Oil Company, Washington: U.S. Dept. of Interior, Geological Survey, 1963, and the text that complements this map, Geology of the Arabian Peninsula, by R. W. Powers, et al. (Saudi Arabia), Z. R. Beydoun (East Aden and Dhofar), F. Geukens (Yemen), and J. E. G. W. Greenwood and D. Bleackley (Aden Protectorate). Ref. Bibliography for details of this series of publications.

[21]Man, as a tool maker, apparently begins in the early Quaternary, perhaps about the early middle or late early Pleistocene. The oldest tools found to date are so-called "pebble tools", found by Leakey in East Africa (and nowhere else so far).

The absolute date of 1,500,000 years for beginning of the Pleistocene is a very round figure. Some geologists would place it closer to 2,000,000. A more accurate date is not necessary for purpose of this thesis.

[22]An attempt is made in Ch. II to make more definite age assignments. Recently published absolute age dates for sabkha formation and acquifer waters afford valuable clues.

[23]W. Dell'Oro, Arabian American Oil Company, Dhahran, Saudi Arabia, (personal communication). (See also Ch. II, footnote 42, for further discussion on this site.)

[24]Geographical Journal, No. 82 (1933), p. 1.

[25]Ibid., No. 107 (1947), p. 28.

[26]D. H. Swartz and O. P. Arden, Jr., Bull. of the American Association of Petroleum Geologists, Vol. 44, No. 10 (1960), p. 1621.

[27]L. F. Ivanhoe, Geotimes, Vol. 12, No. 10 (1967), p. 12.

[28]What was once the Wegener "theory of continental drift" has, in just the past several years, been revived, restudied, more appropriately redesignated "plate tectonics", and come to be virtually accepted as geological fact. Based on modern oceanographic studies, geophysical techniques and geological observation, zones of crustal separation in various areas of the earth's uppermost layers were shown to have been active in the geologic past, and in fact, apparently very much active today. (The various present day continental masses and portions of the ocean floor were once distributed throughout the world in form and position different from today.) The Red Sea axial deep thus marks the zone of present crustal separation between Africa and Arabia, with mantle (molten) material (the layer just below the crust) actively upwelling. Areas of "hot brine" and active intense mineralization in this central axial zone are considered part of the substantiating evidence for this phenomenon of a large crack in the solid crust of the earth. This zone of activity is, in some places, close to 50 km. wide. Generally summing up in simple terms, it can be said that the Arabian Peninsula is slowly but surely separating further from the continent of Africa. The best general summary of this rifting activity is I. G. Gass and I. L. Gibson, Nature, Vol. 221 (1969), p. 926. See also Ivanhoe, ibid.

Another additional interesting fact is that crustal drag has resulted in, and indeed is still resulting in, up-thrusting of the Iranian mountains and complementary down-warping of the Persian Gulf basin and Tigris-Euphrates river plain. Occasional earthquakes in Iran help substantiate still active movement in that area, and R. W. Berry, et al., Journal of Sedimentary Petrology, Vol. 40, No. 1 (1970), p. 131-139, report evidence of anticlinal movements within the history of man in the south Mesopotamian plain. (Ancient irrigation channels, essentially level when in use, are now bowed upward.)

It is also significant that down-warping in the Persian Gulf due to continental separation may substantiate Lees' and Falcon's 1952 theory that the head of the Gulf has, since well beyond early Sumerian times, been pretty much where it is now. G. M. Lees and N. L. Falcon, Geographical Journal, Vol. 118 (1952), p. 24. In addition to the theory of plate tectonics substantiating Lees' and Falcon's theory, Berry's article (ibid.) also backs it up. In essence, Lees' and Falcon's theory can now be accepted as most likely valid.

[29]N. M. Shukri, et al., Bulletin Institute d Egypte, No. 37, Vol. 2 (1956), p. 395. See also M. Abdul-Gawad, Bulletin of the American Association of Petroleum Geologists, Vol. 53, No. 7 (1969), p. 1466.

[30]E. Anati, Palestine Before the Hebrews (London: Jonathan Cape, 1963), p. 139 points out that by the beginning of the Mesolithic men began to colonize small off-shore islands, proof that boats of some sort were by then being utilized. Islands such as those off the Atlantic coast of France, Sicily, Scandinavia, and elsewhere were being reached for the first time. Groups also at this time came to the British Isles. Major barriers such as the Straits of Gibraltar and the Red Sea no longer put limitations on human movement.

It should also be realized, in dealing with ancient population movements, that incentive plays a very large role. For example, while no actual physical barrier may have existed between Syria-Palestine and the Nile Valley, there may simply have been no incentive for significant population movement between the areas in prehistoric times. Conversely, if incentive for movement across the Red Sea from Arabia into the Nile Valley was strong enough, the physical barrier of the Red Sea may have been readily overcome. This may, in fact, have been the case. Climatic change (desiccation) would have been the incentive.

[31] Cambridge Ancient History, Vol. I, Ch. II (Fascicle No. 33), (Cambridge: University Press, 1965), p. 30.

II. PALEOCLIMATE AND PALEOGEOGRAPHY

The effects of climate upon man can hardly be overstressed. Several direct quotes and general comments illustrating the profound relationship between culture and climate are therefore perhaps appropriate to begin this chapter. Harlow Shapley, Harvard astronomer, states:

> Next to the genes and chromosomes, and the mysterious and perhaps non-existent 'life essence,' climate is the major factor in organic evolution It is the prime factor also in demography, for the spread and tribulations of the races and nations of men are directly dependent on the climatic environment. Our cultures and civilizations are tied closely to climate and its vagaries.[1]

P. B. Sears, in the same volume, writes: "The most cursory knowledge of such traits as the use of fire, clothing, shelter, and diet makes it clear that climate is an implicit function of the process we call culture."[2]

Indeed, no plant or animal species can transgress very far outside its accustomed climatic belt, unless it undergoes evolution and adaptation into another form. The exception is man and the few animals who follow him and depend on him for sustenance.

This fact does not mean that man possesses any special physiological adaptation that places him biologically over and above his fellow animals. It means, rather, that by that process which is called "culture" and is unique to man alone, he can break his physiological barriers and mitigate the effects of climate to a large extent. By developing and adapting amenities such as clothing, shelter, tool making, irrigation, etc., this has been accomplished. This breakthrough began when the first primitive man chipped a few flakes from a pebble to use as a tool and culminates today in man's rocket trips to the moon. Thus, along the way, man's shackles to climate have progressively loosened as his culture has advanced.

When we consider the tremendous acceleration of the development of culture that took place after about 3000 B. C., we must realize that until approximately that time man was still to a very great degree shackled to the whims and vagaries of the climate. Nor is he, indeed, even in modern times, completely free. A close analogy to the still profound effect of climate on modern man and population movement is found in the "dust bowls" of the American Middle West in the 1920's and 1930's, when a prolonged dry period caused desiccation and erosion of large tracts of farm and grass lands. The "Okie" movements into California were one result. This population movement, in fact, is an excellent parallel to desert nomadic movements in ancient times from the interior of Arabia toward the "Fertile Crescent."

With these remarks about climate and its relationship to culture, the following pages are devoted to a systematic proof of the effect of climate change in the area under study.

The evidence for paleoclimate in North Africa, including Egypt and the Nile Valley, has been dealt with at considerable length and in detail by Butzer in a number of publications. Other scholars have also discussed it, as it related to their particular areas of work.[3] As pointed out above, for purposes of this thesis the North African-Arabian geographic belt (or Saharo-Arabian climatic belt) can be treated as more or less homogeneous unit, since similar cause and effect factors of paleoclimate, due to similarity in latitude, elevation, topography, and geographic proximity, can be assumed. It should, therefore, be possible to discover analogous finds in Arabia to correspond with the relatively abundant published data from North Africa. The lines of evidence available for analysis of paleoclimate fall easily under the categories: (1) geological; (2) faunal and floral; (3) archaeological; and (4) historical. The last two categories may be considered partially interconnected and complementary.

Before discussing lines of evidence for climate change, one point should be made. It must be kept in mind that man's actions to a considerable extent have affected floral and faunal data as evidence for climate change. During the Paleolithic, well into the post-Paleolithic, and until about the beginning of the Neolithic "revolution", man may be considered primarily as another animal in the complex ecology of flora and fauna. As noted already, however, his acquisition of cultural accoutrements changed this, especially when he began to develope agriculture and animal husbandry. The former biological balance was upset and man then became a separate factor outside the natural ecological system.

Natural vegetation and soils began to suffer at the hands of man. Forests began to be denuded and give way to scrub land through the activity of fuel and building-wood gatherers and browsing goats, camels and sheep. Grasslands were overgrazed and plowed. The same sort of exploitation took place in the faunal system, as various animals were hunted to extinction and food chains drastically upset. For example the dying out of the ostrich in Arabia has, without doubt, been hastened considerably by man (for references see Field, 1952 and 1958). Extinction of the oryx and gazelle is certainly being hastened by a few hundred years by hunting activities. We must keep in mind, therefore, that while floral and faunal changes are still basically determined and significant guides to climatic change, man has affected them considerably.

The first category, geological evidence, can be considered the best evidence available. There can be little reasonable doubt that it is not affected by activities of man, except in very local cases, for example, where deforestation and consequent denudation of the soil cover may have resulted in soil erosion. Generally, the natural forces behind geological processes are of regional rather than local kind, and thus on too large and too wide a scale to be affected by man. Man does not affect the geological agent of weather; rather the opposite, as we have seen above.[4]

The geologic features (sediments and landforms), the various agents responsible for them, and the paleoclimate data that can be deduced from such evidence are discussed under the specific heading of: wadis, gravel systems, aeolian sands, sabkhas, lacustrine beds, and gypsum and sandy limestone deposits for Arabia. The analogous and related data from North Africa and Egypt are presented in more general, uncategorized form.

Wadis.[5] These are best defined as dry stream beds, no longer, or in some cases only briefly locally and intermittently, subjected to the flow of water. In other words, they represent ancient rivers and streams, now existing in "fossil" form. They are thus geomorphic features of past water erosion, common to present day arid topography. There are three main large wadis and numerous smaller ones, with subsidiary tributary systems, that once served to drain rainfall and overflow from the interior of the Arabian Peninsula within the history of man's occupation of the area. These three main wadis are the Batin-Rumah, Sahba, and Dawasir — all of which show clearly an approximate west-east and northeast trending drainage pattern into the Persian Gulf area.[6]

Wadi Sahba, trending almost due west-east, served to drain the approximate central portion of the Arabian Peninsula, and debouched into the Persian Gulf a little below the base of the Qatar Peninsula. Wadi Batin-Rumah, the largest and longest, trends more northerly, and in ancient times debouched into the Mesopotamian plain a short distance north of the Persian Gulf.

Wadi Dawasir, to the south, cannot be traced beyond the Rub' al-Khali, where it is masked by aeolian sands of that great desert. Without doubt Wadi Dawasir also originally drained into the Persian Gulf, perhaps turning more northerly, whence it presently breaches the Jabal Tuwayq scarp, and possibly confluescing with Sahba, or flowing into the Gulf in the Trucial area. Most of Wadi Dawasir's ancient system and a great deal of Sahba's is presently covered by the deposition of aeolian sands brought on by arid climate.

The covering sands furnish proof that the wadi systems underneath are older. These wadi systems are extensive, and with their numerous subsidiary tributaries impose on the peninsula a dendritic pattern of drainage, such as can now be observed in geographic areas elsewhere that presently enjoy humid climates. While the larger Wadis Sahba and Dawasir continued on across the Rub' al-Khali Basin and eventually emptied into the Persian Gulf, a considerable number of smaller ones (draining smaller areas, many from back slopes of the Jabal Tuwayq scarp) seem to have terminated in the Rub al-Khali or confluesced with the larger ones.

With drainage into the Rub' al-Khali from the back slopes of the Hadhramaut and Dhofar Mountains on the south fringe of the peninsula, drainage from the back slopes of the Oman Mountains on the eastern fringe, and drainage from the west fringing Red Sea Hills and Jabal Tuwayq scarp, it is easy to visualize the Rub' al-Khali area as once an extraordinarily well-watered basin, instead of the formidable and almost totally barren sand desert it is today. With drainage from three sides, only the opening to the Persian Gulf to the north, in fact, kept

it from becoming a huge inland lake. Thus well-watered and well-drained, the presently so-called "Empty Quarter" was probably anything but that and no doubt more than adequately supported the human and animal population that the abundance of flint tools seems to indicate.[7]

For indication of the wadi system discussed above and the drainage system into the Rub' al-Khali (Fig. 2); this is a map of the Arabian Peninsula, showing the various major geographic and geologic features discussed in this thesis.

It would be very difficult, even with detailed study and firmer age dating, to assign quantitative data to the amount of the run-off water these ancient river systems conveyed. Butzer, and others, have been able, with fair certainty, to assign similar ancient drainage systems in Africa and Egypt to definite specific pluvial cycles of the interglacial periods of the Pleistocene. Without doubt, the wadi systems of the Arabian Peninsula are due to the same climatic factors. They are probably thus datable to the Pleistocene pluvial periods, and it is obvious from the extent, width, and extensive tributary system that the amount of water they transported and distributed as run-off and ground recharge was large.[8]

Terrace and gravel deposits traced along these wadi systems accompanied by systematic searching could possibly yield Stone Age artifacts in stratigraphic context, for certainly these ancient rivers and streams were frequented by prehistoric man in Arabia.

Were the Nile River to cease flow and dry up tomorrow, it would henceforth be called Wadi Nile. Fortunately, its headwaters rise far away in a climatic zone completely different (wet) from that through which most of it flows. This is not the case for Arabia where the climate throughout the peninsula is arid. A glance at a geologic map of the Nile Valley indicates that there are numerous wadis leading in from the Western and Eastern Deserts into the Nile Valley. These wadis once fed runoff water from these areas. However, now there is no single, subsidiary drainage into the Nile throughout its long journey for almost 1000 miles, well beyond the borders of Nubia. It must be assumed that these ancient Nile tributaries from what is now desert were products of the same climatic factors as the wadi systems of Arabia and were essentially contemporaneous with them.

Gravel Systems. Small scattered patches of late Tertiary gravel occur at: Wadi Nayyal, vicinity of Unayzah, north of Dawadami, in and near Wadi Sahba at places, in Ad Dahna 40 km. south of Wadi Sahba, and at latitude 23°N., Longitude 47°E. These gravels, usually in trains and patches on upland surfaces, except for those in the vicinity of Wadi Sahba, have not been studied to any extent. They are, however, without doubt, associated with early Quaternary water runoff, probably Pleistocene, but also perhaps in part very late Tertiary (Pliocene). Those associated with Wadi Sahba increase in prominence from west to east, and no doubt represent an old major drainage channel. It is likely that the Wadi Sahba structural trough (graben) was the path by which the old river crossed the present area of the Al Aramah escarpment. Elsewhere, channel gravels seem to be associated with freshwater deposits of the late Pliocene Kharj Formation. If the

Kharj deposit represents lacustrine beds, as is possible, the associated channel gravels and fans may be the result of streams that discharged overflow from the lakes. These deposits are of interest in that, although they may in part predate man in the peninsula, they represent a drainage regime that could well still have been in existence after man arrived.

Two outcrops of terrace gravel, definitely datable to the Quaternary, occur in the botton of Wadi Batin, sixty and ninety km. northeast of the Trans-Arabian Pipeline (Tapline), and in Wadi Sahba between meridians 47° and 48°. They are deposits obviously related to post-Pleistocene drainage.

A large, broad, flat sheet-gravel blanket, known as Ad Dibdibba plain, extends from south of Tapline into Iraq and Kuwait. This sheet is the residue of a vast water transported flood of rock debris derived from the basement complex far to the west and funneling out through the Wadi Batin-Rumah channel system. Another smaller gravel sheet, the As Sahn plain (about Latitude 31°N. and Longitude 43° E.), includes basalt pebbles probably water transported from the Harrat ar-Rajil lava field to the northwest in Jordan.

Large, coalescing, fan-delta-like surfaces of outwash gravel emanate from the Wadi Sahba-Wadi Dawasir-Wadi Najran drainage systems. Present distribution of exposures shows that, prior to formation of the Rub' al-Khali and Al Jafurah sand deserts, a vast part of the area now covered by these windblown sands, generally west of the 51st meridian, was blanketed by coarse rock debris pouring out from these channels. Run-off from these large wadi systems is almost negligible today, due to present sparse rainfall. To have distributed such coarse debris as far away as evidenced, past Pleistocene rainfall must have been very substantial, load, velocity and transport factors being considered. With the aeolian sand cover of the Rub' al-Khali superimposed on this gravel system, it seems evident that the gravels represent Pleistocene pluvial periods, while the sands represent Holocene (i. e., post-Pleistocene and post-Paleolithic) desiccation.

The gravels are indicated as Qg on the geologic map.

Sabkhas[9]. These are saline flats that probably result from aeolian sand and silt infilling topographic lows, which then draws up groundwater due to capillary action; this is then evaporated by aridity to form salt crusts. They occur mostly in a narrow belt (about 60 km. wide) along the littoral from Kuwait to Qatar, and along the Trucial Coast. Two of the largest, Matti and Salamiyah, occur in the Trucial area. Sabkhat Matti extends some approximate 100 km. in from the present coast, probably representing a former shallow marine embayment. A third large and prominent sabkha, Umm as Samim, is considerably inland, on the eastern edge of the Rub'al-Khali. It received drainage from the back slopes of the Oman Mountains, and there is no valid reason to assume it was not, in fact, a large inland lake in Pleistocene (and early Holocene) times when rainfall doubtlessly exceeded evaporation. Another large sabkha occurs far inland in the northeastern corner of (Saudi) Arabia in the broad depression known as the Wadi Sirhan. Other smaller inland sabkhas occur scattered over the eastern half of the peninsula. These sabkhas seem to be definite products of aridity and

are quite likely of the post-Pleistocene more probably late post-Pleistocene.[10] Those in the littoral areas represent former estuarine and/or shallow marine environment of probable Pleistocene time. Those farther inland probably represent ancient lakes and ponds that, like the other lakes discussed below, doubtlessly continued in existence as bodies of standing water well into the Holocene, becoming eventually sabkha with increasing desiccation and excessive evaporation. There is, in fact, evidence that some have become sabkha well within historic times.[11]

Aeolian Sands. These are the sand bodies that make up the Rub' al-Khali to the south, the Great Nafud to the north, and subsidiary bodies of sand in between. This extensive sand blanket, one of the largest continuous sand bodies in the world, covers nearly 600,000 square miles and is the product of dry wind transportation, still very active today.[12] This sand system ranges in type from undulating sand sheets and discontinuous patches, wind-oriented barchan dunes, ridges, and long, narrow, sharp, crested dunes, to large sand massifs cresting 30-300 m. above the surface. These last forms are so massive and large that they are called "sand mountains." Since this wind-transported sand system is superimposed on the apparently more ancient water transported gravel and wadi regimes, it is probably Holocene in age.[13] Gravel-floored hollows and "valleys" in between these sand masses of dune, ridge, and sand mountain often contain Stone Age artifacts, mute and stark testimony to ancient man's losing battle with the forces of nature, and climate in particular, in Arabia.

These sands are indicated as Qe on the peninsular geologic map.

Lacustrine (lake) Beds. These have been dealt with generally in Chapter I. They are usually composed of fine quartz sand, clay, and silt that is often fossiliferous with freshwater mollusc shells and ostracod carapaces. These lakes continued perhaps well into the Holocene, eventually drying up after the rest of the great drainage system of running water represented by the gravels and river systems ceased to feed them at the end of the Pleistocene. They were then finally covered by the encroaching windblown sands as desiccation progressively increased with the onset of the Holocene. It is likely that these lakes may have been the last refuge of the old Paleolithic hunters and gatherers and the sites where post-Paleolithic population began to settle.[14] They are indicated with the symbol Ql on the geological map of the peninsula. Their occurrence within the Rub' al-Khali and elsewhere is not completely known. Without doubt there are more.[15] Most likely, the sands of the Rub' al-Khali conceal many, for, as indicated above, this area would have had extensive natural drainage from three sides.[16]

Gypsum Deposits. Young (probably Holocene) bedded deposits of gypsum (calcium sulphate — the probable result of leaching from freshwater accumulation) occur in small patches at several locations, usually in contact with Miocene, Pliocene and Quaternary units. The largest of these is a 60 km. band occurring south from the Wadi Faw along the front of the Al Arid escarpment.

Here it is probably the result of leaching from the gypsum-bearing Sudair (Triassic-Permian) Formation in the face of the escarpment. The combination of gypsum derived from the Sudair and Quaternary gravel in assocation indicates possible water accumulation from what must have been considerable run-off from the foreslope of the main Jabal Tuwayq scarp. It is possible that these deposits, the product of evaporation due to aridity, represent the drying up during the post-Pleistocene of lake beds or similar continuous standing bodies of water superimposed on or near older evaporate-bearing formations.

Sandy Limestone Deposits. These units, somewhat minor in occurrence but nevertheless adding to the evidence for paleoclimate, consist of a discontinuous, thin mantle of freshwater deposited sandy limestones, with interbedded fragments of underlying rocks. Coarse, frosted sand grains and freshwater mollusca are usually present. They are mapped with the symbol Qd, and assigned to Quaternary undifferentiated. Since they represent water deposition of some sort, however, it is probable they are Pleistocene.

Analogous Evidence from North Africa and Egypt. As discussed above, the Nile fortunately has its headwater source far to the south in a humid climatic area. Even as it is, however, it is a mere remnant of its former self. Ancient river terraces have been traced at 300, 200, 150, 100, 50, 30, and 10 ft. above present level, each level indicating an old bed of the Nile, and the highest one representing approximately the beginning of the Pleistocene.[17] Traces of Paleolithic man, represented by flint tools, are found beginning with the 100 ft. terrace.[18] Paleolithic implements are also found in and along the terraces of the old wadi systems leading into the Nile from the Eastern and Western Deserts on either side.[19]

The Fayum (Faiyum) area to the southwest of Cairo and west of the Nile is a watered depression where evidence of numerous prehistoric cultures have been found, the most notable being Miss Gertrude Caton-Thompson's Fayum "A". Large lakes once existed in the depression, fed by rainfall drainage into it. These lakes were occasionally drained into by the Nile during excessively high flood periods, the old Hawara channel marking the connection. A system of contracting shorelines of the lake, each with its characteristic evidence of human occupation, attests to its successive shrinking with increasing aridity. The present Lake Karun in the Fayum is a small remnant, having been at one time some 180 ft. higher.[20]

Kharga Oasis, due west of Luxor in the Western Desert, furnishes another example of climatic change in the region of Egypt. Here also tools of ancient man have been found, some of them associated with gravel deposits lying along the beds of now bone-dry wadis. These wadis mark the flow system of ancient streams into this depression. Several tufa (spring) deposits mark two great pluvial periods at Kharga, according to Miss Caton-Thompson. The first occurred before the arrival of Paleolithic man and the second later. Between the two moist periods, there were apparent dry periods, the whole sequence, however, evolving in a continuum towards today's arid conditions.[21]

Kom Ombo sites of the Sebilian (i. e., Mesolithic) are grouped on rims of now dry water channels, and clearly represent encampments on shores of streams which were gradually shrinking during the Lower, Middle, and Upper Sebilian stages.[22]

Evidence from the Sahara desert is quite similar to that from the Arabian Desert, a fact not surprising if they are both indeed products of the same contemporaneous climatic environment. In the west, ancient watercourses are found in large number, many with tools of Stone Age man, in addition to fossil remains of aquatic animals, reptiles, and molluscs now long extinct.

In Kenya, about 10, 000 years ago, the level of Lake Rudolph was approximately 200 feet higher than today, and it once overflowed into the Nile. Then, like other Rift Valley lakes in the same general area, it shrank drastically, without doubt the result of drier climate altering the rainfall.[23]

Arkell observes that the Sudd depression in the Sudan is perhaps the last stage of an ancient "inland fresh water sea" (large lake), a situation similar to Lake Chad (Tchad).[24]

Fauna and Flora. The present-day fauna of Arabia is essentially African (Ethiopian), reminiscent of the savannah and grassland types of Africa, but surviving in an impoverished state today. It is evidently fast losing its ancient savannah aspect and trending toward more of a true desert type. The fauna was once more varied and abundant, well within the history of man on the peninsula, as indicated by depiction of various animals on rock drawings scattered throughout the peninsula (referred to in the Introduction). A number of these animals are not extant in the peninsula today. The ostrich, as previously mentioned, is a good example of a recently vanished species. It is often depicted in the rock drawings. (See Field, 1952 and 1958.) Its egg-shells, occasionally whole, are occasionally still to be found scattered in the desert. The long-horned cattle (Bos primigenius), also depicted frequently, no longer survive in Arabia — even modern domestic cattle are maintained with extreme difficulty (except in the southern littoral area of Dhofar where the fringe of the southwest monsoon rains affords enough grassland to support cattle breeding). Fat-tailed sheep are often found in the drawings, and must have occurred in the wild state at one time, since they are occasionally depicted with spears sticking into them — evidence that they must at one time have been hunted. (Anati suggests that this animal may have been domesticated in Arabia — see pertinent reference in Chapter III.) Several scenes depict what appear to be camel hunts, indicating that this animal existed in the wild state.[25] Field has indicated that the lion is represented in one series of drawings, and Anati identifies several such depicitions.[26] Other drawings of lions are mentioned by Winnett and Reed.[27] Various other horned animals, other than the oryx and gazelle, also seem to have been depicted in rock drawings. The oryx and gazelle exist today in diminishing numbers, representing the last remnants of a savannah-scrub-grassland fauna.

Actual fossil evidence is meagre so far, but informative. Material available to date has been largely found by chance in the process of geological mapping. Fossil bone material collected from a lake bed site in the southwest

Rub' al-Khali has been paleontologically age dated to "probably late Pleistocene to early Recent" — in absolute terms and very round figures, about 20,000 to 8,000 or 9,000 B.C. Identifications made are: (1) Equus cf. E. hemionus, the Asiatic wild ass - also called hemione or half-ass; (2) Bos cf. B. primigenius, a large bovid, quite possibly the same as the long-horned cow of the rock drawings; (3) a bovid smaller than B. primigenius; (4) a small antelope (?); (5) an unidentified ungulate; (6) Gazella sp.; (7) Hippopotamus antiquus (?); and (8) Bubalus, a water buffalo. G. G. Simpson of Harvard, wrote that:

> The large bovid suggests a somewhat wetter climate and therefore pluvial Pleistocene, although comparable forms are reported from Mesopotamia at least as late as the 9th century B.C. The hippopotamus and water buffalo....would indicate the same, even more strongly. They are also reported as early historic in Mesopotamia, but with considerable doubt as regards the hippopotamus...The wild ass, gazelle, and other doubtful antelopes do not necessarily indicate any marked difference from present conditions. Wild asses occurred in this general region as late as the 19th century A.D.[28]

It is interesting to record that the water buffalo and hippopotamus do not appear in any of the so far known rock drawings. It seems likely that they may have become extinct sometime before man began to depict them. If the drawings are the product of post-Paleolithic man (as they most likely are), it seems a fair assumption that the water buffalo and hippopotamus died off at the approximate end of the Pleistocene, whereas the long-horned cattle, a grass-grazer requiring much less water, lived on until perhaps a little into the first millennium. Rock drawings of a similar nature in Africa date from a possible 8000 B.C. Furthermore, the water buffalo and hippopotamus, as well as the giraffe and elephant, all appear in the North African drawings. Although the fossil bones of only Bubalus (water buffalo) and hippopotamus, out of this group of animals, have been found in Arabia, it also seems possible that the elephant and giraffe existed during at least part of the Pleistocene, perhaps dying off sooner since they would require a somewhat more lush habitat. Lack of depiction of all these animals is fair evidence that the Arabian material may well be post-Pleistocene, hence also helping date the North African drawings. The apparent lack of these animals could perhaps also be taken as evidence for earlier and/or perhaps more arid conditions than in Africa.

The late Mesopotamian occurrences of the animals mentioned by Simpson may represent hold overs from an original indigenous Pleistocene occurrence, or they may represent remnants driven to the north from Arabia by desiccation just as man.

Very little can be said regarding flora. There is evidence that can be inferred, however, from the fauna mentioned above. Large bovids, for example, require grasslands, which are not extensive at all in the peninsula today, although gazelle and oryx, grass-grazers also, still subsist (but barely) on the most meagre of grass patches still to be found in scattered areas. There is little doubt that a fairly lush vegetation existed in Arabia during the rainfall periods of the Pleistocene.

Present flora is a typical desert and low scrub-savannah type that need not be detailed herein. In general, it is very similar to the flora of East Africa and the North African desert. The ubiquitous acacia tree, for example, is as typical of the western portion of Arabia as it is of East Africa.

Fauna and Flora Evidence from Egypt and North Africa. Libya, during the Middle and Upper Pleistocene, harbored Bos primigenius, Hystrix cristata (porcupine), Equus caballus (?), Cervus sp., Rhinoceros, E. usinus, Capra sp. and an antelope. Paleolithic blade tools are associated with them.[29]

In the Nile Valley, from the Pleistocene, Hippopotamus, Felis leo, Bubalus, and Equus sivalensis occur in Sebilian beds from Kom Ombo, while Equus sivalensis, Cervus sp., and Bos sivalensis (smaller than B. primigenius) occur in Wadi Halfa.[30]

From the Fayum, probably Neolithic, Caton-Thompson and Gardner record: Hippopotamus amphibius, Elephas africanus, Bubalus lelivel, and Oryctolagus cuniculus.[31] It should be kept in mind, however, that the Nile Valley would probably have represented a sort of microenvironment to which animals would have migrated when adverse conditions set in — just as man did, himself.

Small pockets of the central Sahara were reported, as late as the last few centuries, to have contained a fauna (quickly killed off when discovered by man) of crocodile, elephant, rhinoceros, hippopotamus and giraffe.[32]

Although a little out of the general area under consideration, data from Palestine is worthy of mention. Pleistocene deposits there have yielded: Hipparion (a distant relative of the horse), Elephas, Stegodon, Hippopotamus, Bos sp., Bison priscus, and Ursus arctos.[33] Of some thirty species recorded from Mt. Carmel in Natufian times, seven are now extinct in the area. The Natufian fauna includes twelve species that prefer or require a forest environment (squirrel, wild pig, red deer, fallow deer) compared with nine species that need open country and drier conditions (gazelle, onager, horse, rodent, mole). Both woodland and open country therefore were available at the time, and from the larger number of woodlands forms, the forest element was larger than the steppe. However, more individual specimens were steppe, there being 2000 specimens of gazelle vs. eighty-eight for the greatest number of any other species. The steppe therefore was prominent. According to Zeuner, it thus appears that in Natufian times, open grassland had begun to replace forests of the last pluvial of the Pleistocene.[34]

Winkler's study of the rock drawings associated with the deserts to the east and west of the Nile affords a breakdown of the faunal sequence as follows:

(1) Naqada I and earlier (to about 3600 B. C.): The "Earliest Hunters" and the "Early Oasis Dwellers" in both the Libyan and Eastern deserts depicted a multitude of giraffe, elephant, and ostrich.

(2) Naqada II (3600-2850 B. C.): The giraffe and elephant are scarce in the drawings of the "Early Nile Dwellers" and the "Autochthonous Mountain Dwellers."

(3) Dynastic period (2850-332 B. C.): Giraffe, elephant and ostrich no longer depicted, the attention of artists being limited to the array of gazelles, antelopes, ibex and domesticated species. Lions first cease to be drawn during the Arab period, after the seventh century A. D. with certainty. Gazelles, antelopes, and ibex can exist on very sparse grass, as do gazelle and oryx in Arabia today.[35]

A quote from Butzer best sums up the data from Egypt:

> The occurrence of the giraffe, elephant, and ostrich in the Libyan and Eastern Deserts can only presuppose a more luxurient vegetation and a somewhat greater precipitation, as all three favor a savannah or parkland and avoid drier steppes. As they are further difficult to hunt, we can assume they were not exterminated by man at this early period, leaving only the possibility of a climatic explanation. One could suppose the rainfall declined a little during the 4th millennium, and again very sharply about the time of the first dynasty about 2850 B. C. This last is born out by the lack of native elephants, giraffes, and ostrich on Egyptian documents after the generous development of tomb reliefs begin with Snĕfru about 2600 B. C. Elephants in particular appear very frequently on slate palettes. . . . and ivory pieces dating from shortly before the historical unification of Egypt under Menes. . . . There appear to be good indications of a certain decimation of the remaining local fauna between the end of the 5th and beginning of the 12th dynasties (c. 2350-1990 B. C.). Today, with the exception of an odd ibex or a few gazelle in the remotest areas, Egypt is almost devoid of game animals. Nor would the vegetation outside the riverine environment be capable of supporting the great variety of antelopes, gazelles, ibex, and deer appearing in the Old Kingdom tombs at Gizeh, Sakkarah, Medum and Abusir.[36]

Frankfort points out that hunting methods prove different types of landscape could be found as late as the New Kingdom (1400 B. C.) when Barbary sheep, wild oxen and asses, and a wide variety of antelope with their attendant

carnivores could be found. He points out that sometimes rows of beaters are shown driving game toward the hunter or into nets, a method possible only in areas somewhat thickly wooded. At other times, lassos are in use, which presuppose pampa-like open spaces with low shrub.[37]

Evidence based on floral data is, as in the case of Arabia, difficult to assess. It must be supposed, as Frankfort points out above, that vegetation of varying degrees of lushness supported the animal populations. Specifically, however, such things as large tree trunks from Badarian times and sites, and fig trees (Ficus, 3 species) from the Pleistocene of Kharga may be mentioned.[38] Various authors have theorized about the "lush vegetation" that must have existed along the early Nile River.

The above presentation of paleoclimate data based on flora and fauna is rather general, considering the fact that a large amount of detailed work has been done in the area by workers such as Butzer, Huzayyin, Caton-Thompson, Bate, and Garrod. That presented here, however, is considered sufficient to make the point that the effect and nature of climate change can be readily demonstrated by such evidence.

A few general remarks are appropriate regarding more indirect and implied evidence in the form of archaeology and history. These two categories may be considered together here in the sense that it is difficult to separate one from the other when dealing with strict Prehistory or even Protohistory. First and foremost, and perhaps really the most obvious evidence of this nature, are the Stone Age implements scattered about the Arabian and North African Deserts. Quite obviously, ancient man, with nothing comparable to modern cultural equipment, lived, and we may assume from the evidence, thrived in these areas. Quite equally obvious, the game animals he hunted, the food he gathered, and the vegetation upon which the game animals subsisted also flourished. This we may take as archaeological evidence. The fact that these populations cease to exist over a period of time, due, as we have seen, to climatic change probably starting about the end of Pleistocene times, can be taken as historical fact.[39]

Another line of historical evidence (properly speaking) comes from examination of population movements in Southwest Asia. There appears to be a direction of movement constantly repeated and recorded throughout the centuries since recorded history began in the Near East (and we may assume long before it began). This is the movement from an approximate center somewhere to the south of the Fertile Crescent. Apparent movements have been from both east and west at various times (which has confused the issue considerably), but it is logical to assume an original south impetus for this radiation pattern.[40] The projected center of this radiation is the Arabian Peninsula. It is further logical to conclude that climatic factors have been the driving force behind these movements. Mesopotamian, Hebrew, Syrian, and Egyptian historical sources back up this evidence of periodic incursions into the Fertile Crescent of what are apparently desert nomad populations. Examples are references to the Amorites

in Mesopotamian sources, who seem to come in from North Syria, and various Egyptian accounts of incursions by nomadic, desert-type peoples apparently coming in from Sinai. It seems clear that the main line of movement is from the desert area bordering the Fertile Crescent and that it may be a cyclic one of absorption and settling down — whether by war or simple assimilation — of desert-dwellers, after which the whole process begins eventually again.[41]

It is perhaps appropriate here, before ending this Chapter on paleoclimate, to speculate on the possible role of the Arabian Peninsula in the so-called "Neolithic revolution." It seems likely that the Arabian Peninsula never took part in the "revolution" in the strict sense. There is no indication that real agriculture was ever practiced, or that any phase such as incipient farming, village farming, towns, etc., ever existed.[42] Again, the factor involved is probably climate. It is probable that in general the population of the peninsula in Paleolithic times, when plants flourished and game abounded, were hunters and gatherers, and perhaps fishermen in the littoral areas. Post-Paleolithic populations were probably herders of a nomadic type, just as they basically are today.[43] This same pattern can be seen in North Africa, and again can be attributed to climatic factors that did not allow agriculture and settled life to develop. It is therefore unlikely that archaeological remains of village sites, architectural remains, etc., will ever be found.[44] It is interesting to note that, outside the Nile Valley and littoral areas, there are so far no known Neolithic or Mesolithic village sites in present day desert areas of North Africa, without doubt for the very same reason there are none in Arabia. Thus, while it is unlikely that the Arabian Peninsula was able to take physical part in the "Neolithic revolution" because of climatic limitations, there is no reason to assume ignorance of Arabian populations about the various innovations of the "revolution." There is, in fact, some reason to believe that Arabia may have been the route through which ideas were transmitted from Mesopotamia into the Nile Valley.

A very important aspect of the paleoclimate of the area under consideration is appropriate here. As seems fairly obvious, we can state, in general terms, as follows: The pluvial periods of the Pleistocene afforded an abundant flora and fauna upon which Paleolithic man as a hunter and gatherer was amply able to subsist. With the close of the Pleistocene arid conditions set in, and a climatic <u>continuum</u>, characterized by progressively increasing aridity, began and lasts to the present. This continuum, however, has not been a steady increase from moist to dry by any means. For if one single constant factor can be attributed to climate, it is that of fluctuation. In the continuum since the close of the Pleistocene, therefore, fluctuation and reversals in the broad trend toward aridity have quite obviously occurred from time to time, some on a small, local scale, difficult to identify, and others on a broader regional scale, easier to identify. These fluctuations might best be considered as <u>temporary respites</u> or <u>relief</u>. Such a cycle, or reversal, has been defined by Butzer and Huzayyin as occurring between about 5500 B. C. and 2500 B. C.

Butzer has investigated data quite thoroughly in arriving at this evidence, which he calls the "Neolithic moist (or wet) phase."[45] It should be pointed out here that it is extremely difficult to arrive at quantitative data when dealing with paleoclimate. Thus, the term "Neolithic moist (or wet) phase" is strictly relative, not meant to imply any particular quantity of rainfall at all. The implication is simply that, relative to the period preceeding it, it was more moist.

When all the above presented data documenting climate change is considered, digested, and rough ends rounded off, the evidence for paleoclimate in the Saharo-Arabian climate and geographic belt can be generalized in the following terms: The climate sequence, beginning within the late Pleistocene, consisted of: (1) a wet phase from about 20,000 to 10,000 B. C.; (2) a dry phase from about 10,000 to 5,500 B. C.; (3) a wet phase from about 5,500 to 2,500 B. C. (though nothing like the Pleistocene wet phase); and (4) a dry phase from about 2,500 B. C., or somewhat earlier, to the present.[46] Fig. 3 presents this paleoclimate data in general graphic representation.[47]

FOOTNOTES

[1]Climatic Change (Cambridge: Harvard University Press, 1953), p. v.

[2]Ibid., p. 35.

[3]Huzayyin, Caton-Thompson, Arkell, Zeuner, for example.

[4]A few investigators would argue whether there has been any significant climate change in the area at all since the approximate end of the Pleistocene. R. L. Raikes, a hydrologist, in Water, Weather and Prehistory, claims the change is more apparent than real, for example, and conversely almost totally ignores the overwhelming geological evidence. Geologists and paleogeographers, however, who are the most competent investigators of paleoclimate, are generally agreed that there has been a significant change (though they often differ in detail and interpretation of the evidence). (See above, Ch. I, footnote 11.)

[5]Arabic singular wādi, plural widyān.

[6]The Arabian Peninsula is gently tilted toward the northeast. The trend of the wadi regime basically reflects this tilt.

[7]This situation may well justify another look at a discarded turn-of-the-century theory proposed by I. Guidi, cited by S. Moscati, The Semites in Ancient History (Cardiff: University of Wales Press, 1959), p. 31, footnote 35. This theory, based on lexical analysis, was that the Semites must have lived together in an original land of rivers and no mountains. It was subsequently disputed and discarded on the grounds of inadequate comparative lexical material and insecurity of conclusions based on negative rather than positive data. Moscati comments that: "Nowadays, thanks to our greatly increased and

perfected knowledge of the Semitic lexicon, the investigation might be undertaken once more, and lead to significant discoveries." Should the Arabian Desert be, after all, the Semitic "homeland", and should it have been, as the evidence seems to indicate, a well-watered area (of no mountains), Guidi's 1879 theory may not, after all, be so far fetched as it then seemed! (See Ch. II, footnote 16, for further pertinent information regarding this subject.)

[8]Good evidence for Pleistocene rainfall in Arabia is, in fact, afforded by a series of radiocarbon dates for deep artesian acquifers in the sedimentary rocks of the approximate central area. Water in these acquifers ranges in ages between about 20,000 and 25,000 years and something over 33,000 years. The authors of this investigation conclude that rainfall associated with pluvials of the last glacial stage, the Wisconsin (Würm), charged these acquifers, several of which are prolific producers. L. Thatcher, et al., Science, Vol. 134, No. 3472 (1961), p. 105. It is highly likely that the present wadi regime of Arabia was carved out in its present basic form in this final pluvial period of the Pleistocene.

[9]Arabic singular sabkha, plural sibakh.

[10]D. J. J. Kinsman, in a study of Trucial Coast sabkhas (including Matti), finds evidence, based on radiocarbon dating, that sabkha formation began about 2000-3000 years B.C. The American Association of Petroleum Geologists Bulletin, Vol. 52, No. 10 (1968), p. 2071. This absolute dating for the beginning of sabkha formation is extremely important because of the valuable information it affords us on the paleoclimate of Arabia and other phenomena that can be possibly tied to it. We might well assume, for example, that such hyperaridity as would cause sabkha formation would probably likewise permit wide scale, dry, aeolian sand deposition at the same time. Thus, a more precise date for the formation of the extensive Arabian desert sand cover (and probably by analogy, the Saharan desert) is afforded. In like manner, a possible substantiating terminal date for the approximate end of Butzer's "Neolithic wet phase" is also suggested. Implied also is a possible impetus for population movements out of the Arabian Peninsula and into the Fertile Crescent. For further information on sabkha formation, see Kinsman, Second Symposium on Salt, Vol. 1, (Cleveland: Northern Ohio Geological Society, 1966), p. 302.

[11]Bibby, Looking for Dilmun, p. 316 and 320, reporting on a Hellenistic site, Thāj, located some 75 km. inland in eastern Arabia, states it is near a large sabkha, which, "when Thaj was a living city, must have been a living lake," otherwise there is no reason at all for the city (rather prosperous) to have been there.

[12]Much of the once extensive date garden area of the Qatif Oasis, near Dhahran, is today in visible process of being choked by encroaching windblown sands.

[13]As noted above (footnote 10), by analogy with Kinsman's sabkha dating, this sand is more likely late Holocene. The exact provenance of this sand system is not known. However, a good hypothesis is that it probably represents cyclic reworking and redistribution of what, during the Pleistocene when pluvial periods fed the great river and stream (wadi) regime of Arabia, must have been a vast veneer of water-transported sand, silt, and gravel over much of the peninsula. The original source of the material would have been the various extensive sandstone formation outcrops (ranging from Cambrian to Cretaceous) which much of the wadi system traversed. The cobbles and pebbles of the various present-day gravel plains and sheets of Arabia then represent the heavier residue of this deposit left in place, the lighter components of silt and sand being reworded and retransported by the prevailing (dry) wind system to form the present distribution of sand dunes, sheets, and massifs. (A quite similar set of circumstances very likely also accounts for the aeolian sand of the North African desert.)

[14]A number of them have associated artifacts. If these lake beds were, in fact, the last refuge of Paleolithic man, such artifacts might perhaps represent terminal Paleolithic to early Mesolithic or Neolithic. A relative chronological key to the flint tool series in Arabia might thus be afforded should this be the case. A systematic search, based on such a premise, might be rewarding.

[15]Refer back to p. 6 for one recently reported, and previously unmapped as a lake bed site. H. St. J. Philby, The Empty Quarter (London: Constable and Co., Ltd., 1933), p. 138-42, records several more.

[16]Indeed, it is possible that such a situation may be reflected in the place name of Abū Bahr for an area on the edge of the Rub' al-Khali located to the east of the southern Jabal Tuwayq scarp. This word implying a place of standing water, may reflect a period (at least as late as the presence of local Semitic-speaking populations) when such water occurred prominently in the area. It consists of an expanse of Quaternary gravel sheets and trains, now partially covered by aeolian sand, that may have represented spill or run-off from the Wadis Dawasir, Magran, and Jadwal-Ghayl on their routes into the Rub' al-Khali basin and the Persian Gulf. A possible substantiating clue to the antiquity of Semites in the interior of the peninsula is afforded by this place-name. While it is very difficult to assign absolute dates to geologic events, it is interesting to speculate that the process of: (1) cessation of wadi flow; (2) successive drying up of remaining bodies of standing water; and (3) commencement of aeolian sand deposition and sabkha formation, had taken place probably well before the middle

of the 3rd millennium B. C. (Kinsman's above-mentioned dates for sabkha formation and possibly analogous dates for beginning of sand deposition serve as substantiating data for the last stage of this process.) Such really being the case, evidence might be afforded for placing Semitic-speaking people in the area at least before the 3rd millennium.

Abu Bahr is one example of intriguing place-names. The series of geologic maps, referred to in Ch. I, footnote 20, contains a potential wealth of documentation (not previously available) on place-names in the Arabian Peninsula. Analysis of these names could possibly be a very significant and informative contribution to the field of Semitic studies, origins in particular.

[17]W. A. Fairservis, Jr., The Ancient Kingdoms of the Nile (New York: Mentor Books, 1962), p. 43-45.

[18]The 100 ft. level contains early Acheulian artifacts, the 50 ft. level late Acheulian, the 30 ft. early Mousterian, the 10 foot late Mousterian. The silts of the Nile Valley floor then contain the post-Paleolithic artifacts.

[19]A recent important survey of the Nile Valley Paleolithic industry is Fred Wendorf et al., "Egyptian Prehistory: some new concepts," Science, Vol. 169, No. 3951 (1970), p. 1161.

[20]G. Caton-Thompson and E. W. Gardner, The Desert Fayum (London: Royal Anthropological Institute, 1934).

[21]G. Caton-Thompson, Kharga Oasis in Prehistory (London: Athlone Press, 1952), p. 15-18.

[22]D. A. E. Garrod, Cambridge Ancient History, Vol. I, Ch. III (Fascicle No. 30), (Cambridge: University Press, 1965), p. 5.

[23]R. E. Leaky, National Geographic, Vol. 137, No. 5 (1970) p. 717.

[24]A. J. Arkell, A History of the Sudan (London: Athlone Press, 1961), p. 2.

[25]See later section on animal domestication, p. 48, for additional data on the camel.

[26]H. Field, Man, No. 144 (1962), p. 88; E. Anati, Rock Art in Central Arabia, Vol. 2, p. 77; Vol. 1, p. 152.

[27] Ancient Records from North Arabia, p. 13 and 208.

[28] "Report on Fossil Mammals from Saudi Arabia, "in correspondence files of Arabian-American Oil Company, Dhahran, Saudi Arabia, 1959. (Quoted by permission.) See also Powers, et al., Geology of the Arabian Peninsula, p. D-99.

[29] Butzer, Quaternary Stratigraphy, pp. 55-56.

[30] Ibid, pp. 67-68.

[31] The Desert Fayum, p. 84.

[32] Paleolithic hunters who roamed the pastures of the Sahara when it was watered appear to have retreated south with the game when aridity set in, thus leaving a sort of vacuum that was filled by later arriving nomadic Caucasoids (Capsians, Moullians, etc., ancestors of the Berbers.) Fairservis, The Ancient Kingdoms of the Nile, p. 55.

[33] Butzer, Quaternary Stratigraphy, p. 80.

[34] F. E. Zeuner, A History of Domesticated Animals (London: Hutchinson and Co., Ltd., 1963), p. 28.

[35] Cited in Butzer, Quaternary Stratigraphy, p. 113 Winkler's low chronology is followed by few scholars today. Most Egyptologists now prefer higher dates, terminating the Gerzean at about 3100-2950 B. C.

H. A. Winkler's analysis is based on rock drawings of species supposedly once indigenous in areas that are now desert. Some of the animals mentioned above, and many others in addition (some formerly indigenous and others never occurring naturally in Egypt) are depicted on various dynastic monuments of the Nile Valley, viz., giraffes at Deir el-Bahri, and monkeys. Dynastic Egyptians, however, faithfully depicted every species they found out about, whether indigenous, encountered through import into Egypt, in travels, or from hearsay.

[36] Quaternary Stratigraphy, p. 114.

[37] Birth of Civilization in the Near East (Bloomington: Indiana University Press, 1951), p. 40.

[38] Butzer, Quaternary Stratigraphy, p. 32. Also Caton-Thompson, Kharga Oasis in Prehistory, p. 14-15.

[39]The problem of chronology and age dating may arise at this point in considering such evidence from an archaeological and historical standpoint. It is true that Epipaleolithic cultural areas have existed (Wendorf's "Terminal Paleolithic" of the Nile Valley, p. 62, for one example), and there are examples of Neolithic type flint industries surviving far into the Bronze Age. The possibility of such occurrences in Arabia cannot be summarily dismissed. However, geographic isolation is usually the cause of such "backwaters," and from the nature of the geography of the Arabian Peninsula, there is no reason to assume that such was the case until perhaps well after the desiccation climax was reached (possibly about 3,000 B.C.).

[40]A further reason for confusion in determining Semitic "origins", for instance, lies in failure to set forth definition of terms. For example, the Assyrians are believed to have derived from somewhere to the west of northern Mesopotamia. This conclusion may well be valid if by "origin" in this case political entity is meant, for, quite likely, formation of a political entity that could be called Assyrian did take place in this area. If one looks for ethnic origin of the Assyrians, however, the period of political formation "to the west" probably represents only a "sojourn", and ethnic roots must ultimately lead back to the south and into the rest of the mainstream of Semitic movements from the Arabian Desert. (See Ch. III, footnote 1, for further comments on Semitic "origins.")

It is, of course, unfortunate that the "apparent" directions of incursion are the only ones we can study, since evidence prior to contact with settled areas is generally lacking. Inference from other lines of evidence, such as presented in this thesis, must be relied upon for the present. For example, two facts seem rather basic: (1) a large population, indicated by flint tools, once occurred in the Arabian Peninsula; and (2) progressive climatic desiccation began at the approximate end of the Pleistocene. Unless we conclude that the makers of the flint tools simply lay down and died in situ as their habitat disappeared, we must surmise that population movement out of the area took place. In this sense, the one basic question that arises is: What happened to the makers of Stone Age tools in the Arabian Desert? Semitic movement into the flanks of the Fertile Crescent seems an obvious clue, if not an answer.

[41]The conquests of Islam under Mohammed may have been a reflection of this long movement. A much more recent example may be the Wahabi movement of the 1920's. It may be argued that both these movements were, in fact, motivated by religion —not climate. But the question of causal factors behind religious movements comes up, and here it is possible that ecology plays a role, and climate in turn is a large factor in ecology. (To what extent can Monotheism be considered a product of desert environment?) It may, therefore, be possible

to conclude that climatic (desiccation) factors indirectly caused these movements. W. Carkel, Die Bedeutung der Beduinen in der Geschichte der Araber (Köln: Oplanden, 1953), p. 26-27, believes such movements are still going on.

[42]However, see above, p. 6, regarding the lake bed site at As Shalfa. The grinding stones from this site, indicating probable grain gathering, suggest the possibility that an incipient stage of agriculture may have been on the verge of development. The climate may have been too dry, however, and the wild grains and grasses that must have been there at that time never really thrived, so that further development did not take hold. The grinding stones are of a size and nature that suggest they were in all probability used for grinding grain, or seeds of some type. Similar appearing querns and rubbers are encountered in a Natufian (Pre-Pottery Neolithic) context at Jericho. See K. Kenyon, Archeology in the Holy Land (London: Ernest Benn, 1960), p. 49.

[43]William W. Howells, Back of History (New York: Doubleday and Co., (1963)), p. 167, states: "The farming system that appeared in Southwest Asia in Neolithic times spread outward with both grains and animals; and in parts of the dry, grassy belt that runs right across Central Asia and Arabia (and on into Africa), it was the animals, rather than the crops that the people eventually found most profitable to depend on as their mainstay. A herding life was thus a special offshoot of this Neolithic basis. One such development took place in Arabia...."

[44]E. Anati, Palestine before the Hebrews, p. 190, states that the origin of many groups inhabiting the Fertile Crescent "must be looked for in the peripheral areas which have no remains of tell, or city mounds, and other long-settled sites and thus have been left blank on archaeological maps."

[45]Several other investigators have also suggested such a period. See Butzer, Quaternary Stratigraphy, p. 10.

[46]The best source for summation of all the varied and somewhat confusing data on paleoclimate in the Near East is J. L. Forde-Johnston, Neolithic Cultures of North Africa (Liverpool: University Press, 1959), p. 7-13.

[47]It is immediately evident from viewing this graph that the "Neolithic wet phase" corresponds roughly with the advent, onset, and firm establishment of agriculture. And it is tempting to speculate on the possible connection between this climatic phase and the so-called "Neolithic revolution." Another related and pertinent aspect to be considered is that cereals (and other members of the grass family in general) require a climate that is dry, but importantly, not too dry (somewhat reminiscent of and perhaps analogous to Toynbee's "harsh but not too harsh" stimulus for the development of civilization). The "Neolithic wet

phase" may well have been of just the right duration and magnitude to allow development of agriculture, based on grain cultivation. By the end of this climatic phase, then, when more arid conditions set in again, cereal domestication had taken firm hold, and, under the aegis of man with his now developed knowledge of irrigation and crop control, had become the mainstay of civilization. This "vagary" of climate may, therefore, account for the development of civilization, at least in this part of the world.

III. PREHISTORIC POPULATIONS OF ARABIA

What is known about ancient populations on the fringes of the Arabian Peninsula, most of it dating from historical times, has been presented briefly at the beginning of the Introduction. The main area with which this thesis is concerned is the interior, and it is this portion that has until recently been terra incognita.

If we accept that the impetus of movement of Semitic-speaking people throughout much of the past of Arabia has come from the Arabian Desert, we can infer certain things about these populations. We can assume, for instance, that they probably became nomadic herders in post-Pleistocene times. We can perhaps assign parallels to the nomadic Beduin of the present Arabian Desert and fringes, and arrive at possible conclusions about their nature.[1] The likelihood of ever finding village sites is, as discussed above, remote. For material evidence, therefore, one must be content with the abundant amount of stone implements and rock drawings left behind by the prehistoric populations of the peninsula. It should be pointed out that the sites for these implements and drawings that are so far known have been largely found by chance, no really systematic search having yet been made. Stratified sites are very badly needed to place the flint tools in chronologic and stratigraphic context. Cave sites and shelters are not common, and in any case are not likely to have been used to the extent that caves in more northern latitudes and higher elevations were.[2] Thus, while the possibility of stratified cave sites cannot be summarily dismissed, it seems more likely that some of the wadi sites and lacustrine terraces may yield desired material if a systematic search can ever be undertaken. Stratified sties in the North African region analogous to the Arabian Desert, the Sahara, are also notoriously lacking.[3]

So far, only rather broad typological affinities have been assigned to the artifacts. As pointed out in Chapter I, they seem to range from crude Lower Paleolithic handaxes to "Solutrean" and "Neolithic" type, beautifully worked, bifacial tools. It seems reasonable to assume, therefore, that they represent a continuous time span from Lower Paleolithic to the end of Neolithic, a period that covers most of the known existence of man. Field states: "Saudi Arabia has been inhabited since Lower Paleolithic times, although the present evidence for the entire Stone Age is very limited and widely scattered. The assemblage of that archaeological mosaic has begun, but the general picture remains undefined."[4]

When we consider the fact that the peninsula most likely was not an isolated cultural backwater in prehistoric times, as it is today, we should assume there would probably have been a normal amount of cultural exchange with neighboring areas. As previously noted, the peninsula can logically be considered a stepping-stone, in fact, between Africa and Asia.[5] There is no reason to suspect that the flint industry will be an isolated one, and firm affinities with

neighboring cultures probably will be established when a real systematic study is undertaken. At present, a few general observations and comparisons have already been made by various investigators. Some of their conclusions are worthy of quotation.

Coon, for instance, discussing Acheulian handaxes and cleavers found on top of Bed II at Olduvai Gorge in Tanzania, believes that this new industry had apparently been brought in from some other region, "either North Africa, or more likely South Arabia, where similar tools have been found in the Rub' al-Khali." And since tools up to the top of Bed II, i. e., up to the Acheulian level, were made by Australopithecines, this seems likely.[6] He further supposes that South Arabia may have been an extension of the African-Caucasoid zone of contact, but that "this contact was probably broken off somewhat later." A further possible independent clue is the fact that South Arabia has long contained non-Caucasoid elements (negroid) that cannot be explained away as the product of slave trade.[7]

Field states that Paleolithic man in Arabia probably arrived across the Sinai land bridge or via the Horn of Africa.[8] He describes "Solutrean type" blades, the thinness of which, combined with delicate retouching, indicates excellent pressure flaking techniques, reminiscent of ancient (Predynastic) Egypt, (i. e., such as the fishtail lances and rippled flint knives.)[9, 10]

Caton-Thompson and Gardner report that the Middle Paleolithic of southwest Arabia is represented by a "crude and relatively unprogressive facies of the Levalloisian.[11]

S. A. Huzayyin speaks of "an expanding early Middle Paleolithic facies that took its course over Palestine and Arabia to East Africa."[12]

J. D. Clark observes that the complete absence of coups-de-poings in the Hadhramaut and the crude nature of the Levalloisian culture certainly suggests that no land bridge can have been present at the Bab el-Mandab during Upper Paleolithic, or more recent times. If a land bridge had been present, it is difficult to see why the developing Levalloisian of the Horn of Africa was not diffused to southwest Arabia. Regarding Neolithic industries, he thinks it is apparent that a definite migration of peoples into the Horn of Africa occurred during late Stone Age time, bringing with them traits which link them with the Saharan Neolithic cultures and with the Neolithic B groups of the Fayum.[13]

Miss Caton-Thompson notes that the Paleolithic evidence from South Arabia seems to be definitely against any connection with East Africa after or during handaxe times, i. e., after about the Kanjaran pluvial. If a pebble culture reached Arabia from Africa during the preceeding Kamaisan pluvial, it would not be surprising.[14] In a later investigation of "Neolithic" type flint tools from Mukalla, she sees favorable comparison with the Fayum Neolithic.[15]

F. Zeuner suggests tentative typological links with the Magosian, with the Beduin Microlithic of Kharga, and (in the stemmed points and scrapers) with the African Aterian.[16] (This last suggested affinity—Aterian—could have very special significance, as will be shown in subsequent portions of this thesis.)

Joan Crowfoot Payne, investigating tools from Habarut in South Arabia, states: ".... The trihedral rods, the leaf-shaped points, the plane, and the arrowheads would all be perfectly in place in a Fayum Neolithic assemblage.... The knife fragments are more precisely paralleled by specimens from Predynastic Egyptian graves, but they show no signs of grinding." She notes, however, the absence of the hollow-based point, a characteristic tool of the Fayum material.[17] The knives are, indeed, extremely interesting. Although apparently lacking grinding before flaking, as Miss Payne notes, and though somewhat less well-finished than the Egyptian ones in general, the serial (rippled) flaking, shape, size, and overall execution technique, as in the Naqada knives, definitely appears to be present.[18]

R. H. Dyson, University of Pennsylvania, regarding some specimens he had occasion to examine, reports that they are ".... all made by pressure flaking and are related to the Neolithic.... techniques found in Egypt and East Africa. Nothing like them exists in India...."[19]

It can be seen from the above reports on what little work has been done on the Arabian Stone Age flint industry that no really clear picture has yet emerged, although some extremely interesting affinities have been suggested. None of the above scholars had apparent access to a great deal of material and all were hindered by lack of stratified sites for proper context. There are definite tantalizing clues and enough evidence contained in these statements, however, to indicate that, when a collection that represents, chronologically and geographically, the entire spectrum of Stone Age tools from the Arabian Peninsula is finally built up and made available to scholars, answers to a number of vexing problems that concern man's early history in this part of the world will be afforded.

Before finishing this brief and necessarily inconclusive survey of what is so far known about the Stone Age industries of Arabia, one other specific problem in the cultural history of the ancient Near East that is possibly very pertinent to the subject of this thesis merits discussion.

It is generally agreed by a number of authorities (Baumgartel, Hayes, Sandford and Arkell, Huzayyin, Vaufrey, and Garrod, for example) that the Neolithic flint industry of the Nile Valley has no firm affinities to any of the other known industries in the region of the Near East. Nor does it seem to fit well into a local developmental sequence from earlier industries of the Nile Valley either. Some pertinent opinions of the above-mentioned scholars are summarized and quoted as follows:

W. C. Hayes states that:

> The Middle Stone Age, or Mesolithic, is so sparsely represented in Egypt that no clear picture of it has yet emerged. The few tools of Mesolithic age reflect a continuation of the small flake and blade industry of the final late Paleolithic, and show almost no

connections with the implements produced by the earliest Neolithic people. In fact, it is probably that the Neolithic people were not related to their predecessors of the middle Stone Age. Also we must recognize among the Neolithic and Chalcolithic peoples a quantity of different cultures and several different ethnic strains.[20, 21]

Garrod, recognizing that the Upper Paleolithic industries of Egypt have no European affinities, as do those of the rest of Southwest Asia, concludes that cultural isolation during this period occurred. She states that the Neolithic of prehistoric Egypt opens with new kinds of artifacts, "swamping the old microlithic element surviving from earlier times, and a new way of life."[22]

Baumgartel recognizes a "gap in occupation of Egypt between Paleolithic and Mesolithic and the Predynastic cultures as shown by the flint tools." She states that the early stages of the culture which develope into the civilization of dynastic Egypt is therefore not in the line of evolution of the Mesolithic or Upper Paleolithic of the Nile Valley, but is fundamentally different from it, as well as from the Capsian of North Africa and the Natufian of Palestine.[23]

Huzayyin states:

> The early Neolithic cultures of Egypt could not have been derived from any of the industries so far known in neighboring areas. Further, technological study of the earliest Neolithic cultures of Egypt has shown that they had no connections whatever with the final Paleolithic facies. All that there is in the way of contact between the two cultures is that certain types of microliths survived and became later on mixed, not with the true Neolithic (Merimde and Fayum A), but with later cultures.... The elaborate and massive bifacial tools of the Neolithic could not have been directly derived by any simple process of technological evolution from the microliths of the final Paleolithic.[24]

He goes on to state that neither the northeast approach nor the western (Sahara and northwest Africa) have yet yielded any evidence of connection, but concludes it is possible that other parts of Southwest Asia, such as Arabia, or the Irano-Taurusian Plateau and its Mesopotamian border may yet yield evidence.[25]

K. S. Sandford and A. J. Arkell, in their studies of the Nile Valley civilizations, conclude very nearly the same thing, as does R. Vaufrey.[26]

Contrary to the above opinions, however, there are several scholars who would see a possible relationship between the Egyptian Neolithic and the African Aterian industries. Forde-Johnston would assign the Aterian a possible Saharan origin. He reasons that at the end of Pleistocene time when desiccation began, this industry then moved into the southern Sahara and into northwest Africa. It therefore survived and evolved into the Saharan Neolithic, from where it developed into the bifacial industry of the Nile Valley. He states that bifacial

leaf-shaped points (one of the characteristic tools of the Aterian) are found in the Solutrean at Parpallo (Spain), in the Aterian of North Africa, in the Saharan Neolithic, and in the Predynastic cultures of Egypt, and concludes that on typological connection alone it is tempting to see a connection between all four groups. He sees no chronological or geographic objectives to this as far as Egypt and the Sahara are concerned and believes a connection is likely.

The Egyptian Neolithic begins somewhere to the west of the Nile Valley and Egyptian civilization is a special development of it, due to the unusually favorably circumstances occurring in the Nile Valley. This interpretation, according to Forde-Johnston, supplies an answer to the question of the origin of the bifacial technique in Egypt, "an answer otherwise unobtainable." (Italics mine).[27] In appraising Forde-Johnston's analysis, it is pertinent to point out that he admits to some evidence for a gap between Aterian and the Egyptian Neolithic industry. Significant also is his admission that the development area for the Aterian is not known, and if elements in the Nile Valley and Saharan Neolithic did not derive from Aterian, their origin is a blank.[28]

Miss Caton-Thompson also suggests an Aterian origin for the Egyptian bifacial leaf-shaped blades,[29] as does Gordon Childe.[30]

Garrod believes that the Aterian shows much finer workmanship than does the native Egyptian culture. She mentions the two characteristic types of arrowheads of the Aterian tool kit—one a leaf-shaped point flaked over both faces, resembling the Solutrean "laurel-leaf" of Europe, the other a tanged point, made from a triangular flake. She believes that the Aterians were a "skillful and aggressive" people, ranging all the way from North Africa 1400 miles to Kharga.[31]

Very recent and important work, based on a systematic survey of Paleolithic implements up and down the length of the Egyptian Nile Valley and well down into the Sudan, is potentially significant as far as affinities between Nile Valley Neolithic and preceeding industries are concerned.[32] Contrary to previous opinion that the Paleolithic was very poorly and sparsely developed in the Nile Valley, "rich" sites, representing "complex and progressive" development, and ranging from Early Paleolithic well into Neolithic times (substantiated by a series of radiocarbon dates) have been discovered. The Neolithic peoples of Fayum A and the early Predynastic communities of Middle and Lower Egypt, however, represent a new population, according to the authors of this study, bringing in "a lithic tradition radically different from that of the immediately preceeding Terminal Paleolithic in this area." It seems doubtful that the surviving "Terminal Paleolithic" people played a significant role in or made up a significant portion of the new Neolithic culture. The authors of this article conclude: "It seems highly likely that these new Neolithic peoples, and not the descendants of the Paleolithic hunters and gatherers of the Nile during the late Pleistocene and early Holocene, formed the cultural base from which Egyptian civilization was to emerge." In evaluating this study, it is perhaps significant to note that it

bases its conclusions on a large, well-dated amount of Paleolithic material (previously virtually unknown) from which to judge affinities with the Neolithic industries of the Nile Valley.[33]

Whether the Egyptian Neolithic did or did not develop out of an Aterian industry, we are still faced with unknown origins in either case. The conclusion to be drawn from the opinions of the experts is that one of three alternatives is possible: (1) The Egyptian Neolithic was a strictly local development or flowering; (2) it developed from the Aterian; (3) its affinities have simply not yet been found. The first alternative can be dismissed, since there is no geographic isolation involved, and it seems fairly certain that the "Neolithic revolution" was "imported" into Egypt. The second can be only a partial answer, since we are still left with the question of the origin of the Aterian. The third alternative seems the best answer for the present. The question can perhaps now be pursued further. Two hallmarks of the Aterian industry discussed above are the bifacial, "Solutrean type", leaf-shaped projectile point and the triangular (in cross section) arrowhead, and these significant artifacts occur commonly in the material from Arabia.[34]

When faced with a hitherto unknown and virtually unstudied series of flint tool industries that occurs in a very near location to the Nile Valley (and North Africa) and that has been shown to have, otherwise, geological, geographical, paleoclimatological, and anthropological affinities, and at least two (perhaps more) important flint tools in common, it is difficult to avoid speculation that the answer to the origin of the Egyptian Neolithic tool industry might be at hand.[35]

Anati's "Oval-headed" and "Realistic-dynamic Style" People. This subject is best discussed here, following the flint industry of Arabia, since it is likely that this population was concerned with at least a portion of that industry in some way. Doubtless, they or their ancestors were makers of some of the tools.[36] These people have already been discussed in general in the Introduction of this thesis. Discussion here will, therefore, be largely concerned with evidence that these people were quite likely in some kind of contact with other contemporary cultures of neighboring areas. Various lines of evidence suggesting these possible affinities are as follows:

(1) Trapezoid (transverse) Arrowheads: The very same kind of arrowhead is depicted clearly on the Egyptian "Hunter's Palette", datable to late Gerzean. Winkler shows a rock drawing of one of his "Autochthonous mountain dwellers" clearly shooting an ostrich with one of these arrowheads.[37] Miss Caton-Thompson records such tools from the "Beduin microlithic" of Kharga. Forde-Johnston says about this peculiar arrowhead that it does not appear in Egypt until Naqada II times, and that it lasts until the XVIII dynasty. He also notes that it appears earlier in the South (Nubia).[38] Baumgartel indicates that it first appears in the Naqada II Period and notes that it is also found in Ubaid strata from Ur.[39] Arkell records it from the Khartoum Mesolithic.[40] The type thus occurs in Mesopotamia, Arabia, and the Nile Valley, and apparently has a long history.

(2) Boomerangs (or Throwing Sticks): A number of the OH ("Oval-headed") and RDS ("Realistic-dynamic Style") people are equipped with this tool, or rather a type similar in appearance. This tool is well-known from Egypt and the Near East. Similar figures come from Lagash, Ur and elsewhere. The "Hunter's Palette" from Heirakonopolis clearly depicts such tools.

(3) Daggers with Semi-lunate Pommels: Several of the OH and most of the RDS people are depicted using such weapons. There is little doubt that they are this kind of dagger, as they are shown often and clearly enough. This weapon is distinctly from southern Mesopotamia (probably originating there) and also occurs in other Near Eastern countries. It dates from about the middle of the third millennium to the later part of the second millennium. A dagger from Meskalamdug's grave is very similar as are daggers from the thirteenth century B. C. from Tallish in Iran.[41] Petrie states that it looks as if the dynastic race of Egypt did not use the dagger as there are none known from the Old Kingdom, even from sculpture or depiction. However, they do begin in sudden abundance in the XI and XII dynasties. From these dynasties, in Petrie's Tools and Weapons, there are some that could be semi-lunate pommeled daggers.[42]

(4) Beards and Headdresses of some of the OH people are similar to some from the "Hunter's Palette."

(5) Small, Double-convex Bow: This weapon, commonly carried by the RDS people, is found depicted from the late fourth millennium in the Proto-literate period at Warka. Again the "Hunter's Palette" very distinctly has similar bows, as does a cylinder seal from Heirakonopolis. (It should be noted that the bow from Warka is shown with hooks at the ends to hold the string. This might be difficult to render on rock drawings.)

(6) A figure of an OH man with a feathered headdress and a shield resembles a similar depiction from the Beni Hassan tomb of Egypt, dated to beginning of the nineteenth century. (This tomb painting, the Abisha fresco, is supposed to represent an Asiatic chieftain in Egypt with his people.)

(7) Sickle Swords: These tools are depicted several times in hands of the OH people, although there may be some reasonable doubt that they are, in fact, such weapons. (These tools would be difficult to depict with accuracy on rock drawings since they would need to have just the right curvature to be definitely identifiable. They could be confused with boomerangs or throwing sticks, for instance.) Such tools are datable to mid-third millennium, from Mesopotamia. Petrie states that the sword is foreign to Egypt and was very rarely imported. There seems to be nothing resembling a sickle sword in Petrie's corpus of Tools and Weapons.

(8) Some of the OH people carry shields like some from the late third millennium depicted in the tomb of Achtar and at Beni Hassan tomb. There is indeed a very close analogy indicated here; the "shields" do appear to be conspecific.[43]

(9) "Tubular" headdress worn by two OH men and shields they carried bear a similarity to those from a stamp seal from the Dilmun culture of Bahrein, datable to the third millennium, according to Anati. In neither case, however, is the depiction very clear, so that valid comparison may be dubious.

(10) Several figures of OH people are holding "scepters" that seem similar to those depicted in late Proto-dynastic times and during the Old Kingdom. These objects also resemble those from a late Chalcolithic hoard of metal from a cave in the Judean desert (Mishmar hoard), datable from late fourth to early third millennium. The depiction really does not seem clear enough to attempt analogies. Such an object would be difficult to depict in rock drawings. "Sceptre-like" objects do seem to be involved, but that is about all that can be said.

(11) Lyres and harps are clearly depicted that seem to date from about the end of the third millennium.

(12) Another kind of dagger (not the one with semi-lunate pommel) that dates from about end of third millennium.

(13) Feathered headdresses worn by some of the OH people resemble one worn by a man from an Amratian white cross-lined pot.

(14) Many of the OH people seem to wear a kind of small apron (which Anati calls a "cache sexe".) Amratian people are depicted on pottery as wearing similar clothing.

(15) Fig. 49, p. 85, Vol. I, of Anati's study depicts an OH man wearing what may be a penis sheath, and feathered headdress. Amratian men are depicted on pottery as wearing such, and warriors on the Jebel Arak knife handle definitely wear them. Some figures from the Saharan rock drawings also wear them.

A general critical analysis of Anati's study, and evaluation of chronological elements and analogies is included as Appendix A.

Rock drawings from North Africa in the same basic style as the Arabian series have been rather extensively recorded and studied by a number of scholars. Forde-Johnston lists and discusses these studies in a full chapter devoted to analysis of them.[44] Some of his comments and conclusions are as follows: (1) The extensive North African drawings probably did not originate in Egypt; (2) the drawings are for the most part post-Paleolithic; (3) they form one continuous series; (4) the animals depicted, both wild and domestic, are all post-Pleistocene; and (5) the animals depicted probably belong to the "Neolithic wet phase," between about 5,500 and 2,500 B.C.

Only one other known previous attempt has been made to correlate Arabian rock drawings with North African ones. Bruce Howe, studying two groups of engravings of long-horned cattle, dogs, and ibexes in the vicinity of Mecca, cautiously concludes that:

> "....the evidence from Kilwa to the north on the edge of the Jordanian desert and Egypt suggests that a broad tradition of this type of engraving may have existed in North Africa and the

> Near East as early as the third or fourth millennium B. C., and that it continued in Egypt into the Dynastic period. Furthermore, the....Arabian evidence....is enough like our groups to encourage one to include them all in a common tradition....The two groups of rock drawings from the Hijaz might be placed tentatively in the long period extending from the local post-Chalcolithic times into the Thamud and Safa period near the beginning of the Christian era.[45]

Anati had much more material for study, and concludes that: "Winkler's rock art people from Upper Egypt seem too close to the "Oval-Headed" people of Arabia to be coincidence. The two groups possess too many elements in common."[46, 47]

In addition to the possible affinities with North Africa and Mesopotamia discussed above, several other points seem pertinent. The hunting-herding theme is common in both areas of Arabia and North Africa. Bos primigenius seems to have been important to people of both areas at at least one phase. Winkler speaks of the appearance of "Hamites with their cattle" in the Eastern Desert of Egypt.[48] Butzer identifies a population he calls "prehistoric cattle nomads of the Sahara" and dates them to about 4,000-2,000 B. C.[49] Lhote defines a "domestic cattle period" of the Sahara and dates it from 4,000 to 1,200 B. C. He quotes two radiocarbon dates of 3,500 and 2,500 B. C.[50] Thus, Anati, who suggests dates between early fourth to mid-second millennium, Butzer, and Lhote are all in approximate agreement on dating of these people.[51]

Anati points out that the Egyptian rock art people did not have semi-lunate pommeled daggers, and suggests that either the two groups had a common ancestry elsewhere in Arabia, and the central Arabian assemblage is a later persistence of the same tradition, (in which case Winkler's "Autochthonous Mountain Dwellers" of Predynastic Egypt would be of Arabian origin), or the OH people represent a group pushed out of Egypt at the beginning of Dynastic times that was able to maintain Predynastic traditions in Arabia later into the third millennium.[52] Being pushed back across the Red Sea, all the way past the littoral of Arabia, and up onto the plateau area, where Anati's OH people occur, seems somewhat untenable theory to the author of this thesis. An alternative and more logical answer might be that the semi-lunate pommeled dagger may have reached Arabia from Mesopotamia sometime after contact of Arabia with Egypt had been cut-off, say during the early third millennium.

Obviously, no sure statement can yet be made about the affinities of the "Oval-headed" and "Realistic-dynamic style" peoples of Arabia with populations of the neighboring areas. Much more work is necessary, especially in view of the fact that the area of pictographs studied from Arabia represents only a small amount of the total area over which these important documents to early man's occupation of the peninsula occur.[53] It seems obvious, however, that these populations of Arabia did not exist in isolation from their neighbors in

Mesopotamia and Africa. It would appear fairly certain that the rock drawings of Arabia existed in a cultural, climatic and geographic environment very similar to the rock drawings of North Africa. Populations of both areas would have been cultural products of the same set of determinative factors. It is probably not rank speculation to conclude even more—that there may well have been ethnic affinities involved also.[54] It is certainly too early to state with much assurance that Egyptian Predynastic civilization had its roots in Arabia, but the theory is very tempting, and contact of some significant kind seems rather certain.[55] Since it is equally possible that the Arabian populations had contacts with Mesopotamia also, it is tempting to see in Arabia a link or stepping stone of some kind between Mesopotamia and the Nile Valley in at least late Neolithic times. Scholars have long agreed that some sort of contact between the two areas existed, but there are many different theories as to the nature of this contact. Some maintain the Asiatic element arrived in the Nile Valley as military invaders; some claim they came as peaceful stttlers and infiltrators. Some claim they came from Mesopotamia directly; others that they arrived from Syria-Palestine, or from several different areas of Asia at the same or different times. Some believe the Asiatics came by a direct route; others see evidence that they came indirectly. The theories are varied.[56] Whichever, if any, of these theories may be correct, it seems a fairly credible hypothesis that, in view of the evidence presented in this thesis, the Arabian Peninsula played an important role. The following section is therefore devoted to speculation on what the nature of this role may have been.

As noted above, the semi-lunate pommeled dagger does not seem to have been made in Egypt until about the XII Dynasty, probably after trade routes through Syria-Palestine were well developed. Nor is there evidence that any dynastic cultural influences from Egypt affected the Arabian populations. All in all, it seems possible that connections between Arabia and Egypt may have been one way (i. e., from Arabia to the Nile Valley, due to desiccation driving population out of Arabia), and that they may have ceased perhaps sometime around or shortly after the first dynasty began.

It is interesting to theorize why such a situation should have taken place. In searching for a possible event that fits this approximate date, we find that the end of Butzer and Huzayyin's "Neolithic wet phase" has been given at about 2,500 B. C. It seems possible, then, that the answer may be in desiccation that made the Arabian Peninsula and the area between the Nile Valley and the Red Sea very nearly the desert that it is today.[57] We might assume further that this desiccation at the same time dried up and drained the swamps, marshes, and lagoons that may have hindered (though not necessarily prohibited) man's passage through the isthmus of Suez.[58] We may visualize also another result of such desiccation being a movement of demographic centers of population away from the now arid areas of Southwest Asia, and up into and along the flanks of the Fertile Crescent, especially now up into the west flank.[59]

The east flank, southern Mesopotamia and extensions of its cultural sphere consisting of the Persian Gulf, east coast of Arabia, and connections on down to the south, seems to have been the most lively area of the Fertile Crescent at the beginning of civilization in terms of cultural activity, trade relations, and also perhaps (though not necessarily) population density. The western horn (Syria-Palestine area) then perhaps became important and entered the mainstream of activity after 3,000 B.C., as the result of the end of the "Neolithic wet phase."[60] It should be kept in mind that the so-called "Fertile Crescent" probably does not take on any real ecological or cultural significance from the demographic standpoint until desiccation sets in and drives populations to it. It then becomes contrastingly "fertile" compared to the areas it borders.[61]

According to this theory of demographic distribution and the Fertile Crescent, the picture might be similar to that shown on Fig. 4, p. 75, showing hypothetical demographic and cultural distribution pre- and post-desiccation.

Thus, we see that the area of main cultural activity (trade, population movement, contact of various kinds) may have been headquartered in southern Mesopotamia, with a broad belt going across Arabia, extending across the Red Sea and into the southern Nile Valley. The Persian Gulf and the east coast of Arabia would have been in this sphere. At the other end of this "cultural continuum", if it may be called that, would have been the Indus Valley civilization, with the Dilmun and possible Magan kingdoms in between.

After desiccation set in, the belt across Arabia, across the Red Sea, and into the eastern desert of Egypt and the Nile Valley is cut, links with the Indus Valley area diminish, and movement shifts to the north along the Fertile Crescent, where the Akkadian and Assyrian empires eventually come into being. The Persian Gulf becomes less important, as Dilmun, Magan, and Meluhha gradually cease to be important to Mesopotamia.[62]

If the center, or at least the northern portion (with the Indus Valley being the southern portion), of this hypothetical demographic and cultural area was southern Mesopotamia, the question arises regarding the incentive for activity across the Arabian Peninsula. At least a partial clue may lie in the already known reason for Sumer's contact with Dilmun, Magan (possibly Oman), and the Indus Valley—trade in various goods, especially metals.[63] (The Persian Gulf and its littoral flanks and the route down to the south must indeed have been a much busier place than we have previously imagined.) As discussed in the Introduction, the western half of the Arabian Peninsula is igneous and metamorphic rock, similar (especially in mineral content) to rocks of the Oman Mountains (the supposed source of Sumer's copper), the southern Sinai Peninsula, and the Egyptian Eastern Desert.

Recent geological and mineralogical mapping of this so-called "Western Shield" area of Arabia has disclosed sources of copper, silver, lead, and gold. Moreover, and very important, many of these mineral sites show signs of ancient working.[64] (Some sites are, incidentally, located in the near vicinity of the rock drawings analyzed by Anati.) Excluding climate as a limiting factor in traversing the area, as we can do, prior to about 2,600 to 2,800 or 2,900 B.C.,

the mineral resources of the Arabian Peninsula become as near and as accessible to South Mesopotamia as those of the Oman Mountains. Since the Southern Mesopotamians were obviously excellent sailors, the Red Sea would hardly have posed a barrier once it was reached, assuming incentive for crossing existed.

It is possible that mining from the interior of Arabia could also help account for the importance of Dilmun (Bahrein), for it would seem to need a little more justification than just a way station in the Persian Gulf between Sumer and the Indus Valley. It makes much better sense as a trading empire, for instance, if it could be made to receive copper and perhaps other mineral material from the interior of Arabia as well as Oman.

The above is theory. There are admittedly only a few clues to take it out of the realm of rank speculation. There are, however, no known facts to disprove it, and it provides a rationale and good working hypothesis for postulating possible late Neolithic cultural connection between Mesopotamia and Egypt across the Arabian Peninsula.[65]

Animal Domestication: This subject, perhaps, is pertinent here, since evidence for animal domestication may furnish needed clues on cultural connections. Also the people depicted in the rock drawings of Arabia appear to have been intensely concerned with herding and hunting the animal life around them.

(1) Sheep. Zeuner states that no wild sheep are known to have existed in Africa toward the close of the Pleistocene. All domesticated sheep encountered in Africa must, therefore, be derived from Asia or from Europe.[66] Baumgartel suggests that the sheep came to the Badarians across the Bab el-Mandeb from Arabia.[67] Adametz maintains the same point.[68] Anati, in his study of the fat-tailed sheep of Arabia, says that this animal is unknown in the rock drawings elsewhere in the Near East (i. e., North Arabia, Sinai, and Palestine). This special breed of sheep is depicted for the first time outside of Arabia in the Uruk III period of late fourth millennium in Mesopotamia, where it appears on a bowl and the mosaic standard from Ur. It was previously believed to have arisen in southern Mesopotamia. The other occurrence of this sheep outside Arabia is in Central and South Africa, where it was one of the two earliest domestic animals to be introduced—the other being the long-horned cattle.[69] According to J. D. Clark, these animals were first bred by "Late Stone Age" populations.[70] Anati concludes that the fat-tailed sheep may well have arisen in Arabia, arriving on the African continent at an unknown date. In some rock drawings there are long spears, an indication in this area they were once hunted in the wild state. No known representations of this special breed of sheep seem to be recorded in Egypt or North Africa.[71]

(2) Camel. This animal evolved in North America (along with the horse), and spread quickly to Asia and down into Arabia during Pleistocene times. However, it probably became adapted to arid conditions in Arabia and therefore managed to survive as post-Pleistocene desiccation set in. The dromedary (i. e., the single humped Arabian camel) occurred sporadically on the borders of the Sahara, but not near the Nile Valley. There is, according to Zeuner, only one

domestication center for the camel, and that is Arabia, probably the central portion. Based on Biblical reference to Abraham's "camels", Zeuner concludes that: By 1800 B. C., the dromedary was a domesticated animal in the borderlands of Arabia and was used for traffic across the desert from southern Mesopotamia to Palestine." He believes that the camel was probably therefore domesticated in the 4th millennium B. C.[72]

There is another school of thought, probably more reasonable, that the camel was not domesticated until comparatively late. If Abraham's "camels" are a scribal error (or addendum), as many scholars assume, there is then no clear documented reference until late second millennium, or even early first millennium, for the Arabian dromedary. W. F. Albright believes:

> There is no clear evidence of any kind to indicate the appearance of the domesticated camel in the Near East before the 11th century B. C. .... The first reference to camels in cuneiform from Mesopotamia, Syria or Palestine alludes to Bactrian camels in the reign of Tiglath-Pilezer of Assyria (1115-1076 B. C.), and the Arabian camel first appears in cuneiform text during the 9th century B. C. From scores of thousands of cuneiform letters and economic texts from all over Southwest Asia between 1800-1200 B. C., not one mentions the camel, though donkey caravans occur often. The earliest Mesopotamian figure of a camel comes from excavations of Aqarquf, dating from about 1300 B. C.[73]

It is further interesting to note that camels were hunted in the wild state in Arabia apparently well after the horse was domesticated and brought into the peninsula, for camel hunts from horseback are clearly depicted on some Arabian rock drawings.[74] Though wild camels existed in Arabia until probably about the beginning of the Christian era - Strabo and Diodorus Siculus mention them - it is just possible that the depictions of hunts from horseback may help substantiate that the camel was domesticated at a relatively late date.[75] There are a number of camel representations from Egypt from Predynastic and early Dynastic times. Then there is a gap in representation of this beast until third or early fourth Dynasties.[76] Thus, there seems a possibility of some sign of contact with Arabia, at least at late Predynastic/early Dynastic times, that was broken shortly thereafter. The later depictions could possibly be from contact through Syria-Palestine when this route was well established. The camel does not really arrive in Egypt as a domestic beast until brought in during the seventh century by the Persians. Petrie records a terra-cotta camel head from Abydos of the first dynasty, and concludes that, since the camel is so far unknown before Greek times, it had died out and been subsequently reintroduced.[77] A stone jar in the shape of a camel has been discovered in a Gerzean context near Memphis.[78] In summary, then, it seems this data may afford some evidence of early contact between North Africa and Arabia, and moreover, some indication of when this contact may have been broken off.

(3) Domestic Ox (Bos primigenius). This animal seems to have arrived in Africa in the late fifth or early fourth millennium B. C., when it was probably brought through the Arabian Peninsula from Asia and into Egypt. Anati cites Winkler as having tentatively connected the introduction of the domestic ox into Africa with the arrival of the human group which he calls the "Eastern Invaders." He believes that in Arabia the domestic ox could go back as far as the fifth millennium, but could also be much later than that.[79] As mentioned already, it is tempting to see the "cattle nomads" of the Sahara and the herders of Bos primigenius in Arabia as related in some significant way.

Anati states: "The presence of wild oxen in Arabia is demonstrated by several....rock carvings which are presently under study. The presence of wild oxen in the southern Judean desert is a well established fact. Wild oxen were certainly still present in Near Eastern deserts in Holocene times, but no date has yet been established of their latest occurrence."[80]

Disappearance of these animals from the Saharan and Arabian deserts is good additional proof for climatic desiccation, for it seems that, even with man's assistance in finding water and food, they still were not able to survive. Without doubt, though, descendants of these animals furnish the livelihood of the present-day cattle herders of East Africa.

Ubaid Sites and their Significance. The basic facts about discovery of this very important pottery industry have already been presented in the Introduction. This portion concerns itself largely with significance of this pottery find in terms of what it adds to the knowledge of Arabian prehistoric cultures.

It should first be noted that correlation of this pottery with that from excavation sites in southern Mesopotamia is excellent. Not only do the rim sherds correspond, but geometric patterns painted in brown, or more often black, on buff and yellow-green ground are duplicated. In addition, pieces of reed-impressioned plaster, obsidian, stone querns, flint tools, including knives, scrapers, awls and arrow-heads, and beads and fingerbones compare very well between the two areas. There is a coarse, red, straw-tempered pottery also found associated with the highly refined, hard, hand-made, green, typical Ubaid ware. When the painted geometric patterns on the Arabian pottery were matched with Woolley's material from Ubaid, it was found that more than a dozen exact duplicates were evident.[81] No real study, above and beyond the fact that Ubaid pottery is involved, has yet been made. It seems likely, however, that what is represented may be an early stage, since clay sickles (as well as clay nails), so common in many later Ubaid layers, are so far lacking in the Arabian material. These sickles do not occur in southern Mesopotamian sites until Ubaid 3 Phase (former Ubaid I period). If such negative evidence can be considered at this early stage in investigation of this pottery in Arabia, a tentative age date might thus be Ubaid 2 (former Haji Mohammed) phase, absolute dates 5,050-4,300 B. C.[82] One carbon-14 date is reported to have been determined at 6,138 B. P. ± 200.[83] It is significant to note that the geographic range of this pottery is extended, so far, by almost 400 miles south from Mesopotamia, a distance almost double its former geographic range.

Another important fact is that all the sites are apparently located on ancient strandlines of the Persian Gulf. This, plus the absence of clay sickles and the fact that oyster shell heaps are often associated with the sites leads one to speculate that the people represented were primarily fishermen.[84] This fact may not be too surprising if we consider that there seemed to be a strong fishing element in early southern Mesopotamia. (The water god, Enki, and fish offerings are prominent.) Joan Oates stresses the importance of marsh-dwelling communities in the formation of early Ubaid cultures, and notes that fish and reed matting are hardly products to be expected from a population dependent on fields and flocks.[85] Another thing to be considered is that the Sumerians indicate a time in their cultural past when they did not know agriculture.[86]

Should the early Ubaidians have been sedentary fishermen, it is not surprising that their sherd fields are located on the littoral. What is more informative, however, is the fact that they do not seem to have settled on the eastern (Iranian) shore of the Persian Gulf. Iran has been open to archaeological surveys of various kinds for a considerable time, and it seems that such distinct pottery (formerly considered to have had an Iranian origin), if it existed there, would have been noted.[87] It is highly significant, then, that Ubaid evidence seems to occur only on the west shore of the Gulf, almost as far as the base of the Qatar Peninsula. An origin to the south and west of southern Mesopotamia therefore seems likely. Another clue might be contained in the fact that, according to Anne Perkins, the general dissemination route of Ubaid pottery is south to north.[88] Oates seems to have succeeded in finally dismanteling the theory of Iranian origin,[89] and no pottery from the Indus Valley is known to have Ubaid affinities. That the Sumerians also had a tradition of origins in Dilmun (which Bibby convincingly proves was probably Bahrein, and very possibly included the east coast of Arabia) affords another clue.

If the above theory is credible, and the Ubaidians had origins in Arabia, this may explain why they did not become agriculturists until later in Mesopotamia. It has been indicated in an earlier portion of this thesis that there is not much likelihood that real agriculture was ever practiced in the Arabian Peninsula.[90] Nor is there anything wrong with a fisherfolk developing a well made and refined pottery style. Another example of such a development is Arkell's "Khartoum Mesolithic" in the Sudan, which made a fine, incised and decorated pottery.[91]

Geological reconstruction of what may have been the ancient shoreline of the western Persian Gulf littoral indicates a configuration and possible ecological environment significantly different from today's.[92] In general, the shoreline was considerably further inland in places, particularly below 26°N. latitude in the vicinity of the more positive land features such as Ghawar. Such configuration would account for the several mentioned sites now some 75-90 km. inland. Thus, it seems that all the Ubaid sites discovered to date may well have been established on or very near the shore or water environment. The contour configuration, which is irregular, discontinuous, and vague above 27°N. latitude, suggests by this nature an environment that may have been at least partially

paludal in nature, with marshes and swamps prominent, and isolated hillocks and hummocks (small islands) rising out of a very shallow fluctuating tidal area.

Below 26°N. latitude the old shoreline is well-defined along what was once the Arabian mainland as well as, at that time, what may have been the island areas of Qatar, Abu Dhabi and Oman. Occurrence of the abundant oyster shell middens, usually of a few meters thickness, that are associated with the Ubaid pottery at these sites partially substantiates this shoreline theory. The environment was, in short, quite similar to that of the present-day Marsh Arabs at the head of the Persian Gulf. The present palustrine area that is the home of these people is, in a sense, the gift of the Tigris-Euphrates river system, just as the Delta of Egypt is the gift of the Nile. But both systems arise in climatic zones that are different from the ones through which they flow and into which they debouch.

As indicated in an earlier portion of this paper, the Arabian Peninsula had no such source to continue its drainage system when desiccation set in. What must have been a paludal(lacustrine) environment along the coast of Arabia where the ancient river systems debouched and which furnished a home for the Ubaidian fishermen (the "paludal people", if we may now call them that) therefore perhaps eventually also ceased to exist.[93] In this context, the present-day land at the head of the Persian Gulf might be considered the ancient remnant of a geographic environment that once covered a considerable larger area along the west coast of the Persian Gulf.[94] In this interpretation, the Ubaidians might have migrated to the north and into southern Mesopotamia as their environment along the coast of Arabia disappeared. Eventually they encountered and adopted agriculture from the north, applying what one might call "native ingenuity", and ultimately giving birth to the Sumerians, when history, properly speaking, begins.

Such a scheme might be represented in the following series of consecutive steps:

1. Hunter-gatherers of the eastern Arabian interior and/or littoral fishermen in late Paleolithic times.

2. Ubaidian fishermen and paludal people, occupying the east littoral of Arabia in post-Paleolithic and early Neolithic times. Movement into southern Mesopotamia toward end of this period. No clay sickles associated with the pottery; pre-agricultural phase.

3. Fishermen and paludal people in southern Mesopotamia, but encountering and adopting agriculture from the north. (Clay sickles begin to appear in Ubaid 3 phase). Now moved out of Arabia due to change of environment, and located in southern Mesopotamia.

4. Adoption of agriculture, movement further up to the north, irrigation, geginning of cities and development into Sumerian phase.

The question of ethnic relationships comes up if we are dealing with the Ubaidians as ancestors of the non-Semitic Sumerians, and suggesting the possibility of an Ubaidian homeland in Arabia. Perhaps without getting involved too deeply in the complex problem of ethnic relationships, it is significant and informative to make several somewhat hypothetical points. First, there seems to be

a distinct possibility of several different ethnic stocks in the Arabian Peninsula from early times. The Ubaidians could represent such a root stock, the Semites another, the Negro a third, and a "Hamitic" population the fourth.[95] We might further postulate a geographic distribution for these groups, with Semitic stock occupying the approximate central portion, Ubaidian stock the eastern portion, "Hamitic" populations to the approximate south and possible west of the Semites, and negroid populations to the extreme south. Such a distribution would explain southern Mesopotamia being the apparent later bailiwick of the Sumerians, while north Mesopotamia would become the home of the Semites (driven to the north, then radiating out west and east along the flanks of the Fertile Crescent.)

"Hamitic" populations to the south of the Semites might possibly explain the linguistic relationship between Semitic and "Hamitic" languages; likewise, this position for these poeple, being just north of the negroid territory, would explain this element in this population. Certainly, based on this scheme, modern anthropological analyses, language relationships, and populations distributions make more sense.[96]

Fig. 5, p. 76, a map indicating hypothetical prehistoric ethnic distribution and population movements as a result of post-Pleistocene desiccation, illustrates the above relationships. If this scheme is, indeed, credible, it adds considerable significant knowledge to the history of mankind in this part of the world, population origins in particular.[97]

The Dilmun and Umm an Nahr Populations: Two other populations of at least partial prehistoric nature that occur on the fringes of the Arabian Peninsula need to be mentioned in this survey. For, without doubt, they played significant roles in some as yet undetermined fashion in the complex of cultural activities of the peninsula. These populations are those of the "Dilmun civilization" and the "Umm an Nahr" culture, both located on or very near the eastern Arabian littoral.

The "Dilmun civilization" has come to light in the expeditions of the Danish archaeological team that has been working for the past approximately by fifteen years on the small island of Bahrein, about twenty-five km. off the coast of Arabia. No final excavation report is yet available. Informative, but brief progress "notes" have been issued from time to time in the Danish journal KUML. A popular book, Looking for Dilmun, by T. G. Bibby, has recently been published on the excavation. The book must serve as the main source material available for the present.

The excavations will not be discussed in detail here. The excavators, however, present a fair case for having located the Sumerian Dilmun, or at least a very important center of that kingdom, empire, trading emporium, or whatever it actually was. When we consider the evidence mounting that the Persian Gulf, at least the adjoining littoral of Arabia, and the route down to the Indus Valley constituted a remarkably busy area in late prehistoric and early historic times, there would seem to be ample room for a "Dilmun civilization". Temples,

other monumental architecture, pottery types, glyptic, etc., seem to attest to the fact that the site was much more than just a Sumerian way station to points further south. The significant point for purposes of this theory is that the political entity involved may well have included portions, if not nearly all, of the eastern Arabian littoral north of Qatar, for remains of this civilization have been found as far north as the island of Failaka off the coast of Kuwait. [98]

No systematic search has yet been made on the littoral of Arabia, but Dilmun pottery and grave mounds also occur there. It is interesting to speculate what may have been the relationship between the Arabian Ubaidians and the Dilmun people. Dilmun may possible have been a commercial offshoot of the South Mesopotamian civilization, established perhaps after 3,000 B. C.[99]

Or, more likely, it may represent a remnant of Ubaidian population left behind on the Arabian littoral after the main movement to the north had taken place. Another possibility is that, since an Indus Valley weight system was in use in Bahrein, close affinities may be with the south, in which case Dilmun may have been a sort of intermediate meeting place for two cultures—the South Mesopotamian (Sumerian) in the north and west of the Persian Gulf, and the southern Indus Valley-Oman culture. Without doubt, there were cultural relationships with the southern Persian Gulf and Indus Valley area that we know little about at present.

The other area that should be mentioned in this survey is the "Umm an Nahr" culture of the Trucial Coast and Oman. Excavations off the coast of Abu Dhabi and inland at the oasis of Buraimi, also by the Danish team, have discovered a "culture", more or less contemporary with Dilmun, but differing in significant respects. It seems likely that it was a highly developed culture. The excavators speculate, with fairly good reason, that it might be the remains of the country of Magan, the source of the Sumerian copper supply. (The Oman Mountains contain copper.) Again we are dealing with a somewhat peripheral area of the peninsula, far removed from the site of the "Oval-headed people". It is an area more in the cultural sphere of the Indus Valley and southern Iran, areas with which it undoubtedly had close cultural relations.[100] We know little about this culture at present, although hopefully in the near future, archaeological exploration in the area will begin in earnest. Eventually, yet another significant population of prehistoric Arabia may come to light.

FOOTNOTES

[1]S. Moscati, The Semites in Ancient History, suggests tha the term "Semite" can be used in a meaningful and useful sense if one keeps in mind the Beduin of the Arabian desert of today as a prototype or standard of reference and comparison. This seems a logical approach, as does Moscati's main thesis in general that the Semitic "homeland" (both ethnically and linguistically speaking) is the Arabian desert. For, if the hypotheses of climate change and population movements put forth in this thesis are valid, the Arabian desert Beduin can be explained only as a relict of an indigenous population that occupied the peninsula (perhaps more specifically, the central portion) before the beginning of desiccation. (It must be kept in mind that the main stream of population movement in post-Pleistocene time was out of the peninsula, allowing perhaps for a small portion of movement into the higher altitude mountain fringes. It would seem difficult to justify any significant movements in, except for perhaps minor ones along trade routes - as may have been the case with development of the South Arabian trade kingdoms.)

[2]Some do exist, however, and are temporarily inhabited by itinerant nomads of today. Z. R. Beydoun, American University of Beirut, (personal communication), reports such sites in the interior highlands of the Hadhramaut and Mahra, where winter climate can be rather severe.

[3]Forde-Johnston, Neolithic Cultures of North Africa, p. 45.

[4]Ancient and Modern Man in Southwest Asia, Vol. I, p. 103. See also North Arabian Archeological Desert Survey, 1960.

[5]C. S. Coon, Origin of Races (New York: Alfred A. Knopf, 1962), p. 656, believes, as does Leakey and others, that the sum total of evidence as presently known indicates that, while mankind likely had its birth in Africa, most of the development of Homo sapiens took place elsewhere. If Africa (perhaps more specifically East Africa) is indeed the birthplace of man, then Arabia may well represent man's first step outside his birthplace, Field's "Nursery of Man". The peninsula would then be the first stepping-stone on man's long and arduous dispersal route throughout the world, and thus the second oldest continuously inhabited geographic area in the world.

[6]Living Races of Man, p. 87-88.

[7]Origin of Races, p. 484. W. C. Brice, Southwest Asia (London: University of London Press, Ltd., 1966), p. 59, also states that: ".... according to Sir Arthur Keith, there can still be found widely in the peoples of Arabia traces of negroid ancestry which are far more general and obtrusive than could be explained by occasional admixture of slave blood." See also A. J. Arkell, A History of the Sudan, p. 24: ".... traces of indigenous Negro peoples still surviving

in South Arabia, India, and Austral-Asia.... The Negro is an ancient race, which was once more widely dispersed than it is today." See p. 53 for further data on this subject of a relict indigenous negroid element in Arabia.

[8]Man, No. 9 (1961), p. 23.

[9]Ibid., No. 121 (1958), p. 94.

[10]Charcoal associated with some of these blades has been radiocarbon dated to about 3,100 B. C. H. Field, Man, No. 214 (1960), p. 172. This absolute date is in the vicinity of dating for the Egyptian late Predynastic cultures.

[11]Geographic Journal, Vol. XCIII, No. 1 (1939), p. 18-38.

[12]The Place of Egypt in Prehistory (Cairo: L'Institut Français d' Archéologie Orientale, 1951), p. 226.

[13]The Prehistoric Cultures of the Horn of Africa (Cambridge: University Press, 1954), p. 326, 330.

[14]Proceedings of Anthropology, Vol. XXXV (1933).

[15]Proceedings of the Prehistoric Society, Vol. XIX, No. 9 (1953), p. 189.

[16]Man, No. 209 (1954), p. 133.

[17]Man, No. 240 (1963), p. 187.

[18]Superficially, and assuming genetic affinity of any kind at all between these tools and the Egyptian ones, natural inclination, in view of present knowledge, would be to consider the Arabian material as representative of a possibly contemporary "backwater," since lack of grinding is a more primitive characteristic. However, when reconciled with the sum total of evidence as put forth in this thesis, which, among other things, implies derivation of certain North African elements from Arabia, the more likely suggestion might be that the Arabian tools are linear progenitors of the Egyptian ones.

[19]Personal written communication to Mr. S. Zimerman, Arabian American Oil Company, Dhahran, Saudi Arabia, February 15, 1956. (Quoted by permission.)

[20]Sceptre of Egypt (Cambridge: Harvard University Press, 1953), p. 41.

[21]A word on relative time terminology for the prehistoric period is perhaps in order here. Recent trend is to eliminate the term "Mesolithic" (never at best a very useful term anyway), as increased knowledge continues to indicate that this "period" is more properly a transition phase between Paleolithic and Neolithic (or hunting-gathering and herding-farming) cultures. The old term becomes more and more meaningless as more data comes to light on the nature of the beginnings of sedentary-agricultural life. Because the period is one of transition, flux and variation from place to place and time to time, no really good general term suggests itself as a substitute. If one is concerned with a hold-over or continuation in time of a Paleolithic type flint industry, for example, (as in the case of Wendorf's "terminal Paleolithic" of the Nile Valley, which he believes ended about 1, 000 years before the beginning of Fayum A — see p. 42 , footnote 33), the term "epi- (upon or from) Paleolithic" might be appropriate. Kenyon's pre-pottery Neolithic agricultural phase of Jericho, on the other hand, might be more appropriately referred to as "proto (early) Neolithic", since practice of agriculture is a hall-mark of the Neolithic, under certain circumstances. Since, however, all of the above terms have some connotation of stone tool industry, and since this may be only generally applicable in many cases, phrases descriptive of the social stage of development, such as Braidwood employs, may be more useful and meaningful in the long run. In most cases, for purposes of this thesis, the terms "post-Pleistocene," or "post-Paleolithic," and Neolithic have seemed sufficient and meaningful enough.

[22]Cambridge Ancient History, Vol. I, Ch. III (Fascicle No. 30), p. 7. She further suggests that, while no fossil human remains have yet been found in Egypt, its cultural isolation during Upper Pleistocene suggests the possibility that the makers of the various industries which derive from the old Levalloisian may have been lingering survivors of a race having Neanderthal affinities, who were not displaced by modern man before Mesolithic times. She admits, though, that this is mere speculation that can only be proved or disproved by discovery of skeletal material. It is interesting to note, however, that skeletal material of modern man, i. e., Homo sapiens, has so far not been found anywhere in Africa that predates for certain the approximate end of the Pleistocene. Coon, The Origin of Races, p. 603-604, states that the earliest Caucasoids in Africa, the Mouillians, came in toward the very end of the Pleistocene, that modern man does not enter Africa until the end of the Pleistocene, and that his entrance may be attributable to climate change.

[23]The Cultures of Prehistoric Egypt, Pt. I, (rev. ed., London: University Press, 1955-60), p. 19.

[24]The Place of Egypt in Prehistory, p. 319.

[25]Ibid, p. 315.

[26]K. S. Sandford and A. J. Arkell, Paleolithic Man and the Nile Valley in Nubia and Upper Egypt (Chicago: University of Chicago Press, 1933), p. 46; R. Vaufrey, L'Art rupestre de Nord Africaine (Paris: Masson et Cie., 1939), p. 117. Also Delacroix and Vaufrey, L'Anthropologie, Vol. XLIX, p. 301.

[27]Neolithic Cultures of North Africa, p. 108, 132.

[28]Ibid, p. 70, 132.

[29]Kharga Oasis in Prehistory, p. 31.

[30]New Light on the Most Ancient East (London: Routledge and Kegan Paul, 1952), p. 46-47.

[31]Cambridge Ancient History, Vol. I, Ch. III (Fascicle No. 30), p. 6.

[32]F. Wendorf, et al., Science, Vol. 169, No. 3951 (1970), p. 1161. Also Wendorf and R. Said, Nature, Vol. 215, No. 5098 (1967), p. 245.

[33]The radiocarbon dates quoted in this study indicate that only 1000 years span or less separates "Terminal Paleolithic" industry from Fayum A. Technological and typological differences between the two industries, however, are of such a magnitude as to preclude Fayum A's having developed from the "Terminal Paleolithic." An outside source, not yet identified, is the likely answer, according to the investigators.

The evidence from this new study may help substantiate Garrod's speculation about late Paleolithic survivors with possible Neanderthal affinities being replaced in the Nile Valley with arrival of modern man in post-Paleolithic times. (See above, p. 40, footnote 22.)

[34]See Field, Ancient and Modern Man in Southwestern Asia, Vol. 2, p. 26-33, Plates XXV and XXVI, for leaf-shaped points; Kapel, Atlas of the Stone Age of Qatar, Plates 17, 23, and 25 for tanged, triangular points and leaf-shaped points; Zeuner, Man, No. 209 (1954), suggests other analogies also. (See above, p. 38-39, for Zeuner's comments.)

Fred Wendorf, Southern Methodist University, (personal communication), states that in Fayum A, bifacial, leaf-shaped points suddenly appear, along with a new lithic complex that looks non-Nilotic. He had formerly surmized that it derived from the east - perhaps the Levant - but concedes that it could possibly have come from the Arabian Peninsula.

[35]The assumed association of Neolithic tools with the so-called "Neolithic revolution" and agriculture, and the suggestion herein put forth of a possible Arabian provenance for the Nile Valley Neolithic invites comment here. H. Seeden, American University of Beirut, (personal communication), states: "The Neolithic revolution was brought into Egypt from areas where early grains were cultivated, i.e., present. Grain came into Egypt from the north, not from Arabia." This contention is probably essentially correct, and no suggestion is made in this thesis that agriculture derived directly from Arabia. However, that incipient agriculture may have been on the verge of development in Arabia has been suggested. (See above, p. 43, footnote 42.) In any case, Arabia could still have been the link or channel through which the knowledge of agriculture was transmitted. (See above, p. 43, regarding Arabia's possible role in transmitting ideas of the "Neolithic revolution.")

[36]It is not known if artifacts were collected that may have been associated with these drawings. They may have been, since Philby was a very astute and accurate observer of such things. However, there is also a noted lack of meaningfully associated tools with most of the North African rock drawings. (J. L. Forde-Johnston, Neolithic Cultures of North Africa, p. 78). Doubtless, the same is true of the Arabian ones, and for the same reasons.

[37]Such arrowheads would seem to be ideal for hunting animals with long, thin necks and/or legs, such as ostrich, especially, and gazelle and oryx. They would have been excellent tools for hamstringing animals that run in herds.

[38]Ibid., p. 73.

[39]The Cultures of Prehistoric Egypt, p. 39.

[40]Early Khartoum (London: Oxford University Press, 1949), p. 43.

[41]See C. L. Woolley, Ur Excavations, Vol. II: The Royal Cemetery (Oxford: The University Press, 1934), plates 152 and 154, for the example from Meskalamdug's grave; see R. Maxwell-Hyslop, Iraq, Vol. 8 (1946) p. 50-51 and Plate V, for Tallish (Iranian) examples.

[42]W. M. F. Petrie, Tools and Weapons (London: British School of Archaeology in Egypt, 1916). See also W. A. Ward's discussion of the occurrence and chronology of this weapon, Journal of the Economic and Social History of the Orient, Vol. VII, Part II (1964), p. 123. He states that the type was apparently introduced into Egypt in the early Middle Kingdom and that it came through Syria.

[43]See E. Anati, Rock Art in Central Arabia, Vol. I, p. 47-48, Plates XIV and XV, Figs. 21-22.

[44]Neolithic Cultures of North Africa, p. 78-97.

[45]Journal of Near Eastern Studies, Vol. IX, No. 1 (1950), p. 8.

[46]Rock Art in Central Arabia, Vol. II, p. 75.

[47]A. H. Winkler's analysis of some of his rock art people —those he calls "Eastern Invaders"—is extremely interesting. He states: "Into this now Hamitic country between the Nile and Red Sea entered a foreign people - seafarers. At one time they were in communication with Mesopotamia. But whence did they come? People dwelling on open coasts....develop the art of shipping and the courage to cross the sea. Throughout a long period, these invaders filtered from the Red Sea into the Eastern Desert. They swarmed all over the mountain region and reached the Nile. They formed a channel through which Mesopotamian influences reached Egypt. Were they elsewhere such intermediaries? Is the sudden rise of civilization in Mesopotamia, Egypt, and India connected with these seafarers? One thing is certain: we have not hitherto taken the sea sufficiently into account as a way of migration of mankind and ideas." Rock Drawings of Southern Upper Egypt, Vol. I (London: The Egyptian Exploration Society, 1938), p. 40.

These rock drawings, as is true of rock drawings in general, have not been given nearly as much attention by scholars as they merit, being all too often summarily dismissed as "too difficult to date." A detailed reexamination of Winkler's drawings and systematic comparison with those from Arabia could be most informative. For unpublished photographs by Winkler see American Documentation Institute Microfilm Nos. 8659-8663, pp. 615, Library of Congress, 1965. (H. F.).

[48]Ibid.

[49]Environment and Archaeology (London: Methuen and Co., Ltd., 1965), p. 453.

[50]In H. G. Bandi (ed.), The Art of the Stone Age; 4000 Years of Rock Art (London: Methuen, 1961), p. 128-129.

[51]It is quite likely that this "cattle period", in some way, has meaningful correlation with the "Neolithic wet phase" of Butzer and Huzayyin. The dates involved seem almost too close to be fortuitous, and the fact that cattle require grassland for sustenance that may have been afforded by the "wet phase" seems additionally significant.

[52] Rock Art in Central Arabia, Vol. II, p. 75.

[53] Field, Man, No. 144 (1962), p. 88, and in a separate publication, Rock Drawings from Saudi Arabia (Coconut Grove, Miami: Field Research Projects, 1970), describes three additional sites. Winnett and Reed (Ancient Records from North Arabia) illustrate (but do not analyze) several sites. Other sites (unpublished) known to the author of this thesis include: (1) vicinity of Wadi Faw; (2) vicinity just to the north of Najran; (3) along the Jilh scarp; (4) about 20 km. northwest of Sakakah. Jebel Qara, where the drawings studied by Anati occur, represents a small area of outcrop of the Wajid sandstone formation. Very possibly many other drawings occur scattered throughout the extent of this formation, the lithology and topographic exposure of which afford excellent drawing surface.

[54] It is true that similar ecological systems (with similar geological, geographical, and climate factors) may cause similar features (homeomorphy) to "evolve" in cultures otherwise totally unrelated spatially and temporarily. (Pyramidal architecture in Egypt and pre-Columbian civilizations of South America is an example.) On the other hand, it must be assumed that similar contemporaneous systems in areas in geographic proximity, given incentive for population movement and exchange and absence of physical barriers, will produce populations culturally and ethnically related in some significant degree.

[55] An important reference here is C. G. Seligman and B. Z. Seligman, Pagan Tribes of the Nilotic Sudan (London: Kegan Paul, (1965)). This book postulates "Hamites" from South Arabia populating Upper Egypt in predynastic times. The authors state (p. 4): "The Hamitic cradleland is generally agreed to be Asiatic, perhaps southern Arabia or possibly an area further east.... Wherever they originated, there is no doubt that they entered (Africa) in a succession of waves, of which the earliest may have been as far back as the end of the pluvial (Pleistocene) period, and so gave rise.... to numerous groups of hamiticized Negroes." They further state: "....the incoming Hamites were pastoral Caucasians...." The Negro element in Hamitic populations is discussed early in this study.

[56] H. Frankfort, Birth of Civilization in the Near East, p. 110, sums up the situation appropriately. "It is unfortunate that we cannot yet answer the question where and how contact between Egypt and Mesopotamia was established. We only know the time at which it took place: later half of the Proto-literate period in Mesopotamia and end of Gerzean and very beginning of the first dynasty in Egypt."

W. B. Emery, Archaic Egypt (Edinburgh: R. and R. Clark, Ltd., 1961), p. 31, is one of the few scholars who has suggested the possibility of an intermediate area of cultural transmittal. He states: "Modern scholars have tended to ignore the possibility of conquest and immigration to both regions (i. e.,

Egypt and Mesopotamia) from some hypothetical and as yet undisclosed area. But vast tracts of the Middle East and Red Sea and East African coasts remain unexplored by archaeologists, so that such a possibility must not be completely ignored."

[57]We must recall here the evidence for hyperaridity beginning in Arabia about this time, when sabkha formation and, quite probably, aeolian sand deposition began. (See above, Ch. II, footnote 10.)

[58]Huzayyin, Place of Egypt in Prehistory, p. 323, states that when the Nile began to dry up and degrade its bed as desiccation set in, the flood plain and delta of the Nile were no longer reached by inundation and lateral and deltaic marshes were gradually drained into the river.

[59]The Indus Valley may have served as a magnet to draw in populations from southeast Arabia and the southern Persian Gulf littoral.

[60]The climate change was, of course, not sudden, so Butzer and Huzayyin's estimate need not be accepted at exactly 2,500 B. C. It would, in fact, fit the general cultural pattern better (assuming above speculation about populations in the Fertile Crescent is reasonable) if the end of the "wet phase" could be moved closer to 3,000 B. C. Butzer, Cambridge Ancient History, Vol. I, Ch. II (Fascicle No. 33), p. 28, suggests a possible "sharp" decline in rainfall in Egypt about the time of the first dynasty - 2,850 B. C.; elsewhere, Quaternary Stratigraphy, p. 116, he mentions archaeological and geomorphological evidence for a decrease in rainfall in Egypt "after about 3,000 B. C." The previously mentioned dates for sabkha formation and aeolian sand deposition would also tend to suggest a date closer to 3,000.

[61]No implication is intended that the Crescent was not inhabited prior to desiccation, however. It most surely was, for ample evidence of various cultures and levels of Stone Age occupation have been found in it. As for the contrast between the west and east horns, it is pertinent that, compared to Mesopotamia and Egypt, not a great deal of information, for some reason, is available on this area of the Fertile Crescent and it does not seem to enter into the main cultural continuum of the area until about late third millennium B. C., and this in spite of the considerable amount of exploration in the area. Nevertheless, this theory of contrast between areas of the Crescent is admittedly tenuous and is therefore put forth with some caution. W. Ward, American University of Beirut, (personal communication), comments: ".... Byblos is already a thriving city with extensive trade relations by 3,000 B. C. The only thing which differentiates Byblos and other western sites from Sumer is writing—and this may already have been in use for all we know."

[62]These places are almost legendary in the Mesopotamian literature references of the first millennium. W. F. Leemans, Foreign Trade in the Old Babylonian Period, p. 165, indicates that trade contact between Mesopotamia and these places probably ceased after the Larsa dynasty.

[63]Leemans, ibid., p. 116-128, sums up the textural evidence for such trade.

[64]Mineral Resources Research, 1967-68, Director General of Mineral Resources, Saudi Arabia, 1969.

[65]Baumgartel, Cultures of Prehistoric Egypt, Vol. II, p. 6-7 and 141, suggests that the provenance of the Naqada II "invaders" of Egypt should be looked for in an area where there was good supply of silver, for these people seem to bring in an abundance of silver items. (The Eastern Desert contains no silver, nor does Sinai.) Petrie, cited in A. Lucas, Ancient Egyptian Materials and Industries, 4th ed., (London: Arnold, (1962), p. 280, states that the silver employed in the Predynastic period was probably obtained from Syria (to which case he attributes its scarcity) and that it could be got only by mining in North Syria. Lucas (ibid, p. 280-281), however, says there is no evidence whatever for a Syrian provenance. He admits that the early source of silver for Egypt is a problem and postulates a possible occurrence of electrum ("white gold"), conceding, however, that no known source of this element now exists in Egypt. It seems quite possible, therefore, that the source of late Predynastic Egyptian silver may have been Western Shield of Arabia.

[66]A History of Domesticated Animals, p. 177.

[67]Cultures of Prehistoric Egypt, p. 24.

[68]Cited by Childe, New Light on the Most Ancient East, p. 47.

[69]Rock Art in Central Arabia, Vol. II, p. 5.

[70]Cited by Anati, ibid.

[71]Ibid., p. 1, et passim.

[72]A History of Domesticated Animals, p. 364.

[73]From the Stone Age to Christianity (2nd ed., Garden City: Doubleday Anchor Books, (1957), p. 120-21.

[74]See Field, Rock Drawings from Saudi Arabia, Plate 3, and Winnett and Reed, Ancient Records from North Arabia, p. 238, for examples.

[75]Such evidence would indicate also that the camel did not become the mainstay and sustenance of the Arabian desert Beduin until late, perhaps early first millennium. Anati's fat-tailed sheep may well have thrived until about this time also, and quite likely asses (wild and domesticated) were still common. (The wild ass occurred in Arabia, and ass trains are well attested in cuneiform inscriptions. Anati documents the fat-tailed sheep in Arabia.) Moscati, The Semites in Ancient History, p. 72, states: "The first mention of Aribi, i.e., Arab nomads for whom the use of the camel and hence the possibility of true nomadism are extensively attested, goes back to the ninth century B.C., and from that time onward such mention becomes frequent to the end of the Assyrian and Babylonian empires."

Camel domestication could also be a clue to paleoclimate (specific evidence for increasing aridity), in that it would probably have been domesticated as a result of desiccation, since no other large sized beast was able to survive in the area under arid conditions. Since it is a difficult beast to handle, it may well have been domesticated as a last resort, perhaps after the ass was no longer practical as a beast of burden in Arabia.

[76]Zeuner, A History of Domesticated Animals, p. 350.

[77]Abydos (London: Eg. Expl. Fund, 1902), Part II, p. 48, Plate 10. Petrie's dating of this object may be somewhat questionable, however, since all of the Abydos material is not first dynasty.

[78]H. Kees, Ancient Egypt; a Cultural Topography (Chicago: University of Chicago Press, (1961)), p. 118. W. A. Ward, American University of Beirut, (personal communication), states: "This (evidence) does not indicate the use of the camel in Egypt, but certainly supports at least an incidental contact with Arabian traders, or the like."

[79]E. Anati, Rock Art in Central Arabia, Vol. II, p. 70.

[80]Ibid., p. 108.

[81]G. Burkholder and M. Golding, "A Surface Survey of Al-Ubaid Sites in the Eastern Province of Saudi Arabia." Paper read at Bahrein Conference, March, 1970. See Appendix A in FRP No. 58.

[82]Chronologies and terminology after E. Porada, in Ehrich (ed.), Chronologies in Old World Archaeology (Chicago: Univ. of Chicago Press, 1965).

[83]M. Golding, Dhahran, Saudi Arabia, (personal communication). Unpublished data.

[84]No intrusive pottery seems present on the sites, as it commonly is in other sherd fields of later dates in eastern Arabia.

[85]Iraq, Vol. XXII (1960), p. 32.

[86]A Sumerian myth records that An, the sky god, brought wheat, barley, and hemp down from the heavens to the fertile earth. Enlil then piled all of it up in the hill country "barring the mountains as with a door". Then the gods Ninaza and Ninmada decided to let "Sumer, the land that knows no grain, come to know grain." A. Falkenstein, in Bottero, et al. (ed.), The Near East (New York: Delacorte Press, 1967), p. 25, (translation from Kramer).

A number of scholars have suggested that the Sumerians are derived from the Ubaid or Warka cultures. Joan Oates, Iraq, Vol. XXII (1960), p. 32 sums up the evidence thoroughly, with the additional added information from the Eridu excavations of the late 1940's, and presents a pretty good case for Sumerians being Ubaidians. Mallowan, Cambridge Ancient History, Vol. I, Ch. VIII, Part I (Fasc. 58), p. 20, states: "Most authorities would argue the arrival of the Sumerians either at beginning of the Ubaid or in the Uruk period, and most agree that the Uruk period is too late."

This assumption is made in this thesis that the Sumerians are linear descendents of the Ubaidians.

[87]See below, p. 51, footnote 93, for one reason why Ubaidians probably never inhabited the Iranian littoral.

[88]Comparative Archaeology of Early Mesopotamia (Chicago: University of Chicago Press, 1949), p. 96.

[89]Iraq, Vol. XXII (1960), p. 32.

[90]Faced with climate change, the post-Pleistocene population of Arabia had perhaps four choices: stay and become nomadic pastoralists, as some of them did; migrate to the littoral and become fishermen; migrate to the river valleys outside the peninsula and eventually take up agriculture; or migrate out of the peninsula and take up animal herding elsewhere.

[91]Early Khartoum, p. 81-95.

Further speculation is perhaps justified on this point of fisherfolk developing a refined pottery. It seems natural, offhand, to associate impetus for pottery development with beginning of agriculture, in that production of surplus food stuffs would require storage of some sort, especially as permanent houses began to be built and need for granaries arose. The connection is not as clear cut

as that, however, on closer examination. S. Cole, The Neolithic Revolution (London: British Museum, 1959), p. 4, states: "At one time, pottery was thought to be one of the essential criteria of Neolithic culture; but later discoveries have shown that it may sometimes antedate agriculture and the domestication of animals, for instance in Kenya and in the Mesolithic cultures of Khartoum and Denmark. Moreover, some of the earliest food-producing communities in the Middle East—at Jarmo and in the lower levels at Jericho—did not make pottery at all." Kenyon's Pre-Pottery Neolithic (Natufian) levels at Jericho present evidence that a "successful system of agriculture may be inferred with a high degree of probability." Archaeology in the Holy Land, p. 45. A more logical hypothesis for the origin of pottery would seem to be that it eventually developed after man became sedentary and was then able to exercise his natural hoarding instinct. In this context, pottery would not be the exclusive bailiwick of agriculturists, and any sedentary population then, whether farming or fishing, might potentially take advantage of and develop it. Even if pottery was "invented" and spread from a central source (as may or may not have been the actual case), there is no reason why the idea might not have reached the Ubaidians, who probably were not in any case culturally isolated, and who could then have proceeded to develop their own distinctive style. The overall point to be made is that the Ubaidians need not have been agriculturists because of their pottery.

[92] R. L. Maby, Arabian American Oil Company, Dhahran, Saudi Arabia. Unpublished data. (By permission.)

[93] It should be realized that these early Ubaidians probably were not deep sea fishermen. The present Marsh Arabs seldom venture out into the open sea. The palustrine environment is a specific one, and the ecology and culture that necessarily accompany and develop from it are specific.

It is likewise interesting to note that it is highly unlikely such an environment could have existed on the eastern (Iranian) side of the Persian Gulf within the history of man. Water depth, nature of the shore line, and drainage system in this area, where the Zagros Mountains plunge rather abruptly into the Gulf, would have precluded such a development. This fact could help account for the lack of Ubaidian remains on the east side of the Persian Gulf, if, indeed, the Ubaidians were "paludal people," as herein hypothesized.

[94] No inference is intended that the present Marsh Arabs are relict populations of the Ubaidian-Sumerians. The point rather to be made is that we may be dealing with a relict ecosystem that might well represent the same kind of base on which Sumerian civilization developed.

[95] There is no valid reason why the peninsula may not have contained several different ethnic stocks. We have already seen that it may have contained an early negroid population in the south. (See Ch. III, footnote 7.)

A. J. Arkell (A History of the Sudan, p. 33) states: "The brown or Mediterranean race in the Sudan is thought to have originated in Arabia, various waves having left the Arabian Peninsula at different times, owing primarily to climatic change, periodic droughts forcing part of the population to emigrate. Thus the Beju of the eastern Sudan and the Masai of Kenya and Tanganyika are probably descendents of earlier waves which left Arabia before the beginning of history...."

S. Moscati, Semites in Ancient History, p. 18, states: "It is now an established fact that the Semitic languages, along with Egyptian Libyo-Berber, and Cushitic, make up a wider linguistic family, the Hamito-Semitic, and that the relationship between the members of this family is so close that it can be explained only on the hypothesis of a common origin."

J. Grinz, Journal of Near Eastern Studies, Vol. XXI (1962), p. 189, states: "....affinity between the Semitic and Hamitic languages may indicate that at one time they existed in geographic proximity. The most likely spot for this to have occurred is the Arabian Peninsula which lies on the border between the Semitic and Hamitic homelands."

C. S. Coon, The History of Man (London: Jonathan Cape, 1955), p. 196-97, speaking of the possible origin of the "gracile, fine boned and slender" branch of the Caucasoid race, states: "We can be reasonably confident, until other evidence upsets the theory, that these deserts of Southwest Asia (i. e., Arabia) were the home of the slender variety of Caucasoid man. In East Africa this type has survived among the slender, narrow-faced Watusi and other cattle people." In another reference, The Races of Europe (New York: MacMillan, 1945), p. 45, Coon speaks of Somalis and Masai as "....East African Hamitic, all of whom....contain admixture of negroid blood." He further suggests (Origin of Races, p. 45) that "The ancestors of the Caucasoids, who, as we suppose, evolved in west Asia, could possibly have been in contact with a Congoid subspecies in South Arabia." Coon has done the most detailed anthropological analysis of the people of the Horn of Africa. (See The Living Races of Man, p. 120.) His measurements and observations of the people of South Arabia (ibid., p. 82) and Sir Arthur Keith's anthropological analysis of measurements and observations made by Bertram Thomas in South Arabia, Arabia Felix, p. 319-321, et passim, form the basis from which relict negroid and "Hamitic" elements are recognized in this area of the peninsula. There is no apparent valid reason to question these analyses. H. St. John Philby, Background of Islam, (Alexandria: Whitehead Morris Egypt, 1947), p. 7-10, suggests Semitic affinity with Stone Age man of Arabia. This is doubtless the result of encountering flint tools scattered about the desert in his wide travels in Arabia, astute in situ observations on the geology, geography and anthropology of the area, and synthesis with a knowledge of the ancient history of the Near East, the total conclusion perhaps put together in the same approximate manner as this thesis. His theories are basically the same as portions of this thesis: wet climate during Pleistocene time with an

"autochthonous" Paleolithic hunter-gathering population that gave rise to a post-Paleolithic population which began to migrate "northwards in successive waves, doubtless in consequence of the progressive desiccation of their homeland after Paleolithic time." He goes so far as to suggest that these "autochthonous" Paleolithic hunter-gatherers of Arabia were "Arabs and spoke Arabic." Philby's opinion may seem dogmatic, but his studies of ancient Arabia are certainly scholarly enough to be taken seriously.

[96] By way of putting "race" and language in proper perspective and providing a logical basis for some of these speculations on ethnic relationships in the Arabian Peninsula, the following observations are perhaps appropriate. "Hamite" is an often misused term, having properly speaking, nothing to do with race in the proper sense. Postulation of a "Hamito-Semitic" language family, however, seems valid, and generally acceptable to linguists. See W. F. Albright, "The Evidence of Language, Cambridge Ancient History, Vol. I, Ch. IV (Fascicle No. 54), p. 13. While it is true that, in historic and especially modern times, language and ethnic affinity are far from always having a close relationship, we must assume this is a function of population movement and dispersal. It must be assumed that, at least ideally, any language as an entity developed in a homogeneous population in some sort of geographic isolation, in the precise and same manner that genetic components (the gene pool) of a particular ethnic group developed. Projected back in time and place to origin, therefore, all members of any particular ethnic group would speak the same language. Language origins thus cannot be separated from ethnic origins in this sense. This rationale for the relationship between "race" and language, as herein put forth, generally follows Albright who states (ibid., p. 3): "While it is difficult to establish a close relationship between language form and the racial in cultural characteristics of its speakers, an intimate relationship does exist between culture and language content." He further remarks (ibid.): ".... the study of the history and development of a language.... provides useful - sometimes unique - evidence of otherwise undiscernable ethnic and cultural affiliations."

[97] The author of this thesis is cognizant of the fact that large-scale population movements, such as herein postulated, cannot be gibly proposed, mainly because they are complex and not easy to analyze. Many factors are involved, many questions concerned with such movements have not yet been firmly formulated. For example: What is the reason for such movements in the first place - political, economical, ecological? What happens to a population when its ecology changes, and what is the effect of gradual vs. sudden change? Does the population expire in situ, or does it pack up and move out? To what extent does it keep its ethnic unity along the way? How easily does it adjust to a new environment or ecosystem? What is the exact nature of the often used phrase, "population pressure?" What role does the time factor play? These and many other questions must be satisfactorily answered before particular and more precise data can be

given on population movements of the ancient Near East. Nevertheless, that certain movements did, in fact, take place, the basic general direction of such movements as herein proposed, causal factors of these movements, and association with different ethnic groups are considered to be fairly valid and reasonable postulation.

[98]Sargon of Akkad records that he conquered ".... Bit-Iakin on the shore of the Bitter Sea as far as the border of Dilmun." This is very possibly a reference to the east coast of Arabia. Bibby, Looking for Dilmun, p. 309.

[99]See Bibby, Looking for Dilmun, p. 378-79, for dating of Dilmun, Magan (?), and Meluhha cultures.

[100]Bibby, ibid., p. 277-278, points out pottery affinities with the Kulli culture of Baluchistan. The Indian humped bull is figured in decoration on some of the pots. He also indicated (p. 306) that the people of Umm an-Nahr and Buraimi may have vanished with change in climate. Stone houses, presence of game animals, and several clues give evidence of "different climate, in particular, greater rainfall, than that of today."

Another interesting find at Umm an-Nahr was what may be camel bones, along with a tomb carving of a camel, non-humped bull, and a goat (or oryx). This presents the possibility of camel domestication in Oman about mid-third millennium.

Note. On April 1, 1955 during the Peabody Museum (Harvard) - University of Karachi Joint Expedition to West Pakistan just north of Jangal toward Surab in Baluchistan we halted at a low archaeological mound (damb) 2.5 miles north of Zayak Spring. Here we collected chert flakes and small cores, painted and plain pottery and a series of terra cotta figurines. I found a figurine of a camel; this is believed to be the oldest proof of the existence of the camel in Baluchistan. The pottery and other figurines are characteristic of the Indus Valley cultures.

Attention is called to the camel ornamenting a copper object from Khurab in Iranian Baluchistan (Peabody Museum Cat. No. 36-91-60-43) about which there has been considerable discussion. (H.F.). See Henry Field, An Anthropological Reconnaissance in West Pakistan, 1955, with Appendixes on the Archaeology and Natural History of Baluchistan and Bahawalpur, Peabody Museum Papers, Vol. LII, pp. 332, 118 Tables, 144 Figures, and 8 Maps, 1959.

SUMMARY AND CONCLUSION

This thesis has presented a general survey of prehistoric populations, as far as known or can be inferred, or the Arabian Peninsula. The basic intent has been to show that the peninsula can no longer be considered a tabula rasa in the history of mankind. When the initial realization is made that it has by no means always been an uninhabitable desert, the presence of various cultures in time and space within the peninsula taking their respective places in the overall cultural complex of the ancient Near East becomes perfectly credible.

It has been shown in this thesis that the Arabian Peninsula probably had a very important role to play in the story of mankind. It has been shown that it may have served as a stepping-stone from man's possible birthplace in East Africa to dispersal routes throughout the world. It has been shown that Stone Age man hunted and gathered at a time when rainfall abounded and game animals and vegetation thrived. It has been shown that the population did not develop in an isolated cultural back-water, and that, to the contrary, because of the strategic geographic location of the peninsula and climate vagaries, it may have been precisely at the crossroads of important early determinative factors concerning population and cultural processes between the continents of Africa and Asia.

A considerable amount of the substantiating data for this thesis is admittedly rather scant. This is not because the evidence is lacking, but simply because it has not heretofore been discovered and analyzed.

The data presented herein have not been investigated in depth, again because so little information is readily available, and because the deliberate intent has been to set up first a broad framework into which later details and observations can be placed. The data used, nevertheless, and the various converging clues that emerge from a synthesis of this data, are sufficient to substantiate the main conclusions, and take them out of the realm of rank speculation.

Likewise, the basic premise around which this thesis is built, namely, that Arabia has not always been as arid as today and that it once sustained a substantial population of ancient man, can virtually be stated as fact. Furthermore, while it is quite true that the keystone that supports this premise and binds the argument of the thesis together is paleoclimate evidence, various tangential lines of other independent and corroborative evidence keep it from being an argumentum in circulo.

Though rather strong inferences have frequently been put forth, an attempt has been made to avoid dogmatism, and no direct and unqualified proposals have been made, such as that Predynastic Egyptian civilization derived from Arabia, or that the Sumerians definitely originated in Arabia, or that the Arabian Desert was the original homeland of Semitic and "Hamitic" populations. Rather,

in support of a general theory that prehistoric populations of Arabia do not represend stunted, terminal offshoots of man's cultural tree, possibly significant "affinities" with neighboring populations and cultures have been suggested.

Doubtless, some specialists and scholars in the field of ancient Near Eastern studies would find what they adjudge to be misconceptions, if not perhaps a few outright inaccuracies, in this thesis. It is hoped, however, that these may not be major faults, and that the general whole will stand as fairly credible and reasonably sound hypothesis. If nothing else, at least a straw man has been set up that may perhaps stimulate incentive to constructive rethinking of some of the impasses that currently plague studies of the ancient Near East.

Eventually, then, some of the missing pieces in the perplexing jigsaw puzzle of ancient cultural patterns in the area may begin to fall into place.

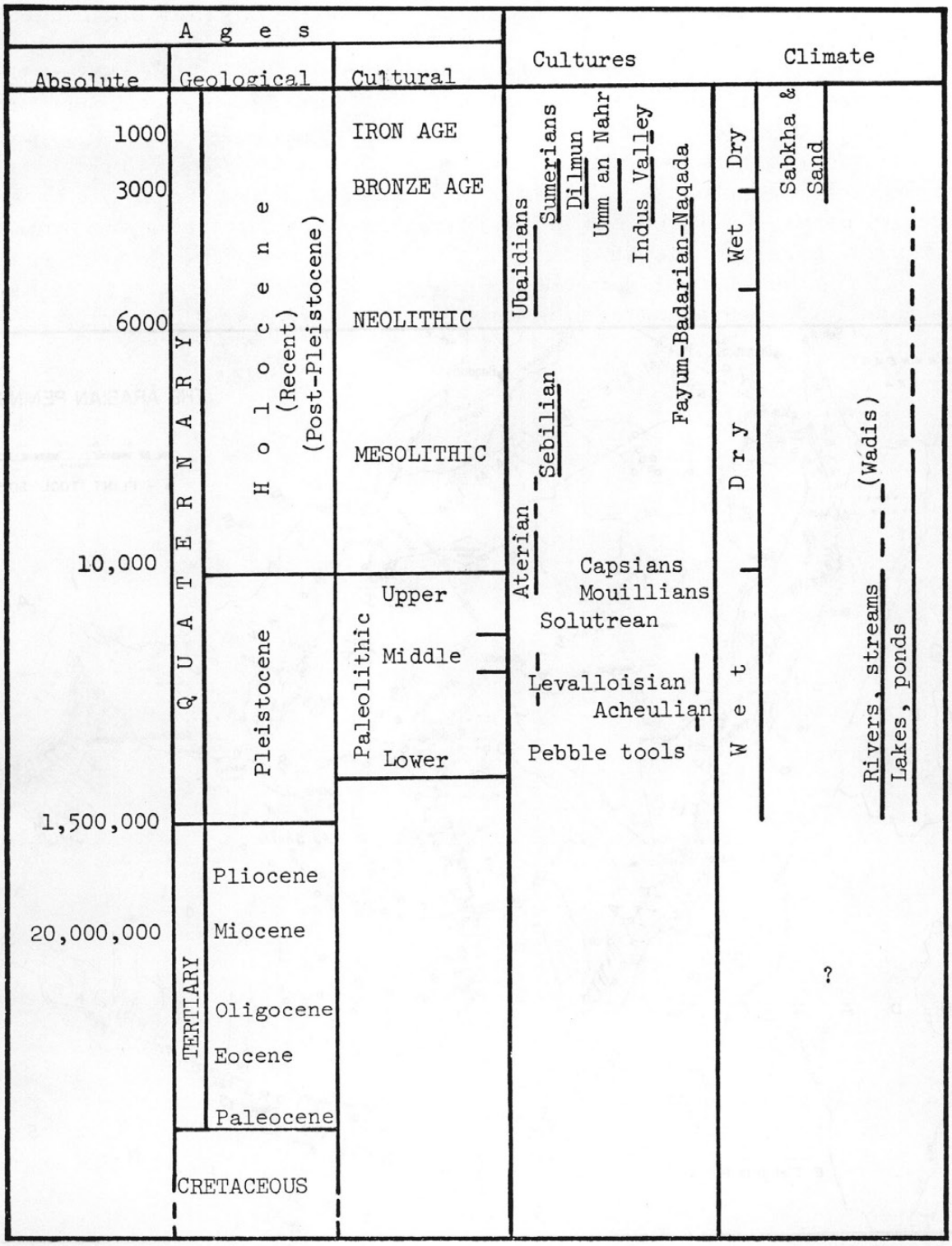

Fig. 1.-- Relative chronologies of periods and cultures.

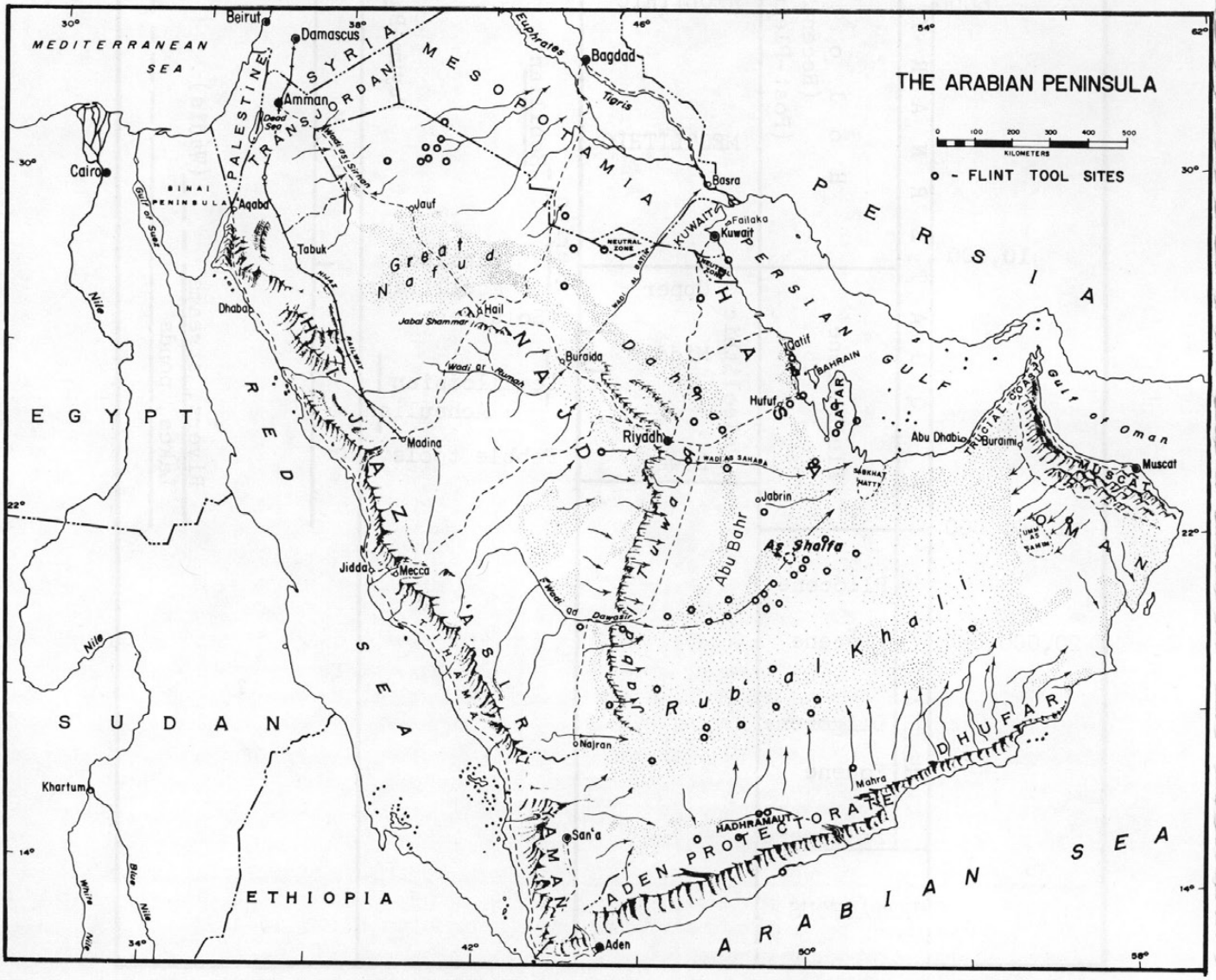

Fig. 2. — The Arabian Peninsula, showing various geographic and geologic features and flint tool sites.

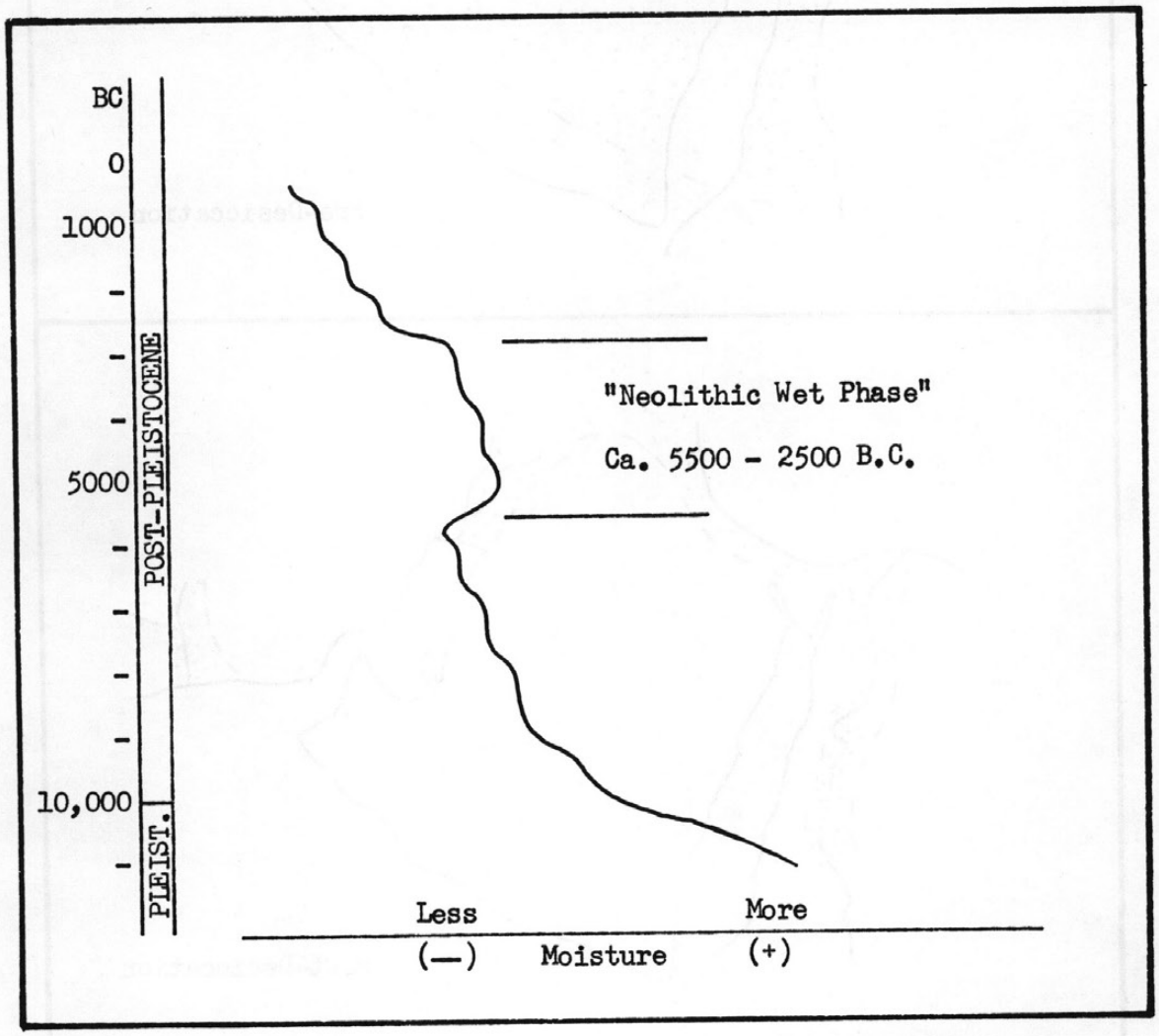

Fig. 3.— Paleoclimate of the Saharo-Arabian climatic belt. (Very general graphic representation.)

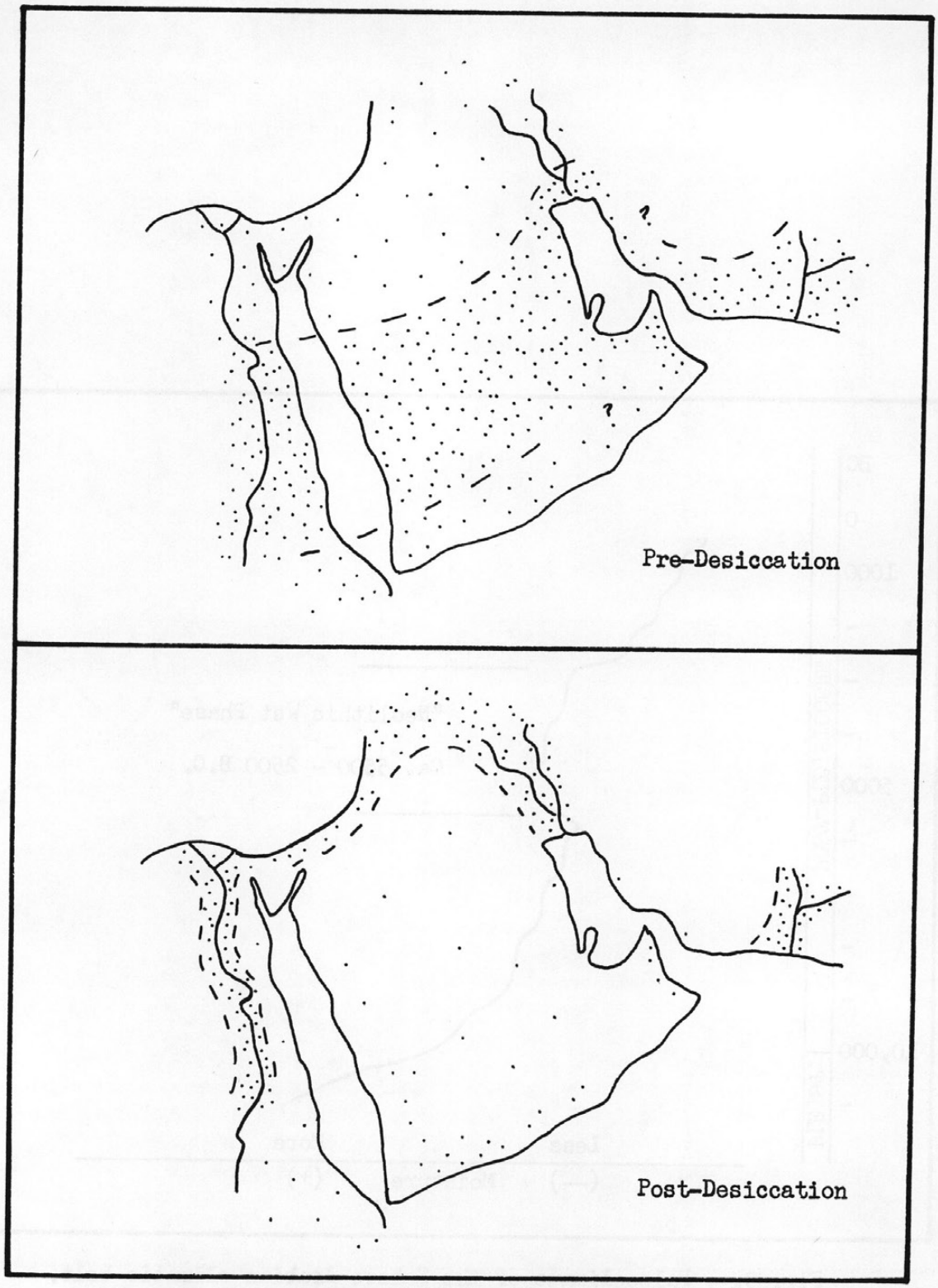

Fig. 4.— The Arabian Peninsula, showing hypothetical demographic and cultural distribution, pre- and post-desiccation. (Density of stippling is meant to represent cultural activity and interchange primarily and population distribution secondly.)

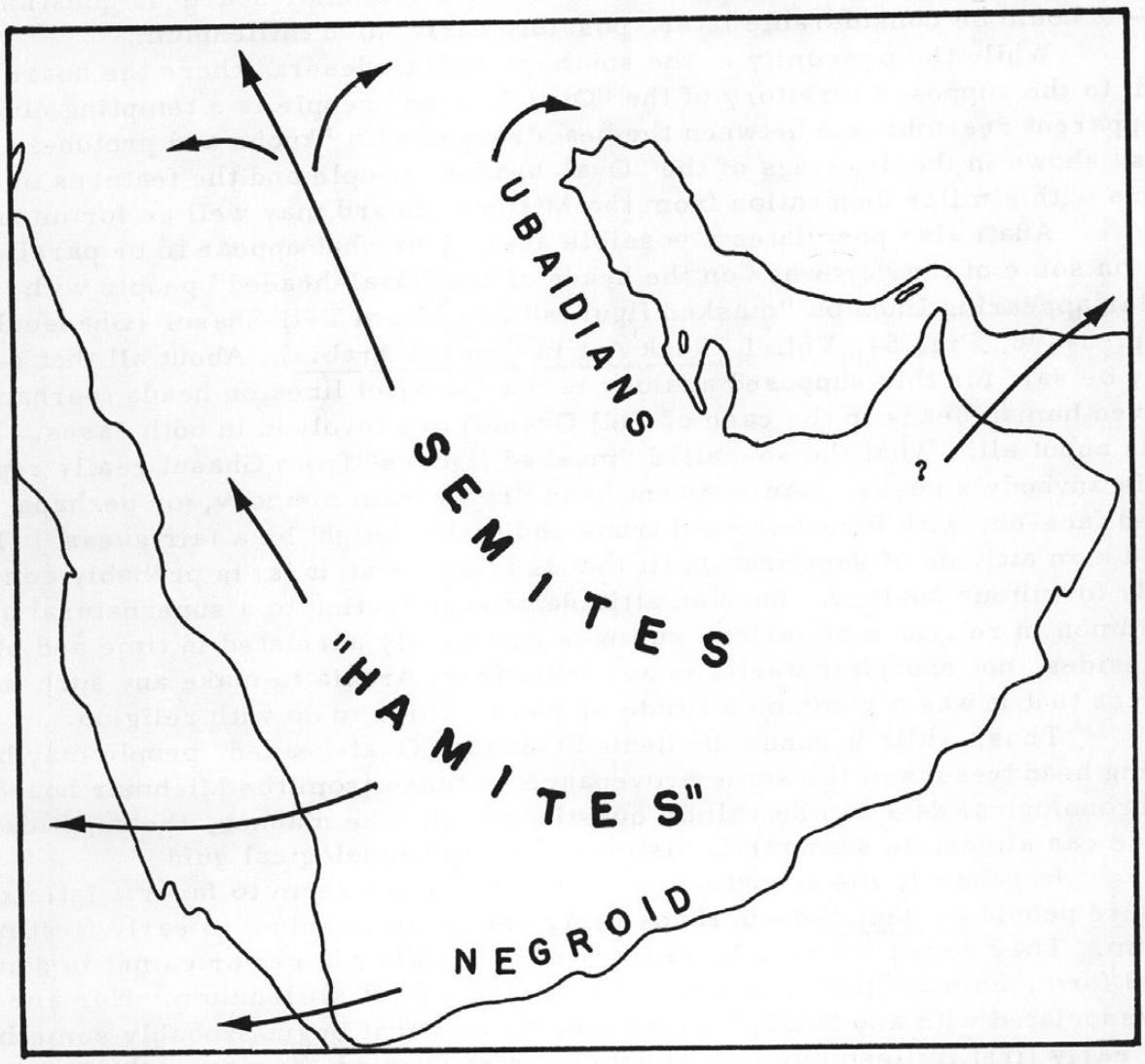

Fig. 5.— The Arabian Peninsula, showing hypothetical prehistoric ethnic distribution and population movements as a result of post-Pleistocene desiccation.

APPENDIX A

CRITICAL ANALYSIS OF ANTI'S STUDY OF THE ROCK DRAWINGS OF ARABIA

Anati's beginning date for the "Oval-headed" people (late fourth millennium), which seems to be based on resemblance of headdresses to those from a late Chalcolithic context (Nahal Mishmar), and on the attitude of supplication (raised arms) being similar to late Predynastic attitudes, is not convincing analogy for several cogent reasons. The date of the Mishmar hoard is questionable—it could be considerable later, possibly early third millennium.[1]

While the proximity of the southern Judean desert (where the hoard was found) to the supposed territory of the "Oval-headed" people is a tempting clue, the apparent resemblance between the headdresses with "knobs and protuberances" shown in the drawings of the "Oval-headed" people and the features of the crowns with similar decoration from the Mishmar hoard may well be fortuitous.

Anati also postulates a possible analogy of what appear to be parallel lines on some of the "crowns" on the heads of the "Oval-headed" people with similar appearing lines on "masked figures" [sic] from Tell Ghasul (Ghassoul). (See p. 89-90, Fig. 54, Vol. I, Rock Art in Central Arabia). About all that can really be said for this supposed analogy is that parallel lines on heads (perhaps not even human heads in the case of Tell Ghasul) are involved in both cases. But that is about all. What the so-called "masked figures" from Ghasul really represent is anybody's guess. (An elephant head drawn from memory, or perhaps viewed face-on, with foreshortened trunk and tusks, might be a fair guess.) The raised arm attitude of supplication (if that is truly what it is) is probably completely fortuitous analogy. Such an attitude of supplication to a supernatural being is common in religions of various cultures completely unrelated in time and place, and besides, not enough material is available from Arabia to make any such inferences that it was a common attitude or had anything to do with religion.

Thus, while it cannot be denied that the "Oval-headed" people may be wearing headdresses of the same provenance as those from the Mishmar hoard, the chronological data can be validly questioned. In like manner, the supplication attitude can almost be summarily dismissed as a chronological guide.

In general, the accoutrements of this culture seem to favor a later date for these people as depicted—perhaps early second millennium to early first millennium. They do not seem to be associated with either horse or camel in domesticated form, animals that would probably indicate first millennium. Nor are they associated with any South Arabian inscriptions that begin probably sometime in the early first millennium.[2] It should be kept in mind, however, that we are talking only about the depicted phase of these people, and it is quite possible that their existence in Arabia does, in fact, go back further.

The people of the "Realistic-dynamic" style have equipment that is different significantly from that of the "Oval-headed" people. While the long spear and shield are the characteristic weapons of the "Oval-heads", the small-sized double convex bow, often accompanied by quiver, and the transverse (trapezoidal) arrowhead are characteristic of the "Realistic-dynamic" style people. The dagger with semi-lunate pommel is apparently common to both, occurring more frequently, however, among the people of the "Realistic-dynamic" style. The chronological value of this dagger in any case in rather limited, however, since it seems to have a range all the way from the time of Meskalamdug in South Mesopotamia (where Woolley discovered an excellent one in the Royal tombs) to perhaps thirteenth century B. C. in the Tallish area of Iran.[3] The small size, double-convex bow seems to be a fairly good indicator of somewhere around 3,000 B. C. All considered, Anati presents fairly good evidence for placing the beginning of the "Realistic-dynamic" style approximately at the beginning of the third millennium.

With a fairly good beginning date, thus, for the "Realistic-dynamic" style, and a fairly good terminal date for the "Oval-headed" people, these two groups taken together (ethnically related or not) as representing the "hunting-herding" depicted phase of Arabia have a range in time of third and second millennium. No definite chronological datum is evident, but the semi-lunate pommeled dagger, and other less reliable clues, all taken in sum total, provide a fairly reliable set of bracketing data.

Much more material from different areas is needed for further study, as Anati readily admits.[4] No really firm conclusions about the rock art people of early Arabia can be drawn until such a study can be undertaken.[5]

FOOTNOTES

[1]Carbon-14 dates reported for this find have a wide variation from 3,400 to 2,900 B. C.

[2]E. Anati, Rock Art in Central Arabia, Vol. II, Pt. 1, p. 2, footnote 5, states: "It seems that the population to whom the literate style and the inscriptions can be attributed reached certain regions of Arabia in an earlier period, while the considered regions (i. e., of the "Oval-headed" and "Realistic-dynamic style" people)....were still inhabited by other human groups." He attributes the "literate" phase to the "artistic expression of peoples who first appeared on the.... stage shortly before the beginning of South Semitic writing."

It thus seems possible that the Semites, who perhaps originally inhabited the present Rub' al-Khali area, probably did not begin to move into the western portion of Arabia (and perhaps also into the southern portion) until the first millennium, when they began to settle along the trade ganglia and routes leading up from South Arabia that began to spring up about this time. Thus the main earlier population movements of the Semites out of the approximate central

portion was probably to the north. Later and lesser movements were to the west into the area which the "oval headed" and "realistic-dynamic style" people had previously occupied and now vacated along with their cattle.

About all that can be said with any degree of certainty regarding the beginning of the literate period in Arabia is that it is sometime during the first millennium. The impetus for development doubtless comes from the South Arabian trading kingdoms which come into prominence about this time. If firmer dates could be agreed on for these kingdoms, the Minean, Sabaean, Qatabanian, and Hadhramati, the question might be elucidated. As it is, a long standing controversy exists between scholars who argue for a "long" chronology (such as Philby, Hommel, Weber, Glaser, et al.), and those who advocate a "short" chronology (such as Albright, Winnett, and Jamme.) The former would place the beginning of these kingdoms in the last part of the second millennium - not later than 1,200 B. C. - and the latter would place it approximately between 700-500 B. C. Winnett, Bulletin of the American Schools of Oriental Research, No. 73 (1939), p. 6, for example, places the beginning at not beyond 500 B. C., and Albright, From the Stone Age to Christianity, p. 38-39, believes that none of the South Arabian inscriptions antedate the seventh or eighth century B. C., and the North Arabian inscriptions are "nearly, if not quite, as old." Winnett and Reed, Ancient Records from North Arabia, p. 64-65, in a survey in 1962 of North Arabia that succeeded in finding and recording more than 300 inscriptions, report some from the vicinity of Tayma that are ".... among the earliest yet discovered in North Arabia, carrying us back in all probability to the sixth century B. C." They further make the statement (p. 69 and p. 90) that the old Arabian script was used in North Arabia from at least the end of the eighth century B. C. to at least the fourth century A. D.

No attempt will be made to discuss the pros and cons between the "long" and "short" chronologies of South Arabia, as it is basically outside the scope of this thesis. Offhand, however, the "short" chronology seems more likely to the author of this thesis. For if impetus for development of these kingdoms was commercial contact with the Greeks and neo-Babylonians, as seems very possible, the "short" date seems more likely.

A partial and selected bibliography on this problem is as follows: W. F. Albright, "The Chronology of Ancient South Arabia in Light of the First Campaign of Excavation in Qataban," Bulletin of the American Schools of Oriental Research, No. 19 (1950), p. 5; A. Jamme, "A New Chronology of the Qatabanian Kingdoms," BASOR, No. 120 (1950), p. 26; A. Jamme, "On a Drastic Current Reduction of South Arabian Chronology," BASOR, No. 145 (1957), p. 25; St. J. Philby, "South Arabian Chronology," La Muséon, Vol. LXII (1949), p. 229; Winnett, "The Place of the Mineans in the History of Pre-Islamic Arabia," BASOR, No. 73 (1939), p. 3; Winnett and Reed, Ancient Records from North Arabia, 1970.

[3]See above, Ch. III text and footnotes 41-42 for references on the chronology of this dagger.

[4]As pointed out, Ch. III and footnote 53, the area studied by Anati represents only a small portion of the total geographic distribution of these drawings in Arabia.

[5]Several interesting and tempting speculations, based on Anati's study and other indirect evidence brought out in this thesis, however, present themselves already, and invite comment in passing. For example, while a considerable amount of stylistic representation can be assumed in these drawings, one element is the stature of these people. They seem very definitely to have been of an extraordinarily tall type. This fact, when put together with otherwise independent evidence for the presence of long-boned "Hamites" and "cattle people" in the peninsula (see above, various references in passim) leads one to wonder if these people may not, in simple fact, represent the last remnant of the "Watusi-Masai" type stock of the peninsula. Anati, Rock Art of Central Arabia, Vol. I, p. 182-183, touches on such a possibility in postulating these people as Biblical "Cushites," who are referred to as being "men of stature" with "shields" and "prominent hats." J. A. Montgomery, Arabia and the Bible, p. 42, also speaks of "a reliable tradition of an original Cushite (Africa) element that once pervaded Arabia," and surmises that: "Without doubt, there was an early exchange of populations between Arabia and Africa, especially across the Strait of Bab el-Mandab ...." Anati thinks, however, that how these people came originally to settle down in this area, where they came from, and what happened to them later on are questions that still require satisfactory answers.

Interpreted in terms of points put forth in this thesis, it may be possible to offer at least tentative answers to Anati's above questions. The Cushitic element existing in Ethiopia in Biblical times could be that portion of the old "Hamitic" population already driven out of the Arabian Peninsula by desiccation. The contacts to the north on the southern edge of the Fertile Crescent could be that portion that had migrated to the north (perhaps parelleling the basic route taken by the Semites) and to the west out of the desiccating peninsula. Without doubt, a relict population with its cows, and perhaps fat-tailed sheep, stayed behind to eventually become extinct in the peninsula. The tall, long-boned cattle nomads (such as Watusi and Masai) of present day East Africa may very well then be living descendents of these ancient people who left such rock drawings behind as evidence of their sometime occupation of Arabia.

APPENDIX B

CRITICAL ANALYSIS OF KAPEL'S STUDY OF THE STONE AGE TOOLS OF QATAR

Holger Kapel, of the same Danish team that excavated the "Dilmun civilization" of Bahrein, spent some four years collecting and studying the Stone Age tools of the Qatar Peninsula. The volume, Atlas of the Stone Age Cultures of Qatar, is the result. In this catalogue, no attempts have been made at correlation with other series of tools from Asia, Africa or Europe. The tools are assigned, however, in a broad typology, to four groups, designated A, B, C, and D. The B group, for example, is the "blade-flake" group, and it is this one that is of special importance to this thesis. For, included in this flint tool repertoire are two types of projectile point—the leaf-shaped, that we have already seen is a hallmark of the Aterian, and also occurs commonly in the Arabian material discussed, and the tanged, triangular (in crosssection) "blade" point, another hallmark of the Aterian.[1]

Kapel notes that little is known about the material from Arabia proper. We must assume, however, that the Qatar material would most surely be derived directly from the main Arabian Peninsula, since Qatar is, in effect, a geographic cul de sac. The Qatar tools will doubtless tie in neatly with the material from Arabia proper when such a study is finally undertaken.

Kapel makes another interesting and informative point in the notable lack of microlithic tools such as occur elsewhere in Egypt, Africa, India, and Europe.[2] Burins are lacking also, as are likewise hollow based points (such as are common in the Fayum). The meaning of this must for now remain uncertain.[3]

Thus, the two main characteristic Aterian tools also seem to be present in the Arabian tool kit, and Zeuner has suggested an additional possible affinity in scrapers.[4] It is highly premature to make judgement now. But the possibility seems to be that an Aterian industry may have ranged all the way across the Arabian Peninsula, across North Africa, and up into Spain (Parpallo). If the Arabian industry does, in fact, represent Aterian, the known geographic range of this important industry must be increased (at least doubled). The makers of these tools would therefore have been even more "skillful and aggressive" than Garrod has supposed,[5] and their "place and significance in the Paleolithic world" even more important than Caton-Thompson has suggested.[6]

FOOTNOTES

[1]See Ch. III text and footnotes 27 and 31, where Forde-Johnston and Garrod mention these points in the African Aterian tool kit. See Kapel, Plates 17, 23, and 25 for Arabian (Qatar) examples. None of the latter points are so far noted in the material from Arabia proper. Figured material is so far rare, however, and it is difficult to tell from written description. Without doubt, such points exist in Arabia proper. (These points are not well-finished, and it is quite possible that they may have been overlooked for more artistic points by collectors, most of whom have to date been amateurs.)

[2]It seems possible that the microlithic industry of Egypt and North Africa could represent a holdover from Paleolithic times (see references to Huzayyin, p. 59, and Garrod, p. 58). It then perhaps became mixed with the non-microlithic "Arabian Aterian" industry when it arrived in North Africa in post-Paleolithic times.

[3]Forde-Johnston, Neolithic Cultures of North Africa, p. 73, has already concluded, however, that the hollow based point may have been an indigenous development of the Nile Valley.

[4]Man, No. 209 (1954), p. 133.

[5]See Ch. III text and footnote 31. She observes that the Aterians were a "skillful and aggressive people, ranging all the way from northwest Africa to Kharga some 1400 miles."

[6]Caton-Thompson, "The Aterian Industry' Its Place and Significance in the Paleolithic World," Journal of the Royal Anthropological Institute, Vol. LXXVI (1946), p. 81.

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ABSTRACT

Evidence coming to light in recent years affords good reason to postulate that the Arabian Peninsula should no longer be considered a blank page in the history of mankind in this part of the world. Recent geological mapping of the peninsula and other clues afford good evidence for interpretation of paleoclimatic data, and indicate that the climate, within the history of man's occupation of the area, has not by any means always been as arid and inhospitable as it is today. Flint tools that apparently range throughout the age of mankind are being found in the peninsula in abundance, very often occurring in the middle of the present day desert sands. Rock drawings depicting ancient man with his cultural accoutrements are found scattered about Arabia. Ubaidian cultural remains that date from about the fifth and fourth millennium B. C. have recently been discovered on the eastern littoral, and are indicative that this very important population occupied, and perhaps originated in, the peninsula.

In this thesis, the above lines of evidence are discussed in detail, analyzed, and synthesized, along with data from modern anthropological observations, to present a logical hypothesis that the Arabian Peninsula is not a tabula rasa in the history of man in this part of the world, and that there is good reason to believe that it played a key role in the cultural evolution and prehistory of ancient populations in the Near East.

Chapter I is an introduction and general summary. Chapter II is devoted to a detailed analysis of paleoclimate, based largely on geological and paleogeographical data. Chapter III is an attempt to interpret and analyze, from the evidence presented, the nature of the various ethnic and cultural groups that occupied the peninsula in prehistoric times, and fit them into the already known framework of prehistory of the Near East.

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