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William C. Hayes

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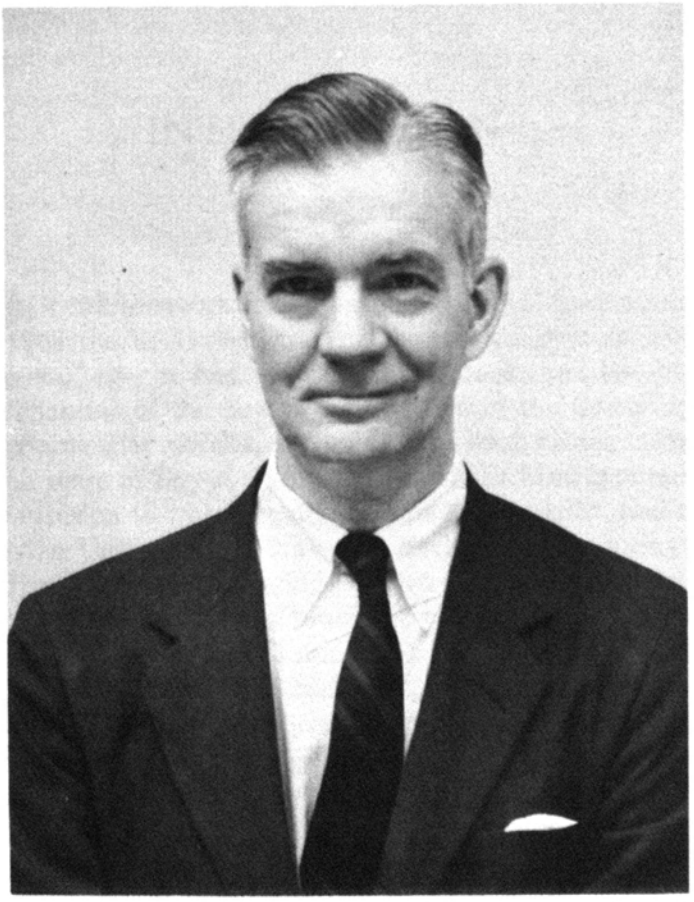

WILLIAM CHRISTOPHER HAYES
1903–1963

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INTRODUCTION

WILLIAM CHRISTOPHER HAYES was on the day of his premature death on July 10, 1963 the unrivaled chief of American Egyptologists. Though only sixty years of age, he had published eight books and two book-length articles, four chapters of the new revised edition of the *Cambridge Ancient History*, thirty-six other articles, and numerous book reviews. He had also served for nine years in Egypt on expeditions of the Metropolitan Museum of Art, the institution to which he devoted his entire career, and more than four years in the United States Navy in World War II, during which he was wounded in action—both periods when scientific writing fell into the background of his activity. He was presented by the President of the United States with the bronze star medal and cited "for meritorious achievement as Commanding Officer of the U.S.S. VIGILANCE . . . in the efficient and expeditious sweeping of several hostile mine fields . . . and contributing materially to the successful clearing of approaches to Okinawa for our invasion forces."

Hayes' original intention was to work in the field of medieval archeology. His first field experience, however, was with the University of Michigan expedition digging the ruins of ancient Carthage. Thus archeology and art engaged his attention early in life, and he had won an M.A. and an M.F.A. at Princeton before he even dreamed of becoming an Egyptologist.

Already a member of the Metropolitan Museum's Egyptian expedition at Deir el Bahri in 1927, Hayes found his place quickly and developed rapidly. He began his hieroglyphic studies with the private study of Alan H. Gardiner's epoch-making *Egyptian Grammar* (Oxford, 1927). This kindly giant of Egyptology was his inspiration, and the veteran found in his young disciple a kindred spirit, gave him personal instruction for several summers in England, and held him in close friendship to the end. Ultimately the older man was to outlive the younger by less than six months.

Hayes was endowed with a beautiful mind. The perfection of his work—

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and he was ever a perfectionist—was well exemplified even in his first book, *Royal Sarcophagi of the XVIII Dynasty* (Princeton, 1935), which in every respect was a model publication and one of the most useful Egyptological Ph.D. dissertations ever printed. Its preparation took him into the eerie darkness of those ancient labyrinths in the Valley of the Tombs of the Kings where, surrounded by painted gods, snakes, headless spirits, and wailing ghosts of the departed, he copied hieroglyphs and studied the developing form and decorative style of the quartzite coffins, the resting places of the Pharaohs. Thus he was able, in the tombs of the kings, to establish their chronological order, long disputed by the philologists and historians, by the style of their sarcophagi. Most of these wonderful monuments still lie in the tombs because of the sheer impossibility—lacking a Belzoni—of removing the gigantic monoliths from the depths to which they were lowered at the royal funerals so long ago. But Hayes was strong and adroit and determined. He was already as adept at handling stone fragments weighing a ton as at piecing together with his tweezers the faience fragments of broken tiles from the palace of Ramesses II. He did this in his second book, *Glazed Tiles from a Palace of Rameses II at Kanṭīr* (New York, 1937); several of his articles record the assembly of mighty statues and sphinxes of Queen Hatshepsut and the shattered sarcophagus of her favorite, the Chief Steward Senmut. The ambitious Senmut possessed not one tomb but two in the Theban necropolis. One of these was discovered by the Metropolitan Museum expedition. The other was cleared by the expedition, and from some of the humblest and least glamorous objects which could possibly be found in such an operation Hayes produced his remarkable book, *Ostraka and Name Stones from the Tomb of Sen-mut (No. 71) at Thebes* (New York, 1942). A portion of this book was devoted to the pictures and inscriptions often rather crudely sketched or written on limestone fragments (ostraka), yet significant and interesting because the author was able to demonstrate that they were preliminary drafts of scenes and texts which were to be executed on the walls of the tomb. Since the tomb is now a sadly demolished wreck, some of the sketches provide the only surviving evidence of the nature of that noble funerary monument of ancient Thebes.

A second section of *Ostraka and Name Stones* is a penetrating analysis of some obscure words pertaining to building, masonry, etc., found in the work records written on ostraka from the tomb. Here Hayes appears as the lexicographer, and every student of hieroglyphic can transfer welcome new meanings to his copy of the Egyptian Dictionary.

But Hayes' philological studies were by no means confined to a narrow segment of the Egyptian language. At Lisht the Metropolitan Museum had conducted extensive excavations, and he had a good volume to show for his work there in *The Texts in the Maṣṭabeh of Se'n-Wosret-ᶜankh*

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at Lisht (New York, 1937). It was a publication of some Twelfth Dynasty copies of the ancient Pyramid Texts. Among them he discovered a hitherto unknown pyramid text, and he was likewise able to demonstrate that the Middle Kingdom copies were derived from early originals though not actually copied from the examples still preserved in the pyramids of the Fifth and Sixth Dynasties.

On his return from Egypt in 1936 Hayes had become Assistant Curator of Egyptian Art. Henceforth he was to devote most of his energy to the study of the Egyptian collections of the Metropolitan Museum. They are the finest and most extensive in the western hemisphere. With the instinct of a born educator he set out to interpret them to the public and to reveal their role in the development of civilization. He had already made a noteworthy contribution in this direction in one of his longest articles, his popular "Daily Life in Ancient Egypt," illustrated in part with thirty-two extraordinary paintings done under his direction by H. M. Herget. This remarkable work, published in 1941 in the *National Geographic Magazine* (and still available in book form), combined the intimate knowledge of Egyptian art, crafts, industries, recreation, religion, and customs, which Hayes had by this time thoroughly mastered, with the artistic talents of Mr. Herget. A vast audience of *National Geographic* readers was thus given by far the best picture of Egyptian life ever achieved by modern scholarship, with each interpreted detail based on precise archeological evidence.

It must be supposed that Hayes' mind was deeply preoccupied with the desire to interpret Egyptian culture to his contemporaries and to utilize for that purpose the rich collections of the great museum to which he was devoting his life. For within a year after his release from the United States Navy at the end of the war he had completed the manuscript of the first half of what was to be his greatest achievement, which he modestly entitled *The Scepter of Egypt, a Background for the Study of the Egyptian Antiquities in the Metropolitan Museum of Art,* though publication of the work was delayed for several years until 1953. The subtitles of the two volumes reveal their actual historical character: Part I covered the period in Egypt *From the Earliest Times to the End of the Middle Kingdom,* while the second volume (Part II) carried the story through *The Hyksos Period and the New Kingdom* (New York, 1959). In these two rich volumes, sumptuously printed with a multitude of carefully chosen photographs, Hayes traced the history of Egypt from the prehistoric beginnings to the end of the New Kingdom as the story was illustrated by actual objects in the collections. While guides and other handbooks to museum collections had been produced before—and some of them very good indeed—none was quite so ambitious as *The Scepter of Egypt* and none so fully and successfully enlightening to the user. In a total of more than nine hundred pages of text and with over five hundred

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photographic reproductions, the Egyptian objects in the Metropolitan Museum tell their story to the visitor in a manner unparalleled in the world.

But William C. Hayes' mind operated not only within the circle of his own museum. His developing historical interest led him to delve wherever he saw an opportunity to interpret the culture of ancient Egypt. Thus, between the two parts of *The Scepter of Egypt* he produced a work of pure scholarly research which probably ranks as his best scientific publication. The Brooklyn Museum possessed a tattered papyrus manuscript acquired more than fifty years previously by Charles Edwin Wilbour. It consisted of five to six hundred torn fragments, many of them exceedingly small, and these were mingled in exasperating confusion with similar scraps of other papyri written in a virtually indistinguishable hand. Hayes undertook to solve the hopeless puzzle and succeeded with the assistance of Mr. Anthony Giambalvo—able preparator of the Brooklyn Museum—in piecing together the multitude of hieratic fragments. Though his modesty led him to state "that any final commentary on it must necessarily be written by . . . specialists . . . in the social, economic, legal, and political aspects of ancient civilizations," there is little doubt that his study of the "seven odd feet of ancient writing paper" has produced its definitive interpretation. He found in it "the criminal register of the late XIIth and early XIIIth Dynasties and a series of mid-XIIIth Dynasty entries" which was intended "to establish the right of a woman named Senebtisy to the ownership of ninety-five household servants." Hayes proceeds to an enlightening discussion of classes of labor in the Egyptian Middle Kingdom, the administrative and judiciary organization of the country, "the extent to which the activities and spheres of influence of the various departments of the government overlapped one upon the other and the efficient and apparently frictionless manner in which, for example, the Departments of Agriculture, Labor, and Justice coöperated with one another and with the officials of the provincial administration in the handling of problems and conditions germane to them all." Finally, from his study of the names of the "ninety-five household servants," he is able to conclude that, in the early Second Intermediate Period of Egyptian history, *before* the conquest of the Hyksos, "the Asiatic inhabitants of the country . . . must have been many times more numerous than has previously been supposed." He believes that a "brisk trade" in Asiatic slaves was carried on by the Asiatics themselves, with Egypt as the principal market for the trade, much as described in Genesis 37:28, 36 in the account of the sale of Joseph to the Ishmaelites.

The foregoing account of Hayes' *Papyrus of the Late Middle Kingdom in the Brooklyn Museum* (Brooklyn, 1955) makes no pretense at an evaluation of his achievement; it is but an illustration of what a devoted scholar

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can recover from a body of seemingly hopeless material by the application of patience and unflagging industry.

Hayes had been Assistant Curator and Associate Curator of his department at the Museum. The full curatorship came to him in 1952. There followed a period of hard work and disappointment. His work was curtailed to some degree by a heart attack. Nevertheless, he accepted an assignment to prepare some of the chapters for the proposed revision of the *Cambridge Ancient History*. He contributed four of these, one on Egyptian chronology, the others dealing with the history of the Middle and New Kingdoms. Already published in pamphlet form, they are the best treatment of the topics in English.

By this time it was inevitable that Hayes' developing interest in Egyptian history should summon him to the logical goal of a complete "History of Egypt." All his scientific work had been leading toward it. He had amassed voluminous notes and bibliographical records. Much of the preliminary labor had been performed in the preparation of the *Scepter*. The "History" was in his files; he must fill in the gaps and carry it on to the end. He envisaged a work in four volumes and thought that it might be issued by the Oxford Clarendon Press.

Probably the most difficult section of the "History" would be the beginning. It would be necessary to set forth what is known about the geology and geography of Northeast Africa, relate it with other regions of the surrounding world, and trace early man into the ancient Valley of the Nile. This was largely foreign territory to Hayes, but he undertook the task with his usual thoroughgoing ardor. He discovered at once that the prehistorians and geologists held widely divergent views, often quite unreconcilable, and furthermore that the literature was increasing with such rapidity and to such proportions as to require constant revision and reconsideration of his results. In *The Scepter of Egypt* he had covered prehistoric and predynastic Egypt—from the earliest times to the beginning of the First Dynasty—in approximately seventeen pages of text. As he proceeded with the new work he was to require, in text and notes, more than a hundred and fifty. One chapter sufficed for the *Scepter;* he was well into the fourth chapter of the projected first volume, without reaching the end of the predynastic period, when he had to lay down his task forever.

Long before embarking upon the actual writing of his new "History," Hayes had explored with this editor the feasibility of publishing at least a selection of the chapters in the *Journal of Near Eastern Studies*, doubtless at a stage of his thinking prior to his realization of the magnitude of the work. The plan was later abandoned in favor of direct publication in book form. At the time of his death a draft of the first three chapters, with their notes, and even of the incomplete fourth chapter, were in the hands of the

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Clarendon Press. They were generously released by the editors, and the original plan of publication, so sadly altered by circumstances, was resumed. Thus they have appeared first of all in *JNES*, XXIII (1964), 73–114, 145–92, and 217–74; however, the title selected for the fragment of Hayes' great unfinished work, *Most Ancient Egypt*, is not his choice but merely the briefest possible clue to his distinguished legacy.

It has already been stated that William C. Hayes was a perfectionist. That very quality may have led to occasional defects in these chapters of *Most Ancient Egypt*. Yet it must be made perfectly clear that, if such be discovered by the reader, they are to be attributed not to the author but to the editor. In his struggle for perfection, Hayes was engaged, near to the time of his death, in a detailed revision of the form of the notes to the chapters. He had originally cast the references in normal bibliographical style, including name of author, title of work, facts of publication, and page numbers. In the interest of brevity, however, he had decided to adopt a condensed style by citing only the author and date of his work—details would be given in full in the exhaustive bibliography at the end of the work, where each article or book cited would appear but once. This editor found the notes to chapter 1 in both forms, with a few additions in the brief style; those to chapter 2 were in normal form; and the notes to chapter 3 were prepared in the brief style alone. Obviously, all the notes must be published uniformly in individually comprehensible form, since there would now be no general bibliography. Owing to the editor's absence in Nubia as director of the Oriental Institute Nubian Expedition, the conversion of all notes to uniformity was confronted with some difficulty. While every attempt was made to achieve the fullest accuracy, it is too much to hope that there has been complete success. It is hoped that the reader will exercise a measure of indulgence when he fails to locate a given reference or detects a wrong one, realizing that the late author would have revised his manuscript for publication better than any editor.

It will undoubtedly be universally recognized that William C. Hayes' *Most Ancient Egypt* is the best discussion of the beginning of civilization in the Nile Valley. It is right and proper that the book, even though but a fragment of the author's great plan, should be made available beyond the circle of *JNES* readers. The editor is pleased to feel that in this final form the volume may be regarded as another garland laid beside the monument of his enduring fame.

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CONTENTS

1. THE FORMATION OF THE LAND

2. PALEOLITHIC MAN IN EGYPT

3. THE NEOLITHIC AND CHALCOLITHIC COMMUNITIES OF NORTHERN EGYPT

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4. THE PREDYNASTIC CULTURES OF UPPER AND MIDDLE EGYPT

* See p. 148, n. 1.

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1

THE FORMATION OF THE LAND

THE story of human activity in the land now known as Egypt stretches back some five hundred thousand years to an early stage of the present, or so-called Quaternary, era in the history of the earth's surface. As elsewhere on that surface this scarcely conceivable span of time covers only a minute fraction of the story of the land itself, the more recent chapters of which take us back approximately sixty million years, through a long chain of geological and climatic developments, to the initial phases of the preceding Tertiary era.

1. THE EGYPTIAN TABLELAND

Early in the Eocene period, the second major division of the Tertiary, the Mediterranean Sea extended in a deep bay over the northeast corner of the continent of Africa, its warm waters reaching southward to at least the twenty-third parallel of latitude and westward over the northern portion of what is now Libya. The bed of the bay and the land masses bordering it on the east and south were composed alike of three principal types of rock superimposed one above the other. At the base lay the metamorphic and igneous rocks of Archeozoic and Proterozoic origin—schists, gneisses, granites, diorites, and quartzes—now visible over a wide expanse south of the Second Cataract of the Nile and in small, isolated areas further to the north, as at the First Cataract and in the hills bordering the Red Sea. On these rested the great layer of sandstone, of Upper Mesozoic (Cretaceous) date, which is encountered today all along the Nubian Nile between the Second Cataract and el-Sebaiya in southern Upper Egypt, in the oases of the Libyan desert, along the western slopes of the Red Sea hills, and, as an isolated extrusion, as far north as Abu Roash, near Cairo. At the top, above the sandstone, lay strata of Upper Cretaceous limestones, shales, and clays, now much eroded over the limited areas where they remained exposed, but still to be seen in the oases, on the west side of the Red Sea hills, and in the neighborhood of Esna in Upper Egypt.

On the ancient sea bottom, so constituted, the waters of the Eocene bay laid down the massive strata of sedimentary rocks—principally limestones—of which the Egyptian tableland is for the most part formed.

Toward the end of the Lower, or early, Eocene forces exerted on the earth's crust began to thrust this tableland upward and clear of the sea, a prolonged process which continued, with occasional interruptions, throughout the bulk of the Eocene and the succeeding Oligocene and Miocene periods and which was therefore contemporaneous and probably associated with the crustal movements responsible in Europe and Asia for the creation of such relatively recent mountain chains as the Alps, the Carpathians, and the Himalayas.

In the course of its elevation the table was tilted slightly downward from south to north, its southern portion emerging first, its central and northern sections remaining submerged beneath the waters

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of the slowly receding bay or becoming resubmerged by occasional transgressions of the sea long enough to have superimposed upon them strata of limestone and other sediments characteristic of the Middle and Upper Eocene and subsequent phases of the Tertiary.

The results of this are discernible to the traveler passing from Lower Egypt into Upper Egypt and Nubia. At Cairo the Lower Eocene strata are buried deep beneath the marine and estuarine deposits of later geological periods and do not appear above the surface until one reaches a point halfway between Deirut and Manfalut in Middle Egypt, whence southward they rise in the towering cliffs characteristic of the section between Asyut and Luxor. South of Luxor erosion of the limestone plateau has laid bare the more ancient rocks which once formed the old sea bed—the shales of Esna, the sandstone of Nubia, and the crystalline rocks of the cataracts and the region south of Wadi Halfa.

On the return trip from Upper Egypt to Cairo the sequence is reversed, and we can follow the stages of the marine regression through the Eocene period by the changing nature of the surface strata along the edges of the Nile Valley. Between Deirut and Manfalut the Lower Eocene limestones dip beneath those of the Middle Eocene, and from Samalut the latter are replaced by soft clays, the Nile cliffs thence northward giving way to flat, open country relieved here and there by small mesas. On the east of the river just south of Cairo the limestones reappear in the high scarp of the Moqattam hills, but in the plains on the west the Middle Eocene strata have long since disappeared beneath various Upper Eocene sediments, which after a short distance are themselves covered by a blanket of Oligocene sands and gravels, the latter stretching from the region of Cairo southwestward over the Libyan desert.

By Upper Eocene time the sea had withdrawn to about the latitude of the Fayum and the Oligocene period witnessed its retreat still further to the north. When, following a phase of accentuated uplift in the late Miocene period, the elevation of the tableland was arrested, the head of the ancient bay of the Mediterranean lay near the apex of the present Delta or perhaps still further to the north.

2. The Nile Valley

All the while a factor of the utmost importance was at work—erosion of the rising tableland by rain water beating down upon it and draining in torrents from the neighboring highlands. The Lower and Middle Tertiary were periods of moderate to heavy rainfall, and the river or system of rivers which flowed down the sloping plateau to the sea was of gigantic volume and force. Unlike its relatively puny descendant, the modern Nile, this ancestral river system—the Urnil of the German geologists—was fed by numerous tributaries along almost the whole of its length, a circumstance which evidently more than compensated for the fact that it seems not as yet to have established a connection with the drainage system of the East African Sudd and lake regions and only to a very limited extent, if at all, with that of the Abyssinian highlands.

The once prevalent belief that in Egypt the main stream formerly followed a course which lay somewhat to the west of the present river is no longer generally held. Traces of what have been thought to be the Upper Eocene estuary of the "Urnil," however, are found to the west and north of the Fayum, and the vast triangle of sand and gravel which may have formed its Oligocene delta can be traced

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from Deirut in Middle Egypt northwest to the oasis of Moghara and, far to the northeast, over the northern end of the Red Sea hills and the Gulf of Suez. The "Petrified Forests," extending over the Libyan desert from the northern Fayum to the region east of Cairo, are composed of ancient tree trunks and other silicified wood carried down by the huge stream and deposited around its mouth. Mixed in with the Upper Eocene estuarine deposits and the Oligocene sands and gravels are shells of tropical fresh-water snails and turtles and bones of river fish, snakes, crocodiles, and large land animals including an early form of elephant and the strange extinct beast, Arsinoitherium.

The cutting of the present Egyptian Nile Valley commenced well back in Miocene times; but the bulk of its excavation was accomplished during the so-called Pontic Pluvial period, the intensely rainy interval coming between Suess's Second and Third "Mediterranean" periods and spanning the Upper Miocene and Lower Pliocene ages. The course adopted by the river was either dictated by recently created undulations in the surface of the plateau or was simply the bed in which the ancestral Nile happened to find itself at the time the now accentuated uplift of the tableland forced it to cease meandering. Once entrenched in the limestone there was no possibility of a major alteration in the direction of the river, and the great stream followed a generally northerly course down the continuously rising tableland to the Mediterranean. So rapid was the rise of the plateau that there was no chance for any but vertical erosion. The result is a gorge six to nine miles wide and 1300 to 1600 feet deep, down the center of which the modern Nile, raised high on its own alluvium, now flows. The cutting of this gorge, intensified in Upper Miocene times by a marked increase in the general elevation of the plateau, was completed by the early part of the Pliocene period.

Whereas, in the main, the Nile Valley and its tributary gorges are the products of erosion, volcanic activity and crustal movements of mid-Tertiary date were responsible for many of the striking physiographical features seen both in the Valley itself and in the surrounding plateau surface. It was at this time that the belt of dolerite stretching from the north side of the Fayum toward Cairo, the "Black Hills" near el-Bahnasa, and the prominence of Karat el-Soda, to the west of Manfalut, were thrust to the surface as intrusions of molten rock, penetrating the rock formations of younger date, up to and including those of Oligocene origin. The sulphurous springs still found in various parts of Egypt, notably at Helwan, were products of the same igneous eruptions.

More important and far-reaching in their effects than these small and isolated volcanic spasms were the crustal movements which in the Miocene period affected the surface of the plateau and gave rise in Egypt to two sets of folds, the first extending from north to south, approximately parallel to the Nile, the second—and perhaps the later—group running diagonally from northeast to southwest across the course of the river. The first set of folds produced the Kharga oasis anticline on the west of the Nile Valley and that of the Wadi Qena on the east, the second group being responsible for such notable landmarks as Gebel Abu Roash and the Moqattam hills, Gebel Ataqa, the Qallala hills, the Wadi Araba, and, far to the south, the hills of the Thebaid. At Silsila, forty miles north of the First Cataract, transverse faulting left exposed across the course of the river a barrier of hard Nubian sandstone and just south of

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this opened the wide tectonic basin enclosing the Kom Ombo plain.

3. The Red Sea and the Red Sea Hills

Before following the development of the Nile Valley through the end of the Tertiary and into the period of human occupation we must not overlook one of the most important events in the geohistory of Egypt—the coming into being of the Red Sea and, with it, the admission of the waters of the Indian Ocean to the east coast of Egypt and the definitive separation of the continents of Africa and Asia.

Unlike the Nile Valley, the Red Sea is of rift origin, the result of a long and complicated tectonic process, which, starting back in Palaeozoic times and again in the Middle Eocene, had accomplished the bulk of its task by the end of the Pliocene period. The process commenced with the vaulting upward of the region between northeastern Egypt and Sinai in a broad anticline, the crest of which lay in the line of the present Gulf of Suez. Following extensive erosion of this ridge, the lateral pressure was relieved by an in-folding of its axial region, and the creation thereby of a long, narrow depression, or geo-syncline, between Asia and Africa, into which the Mediterranean Sea forthwith intruded. In the course of succeeding geological periods the rift, thus inaugurated, expanded slowly southward and following renewed orogenetic movements in the Upper Pliocene, spread at length to form the southern Red Sea and to open a connection with the Indian Ocean through the Bab el-Mandeb. By Upper Pliocene times, however, the Gulf of Suez and hence the whole of the Red Sea had become cut off from the Mediterranean by an upthrust barrier about ten miles wide and originally over six hundred feet in height, occupying part of the present site of the Great Bitter Lake and Gebel Gunaifa. This barrier apparently remained unbroken until modern times when the two seas were once more united by means of the Suez Canal. It may, however, have been submerged during the Pleistocene epoch at moments of maximum high sea-level and overland communication between Asia and Africa thereby temporarily severed.

Though of somewhat earlier origin than the Red Sea itself, the rugged chain of mountains which rises along its western shoreline and stretches northward into southern Sinai owes its existence largely to crustal movements of mid-Tertiary date. This being so, we should expect and do, in fact, find the same strata of Eocene limestone occurring in the Nile Valley in Upper Egypt banked against the east side of the Red Sea hills, sloping down to the water's edge beneath layers of younger deposits, gypsums and ancient coral reefs. Along the crests of the hills the sedimentary covering has long since disappeared, leaving the ancient metamorphic and plutonic formations exposed in a wild and jagged skyline which rises northwest of Safaga (Gebel el-Shayeb) to almost 7,200 feet above sea level, and in southern Sinai (Gebel Katharina) to more than 8,600 feet. The slopes of the hills on either side are scarred by innumerable ancient watercourses, those on the east draining directly into the Red Sea, those on the west running down into the plains east of the Nile and expanding there into a succession of broad valleys along the eastern rim of the main river gorge. One of the largest and most important of these valleys is the Wadi Qena, a "sunken plain" twelve and a half miles wide and one hundred and twenty-five miles long from north to south, which joins the Upper Egyptian Nile Valley at the apex of the bend between Luxor and Nag Hammadi.

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4. The Pliocene Gulf

In the Middle Pliocene, or Third Mediterranean Period, the Nile Valley, its primary excavation now complete, was passing into the second principal stage of its development. Owing either to a general subsidence of the land masses bordering the Mediterranean or to a rise in its waters the sea at this time backed up into the Nile gorge, filling it to a depth of more than six hundred feet and thus forming a long, narrow gulf extending from the headlands of Gebel Abu Roash and Gebel el-Ahmar southward beyond Kom Ombo and perhaps as far as Aswan. On the east the waters of the gulf spread up into the lateral valleys mentioned in the preceding paragraph and on the west may possibly have broken through the boundary of the valley proper and flooded the low-lying ground draining into the Great Oases of the Libyan Desert. The Nile, still a river of formidable volume, flowed into the southern end of the long bay a few miles north of its head, and all along its sides innumerable tributary streams poured into it the copious drainage from the well watered plateau. The nature of the sediments laid down by the water of the gulf shows that only to about a hundred miles above modern Cairo was it marine and south of this brackish or fresh, the freshwater and estuarine zones progressing ever northward with the slow return to fluviatile conditions at the end of the Pliocene period.

In the course of its prolonged Pliocene submergence the Pontic valley and its tributaries were gradually choked with clay, sand, and gravel deposits, which by the beginning of the Pleistocene period had filled them to a height of at least 590 feet above present sea level. The bed of the valley had already become encumbered by huge masses of Eocene limestone slipped down from the precipitous side walls of the gorge. Over and around these the still waters of the gulf proper deposited layers of soft, clayey sediments, which in the northern reaches of the valley are found to be rich in marine fossils. Far exceeding in volume these fine, deep-water deposits, however, was the sandy and gravelly detritus brought from the south by the main river and swept down off the valley sides by its torrential tributaries. Although it is possible to distinguish definite stages in the filling process, separated from one another by intervals of erosion, in most places the various constituents of the fill are intermingled side by side in no readily apparent chronological order. In general, the softer deposits occupy the center of the valley, with the coarser material banked against its sides and fanned out in screes around the mouths of its tributaries.

The lateral portions of the Pliocene gulf deposits, augmented by patches of Pleistocene gravels, sands, and silts, form Egypt's "low desert," that strip of now barren terrain which in the middle and southern parts of the country separates each edge of the Nile's alluvial plain from the rocky walls or eroded slopes of the high desert plateau and which since the Paleolithic age has provided men with a much frequented area of habitation.

5. The River and Wadi Terraces

During the very long interval of transition from the Pliocene to the Pleistocene period—the so-called Plio-Pleistocene—the sea once more withdrew from Egypt, the waters of the gulf receded, and the broad and swiftly flowing river streamed down to the Mediterranean over the mixed deposits which choked its ancient valley. On these deposits the Nile and its tributaries spread sheets of coarse gravels, brought from afar: pebbles of Nubian sandstone, igneous and metamorphic rocks,

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and mixed gravels from the Red Sea hills. Still missing from its sediments, however, are those minerals (notably augite) which would indicate a substantial connection with the Blue Nile or the Atbara. Though the upper reaches of the main stream may already have been receiving water from the Sobat and the Bahr el-Ghazal it is clear that the hydrography of the Pliocene and early Pleistocene Nile must have presented a picture quite different from that of the present day and that the annual summer inundation, now so important a factor, as yet played no essential role in the life of the river and its valley.

In common with many other of the world's rivers the Nile during the Pleistocene period eroded its new bed and deepened its channel, not in one long, continuous operation, but in sharply defined stages separated from one another by periods of stability, during which new and distinctive types of gravel were spread out over the river bed. In northern Egypt these stages appear to have been to a large extent eustatically controlled, that is, governed by and hence directly related to, alternate lowerings and raisings of the sea level of the Mediterranean. In the southern reaches of the valley, too remote from the sea to be affected by fluctuations in its levels, changes in climate with accompanying decreases or increases in the local precipitation and run-off seem to have been the factors chiefly responsible for the alternating phases of aggradation and erosion entered into by the Upper Egyptian Nile and its tributaries. In both areas the natural tendency of the river to meander was to some extent checked by the coarseness of the material along the old valley sides, and in general each new channel was excavated in the soft and low-lying deposits along the center line of the fill.

The result was a series of gravel-coated river terraces, cut in the gulf deposits and descending like flights of steps from both sides of the old valley down to the river's edge, each pair of terraces being the lateral portions of a former Nile bed, left high and dry by a new deepening and narrowing of the channel. Though extensively eroded by subsequent meanderings of the Nile itself and by the lateral tributaries within the main valley, remains of these terraces are still to be seen in Upper and Middle Egypt and in places on both sides of the Delta. South of Aswan some of the higher terraces, cut in the native sandstone of the Nubian valley, are well preserved. Nowhere, however, have more than two or three terraces of a series survived in a single locality and then usually on only one side of the river. Frequently—especially in Nubia and southern Upper Egypt—all that remain are eroded rock platforms from which the sand and gravel covering has been scoured away. Further north the terrace structures themselves have often been demolished, leaving formless accumulations of sands and gravels redeposited at lower levels and in some instances at considerable distances downstream.

As is customary elsewhere, the Nile terraces are designated according to their individual heights above the present flood plain of the river in the localities where they occur. The "100-foot terrace," for example, comprises those sections of gravel or rock platforms which are found to be between 80 and 100 feet (25 to 30 meters) above modern Nile level, regardless of whether they belong to the pluvial(?) terrace series of Upper Egypt or to the eustatically controlled (and, presumably, not directly related) series of Middle and Lower Egypt. Besides the successions of terraces formed in the main valley there are similar and corresponding sets in the lateral valleys, or wadis. These are of importance because they survive in sections

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of the country—notably in southern Upper Egypt—where the main river terraces have been largely destroyed.

In the region of Saqqara and the Fayum depression Plio-Pleistocene river gravels have been noted to a height of 470 feet above the Nile and near the apex of the Delta are preserved to a maximum present altitude of 765 feet; but the highest gravels describable as general features of the landscape are those at 320 and 255 feet (98 and 78 meters), segments of which are preserved along the west side of the Nile from the southwest edge of the Delta to the town of Mallawi in Middle Egypt. In Upper Egypt and Nubia the highest surviving platform is the 300-foot terrace. This was succeeded, during the period bridging the Upper Pliocene and Lower Pleistocene by two terraces 200 and 150 feet, respectively, above present river level.

The 100-foot terrace of Upper Egypt carries us well down into the Pleistocene period and—what is of considerably greater interest—into the period of the earliest known human occupation of Egypt, for incorporated in the gravels of this terrace are found the earliest stone implements which can with assurance be identified as the handiwork of Man. A terrace of similar height in Middle and Lower Egypt appears to be composed, in part at least, of redeposited sands and gravels of the 100-foot Upper Egyptian stage. As exemplified in the estuarine gravel deposits of Abbassiya, near Cairo, and in those of the Rus Channel, near the Fayum, it has been found to contain "rolled," or travel-worn, specimens of the same early types of implements seen in the south as well as unworn implements of more developed forms. That this terrace, in any case, is appreciably later in date than its Upper Egyptian counterpart is suggested not only by the types or condition of the implements found in it, but also by its probable association with a datable Mediterranean sea level (the Tyrrhenian).

The series is continued by terraces at 50 and 30 feet in Upper Egypt and 33–50 feet in northern Egypt, in the gravels of which occur implements of progressively more advanced types. The 10-foot terrace, a low gravel platform visible chiefly in the lateral wadis of Upper and Middle Egypt, belongs apparently to a period of aggradation which followed by a considerable interval the cutting of the face of the 30-foot terrace.

Soil profiles taken in the Nile terraces disclose the formation, immediately following the deposition of the gravel cappings, of calcareous brown soils evidently developed during phases of fairly heavy local precipitation and cool temperatures. These phases were followed by unproductive intervals of aridity and then by periods of warm, moist climate during which sandy red earth made its appearance and subtropical steppe conditions may have prevailed. The presence of augite in the sediments of the 100-foot terrace of Lower Egypt suggests that the main river was now being fed by the Blue Nile and the Atbara, though not to the extent current in later Paleolithic times or at the present day.

With the 100-foot terrace of Upper Egypt we abandon the broad dating by geological periods and date this terrace and all subsequent milestones in the geohistory of Egypt in terms of human activities and human development. In these terms, the 100-foot and 50-foot terraces belong to the Lower Paleolithic, or Early Old Stone Age of Man's development (Abbevillian and Acheulian), the 30-foot terrace to the transition stage between Lower and Middle Paleolithic (Acheulio-Levalloisian), the 10-foot terrace of Upper Egypt and the earliest silts and fine gravels to the Middle Paleolithic

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(Levalloisian), the immediately subsequent phases of the river to the Upper, or Late, Paleolithic (Epi-Levalloisian), and so on.

6. "Recent" Developments in the Nile Valley

The penultimate stage in Nile history may be said to have begun in late Middle Paleolithic times with a sharp decrease in the local rainfall and run-off and—coincidentally—with the establishment, chiefly through the Blue Nile and the Atbara, of a full-scale connection with the drainage system of the Abyssinian highlands. As a result the annual summer flood became for the first time a dominant factor in the life of the river and the deposition of coarse local sands and gravels was replaced in Nubia and Upper Egypt by the building up on the valley bottom of massive layers of finer, alien sediments—the so-called Sebilian, or basal, silts. These silts, brought from the East African uplands by the floodwaters of the now relatively sluggish stream, reach a height of 100 feet above the present river level in the region of the Second Cataract, tapering down to 20 feet in the latitude of Luxor in Upper Egypt and dipping beneath the modern alluvium near Nag Hammadi. Thus, in the south the lower gravel terraces and platforms were overlapped and partially covered up, and with the rise of the river's bed, its waters spread out to form lakes and marshy tracts along its course, as in the broad bay enclosing the Kom Ombo plain. In the basal silts of Nubia and Upper Egypt occur implements of Upper Levallois and early Epi-Levallois types. Further north what would appear to be contemporaneous industries, also of Levalloisian character, are represented in the 25-foot fine gravels, or silts—the so-called 8-meter terrace—of Lower and northern Middle Egypt, in the sub-alluvial "Sebilian" gravels of Middle Egypt, in the ancient Fayum lake beaches at elevations of 112 and 92 feet above sea-level, and in the silts of the Wadi Tumilat, on the east of the Delta. Off to the west the wadi gravels of the Kharga oasis scarp have been found to contain analogous industries identified, respectively, as Upper Levalloisian and "Levalloiso-Khargan." Fossilized bones found in Sebilian deposits near Kom Ombo and in association with such deposits at Qau and Asyut in Middle Egypt reflect the existence at this period of a rich and varied fauna, including species of hyena, donkey, horse, hippopotamus, pig, ox, lion, gazelle, bubalis, ostrich, crocodile, tortoise, two kinds of fish, and numerous shellfish. Human remains, believed by their finders to be of Paleolithic date, resemble those of the predynastic Upper Egyptians of a much later period.

In Late Paleolithic times the Nile entered upon a new period of bed erosion, resinking its channel to a great depth in the silt deposited during the preceding stage and leaving on its margins, in the form of fresh spreads of fine gravel, the concentrated coarser elements from the eroded silt. The fall of river level is marked by a descending series of shingle beaches, still visible in isolated localities in Nubia and Upper Egypt; but even better seen in the descending shorelines of the subsidiary lakes and marshes referred to above, which with the lowering of the river were gradually drained of their water. In the materials forming the ancient surfaces of these lake and river beaches are found Late Paleolithic implements of the advanced and diminutive types which characterize the final stages of the Levallois tradition in Egypt (Epi-Levallois II and III).

Approximately ten thousand years ago, in the period of transition between the Old Stone Age and the Neolithic, or New

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Stone Age, the Nile, responding to an early postglacial rise in sea-level, began anew to aggrade its bed and choke its mouth with sediments of Abyssinian origin—first with mica-bearing sands, silts, and fine gravel, and then, beginning probably in early Neolithic times, with the silts, clays, and fine sands which form the present arable land of Egypt. This fertile, uppermost alluvium, brought from far to the south by a river which over the last sixteen hundred miles of its course is without a tributary, has been aptly termed by a French geologist "la terre végétale." Every year the summer inundation deposits a new layer of this life-giving soil in the Egyptian Nile Valley and over the flat alluvial plain of the Delta; and little by little the accumulation has not only choked and buried the earlier channels of the river, but has crept up around the monuments of ancient man, sparing neither prehistoric camp sites nor the more recent structures of historic times. Borings taken in three zones between Aswan and Cairo have recorded silt at depths of 22, 28, and 32 feet, and from such borings and other observations it has been estimated that the rate of silt deposition, before the construction of the modern dams and barrages, was 0.0405 inches a year or three and a half to four inches a century. Unfortunately for all such estimates, the rate of deposition, controlled by fluctuations in the sea-level of the Mediterranean and in the volume of the Blue Nile, appears to have been far from uniform, varying considerably not only from one locality to another, but from one period to another. It is, indeed, probable that 60 per cent of the total upper alluvium was laid down before the beginning of the Old Kingdom (*ca.* 2700 B.C.), 20–25 per cent during the last 2500 years, and, by contrast, almost none at all between the years 1960 and 900 B.C.

The horizontal development of the Nile's alluvial plain has been less thoroughly studied than its vertical growth; but it is evident that since early historic times, and especially from the Hellenistic period onward, considerable lateral expansion has taken place at the expense of the adjoining low desert, particularly in areas where the latter, dissected by former wadi activity, slopes gently downward toward the valley floor. With the onset of each annual flood the coarser and heavier sediments (chiefly sands) brought down by the river are piled up along its banks, forming levees which rise above all but the highest water levels and have thus formed favorable sites for human habitation. The rest of the flood plain, built up more slowly of the finer and more widely distributed elements in the river's load, falls away gently toward the sides of the valley, forming basin lands, in the low-lying outer portions of which the groundwater remains visible throughout the greater part of the year in the form of small lakes and marshes. Networks of lateral waterways spilling over at high water from the elevated river bed into these basins have cut the levees up into series of hills, or islands, the tops of which have been raised still further by the accumulated deposits of civilization.

The annual inundation of the Nile, as we have seen, probably became a salient feature in the life of Egypt at the time of the serious decline in the local rainfall which occurred during the latter part of the Middle Paleolithic period. Nowadays the yearly flood waters come chiefly from the late spring and summer rains around the headwaters of the Blue Nile and the Atbara, the former of which joins the White Nile at Khartoum, the latter two hundred miles to the north. Some conception of the magnitude and force of the flood can be derived from the fact that between the months of June and Sep-

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tember the volume of the Blue Nile may increase from a normal 7,000 cubic feet to over 350,000 cubic feet per second. At Khartoum the initial rise of the river is usually discernible about the middle of May; at the First Cataract, on the southern boundary of Egypt proper, early in June; and at Cairo, at the end of June or during the first weeks of July. The time of the river's rise can, however, vary considerably from year to year, the intervals between floods differing by as much as eighty days during a single generation. Before the end of September the inundation has normally reached its height and the swollen river has submerged the whole of its alluvial plain and spilled over into low-lying hollows along the desert's edge, transforming them into marshes or shallow lagoons. Today part of the flood is held in reserve by a series of modern dams and barrages; but until 1890, when the first of these was completed, the flood waters drained unimpeded into the open sea, often leaving in their wake considerable damage to revetments, dikes, roadways, bridges, modern villages, and ancient ruins. By the end of November the bulk of the water has receded from the land leaving the moist fields, covered with a thin layer of fresh silt, exposed and ready for the annual planting. In Middle Egypt the average difference between low water (May–June) and the height of the inundation (September) is twenty-two feet; but here again there is a yearly variation depending more or less directly on the volume of the equatorial rains. An inundation four or five feet below the average is a "bad Nile" and in antiquity a succession of these usually resulted in crop failures and famine. On the other hand, an exceptionally high Nile (30 feet or over) was almost equally disastrous because of the widespread destruction which it wrought.

During the long and for the most part arid periods discussed in the foregoing paragraphs it is only natural that a second agency, wind, should have played a part in shaping the Egyptian landscape, not only by formidable feats of surface erosion, but also by the deposition of dry, sandy material either on or between layers of Nilotic sediments or in the form of marginal dunes along the western fringes of the valley. Wind-blown sand occurs, for example, in the basal (Sebilian) silts of Upper Egypt and both above and below the later alluvial deposits of sections of Middle Egypt. Fields of sand encroach upon the western margins of the alluvial plain between Gebel Deshasha and Deir el-Miharraq and constitute locally "a considerable hindrance to cultivation." A study of the marginal dunes suggests that they can be divided into two principal groups—the Older Dunes, built up between 2350 and 500 B.C., and the Younger Dunes which came into being between A.D. 300 and the present day. Unlike the mobile dunes of the desert plateau and those which move across the Pleistocene gravels west of Beni Mazar, most of the marginal dunes are more or less anchored in their places by the local vegetation.

7. Lower Egypt and the Delta of the Nile

When, in mid-Tertiary times, the Nile adopted its present course it flowed into the gradually diminishing Mediterranean by way of a broad bay or estuary, the head of which lay, as we have seen, in the neighborhood of modern Cairo and is marked today by the prominences of Gebel Abu Roash and Gebel el-Ahmar, the ancient "gates of the Delta." The geohistory of Lower Egypt, insofar as it has a bearing on Man's activities in this most

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important region, is the story of the building up in this bay of a series of superimposed deltas, which as time progressed contracted laterally, but thrust steadily northward until by Late Paleolithic times the present coastline, some 110 miles north of Cairo, had been reached.

Though much of the prehistory and early history of Lower Egypt lies buried beneath the silt of the present Delta, beyond the confines of the latter and in its southern and eastern portions are still preserved large expanses of those far older deltas formed by the Nile before and during the occupancy of earliest Man. Ancient deltaic deposits have been identified as far south as Minya, 130 miles above the apex of the modern Delta; and we have already traced the gravel spreads of what well may be the Oligocene delta of the ancestral river system northwest across the Libyan Desert as far as Moghara and northeast across the Arabian Desert beyond Suez.

Miocene deposits, unknown in the Nile Valley, not only stretch westward from the oasis of the Wadi el-Natrun, but are also found in abundance in the much faulted region between Suez and the east side of the Delta. Some of the drainage lines in the area between Cairo and the Gulf of Suez probably date back to Upper Miocene times.

Estuarine beds of the Pliocene period preserved in the Wadi el-Natrun are of special interest because of the rich and varied fauna contained in them—a fauna comprising both aquatic and land animals whose bones had been collected and swept down by the river, in some cases probably from hundreds of miles upstream. Besides fish, turtles, and crocodiles the aquatic fauna include a dwarf hippopotamus, three species of otter, and a sea cow. Among the bones of land animals were those of a mastodon, an elephant, a rhinoceros, a giraffe, a camel, an early form of horse, a boar, a hyena, a type of large cat, and three cynopithecoid apes.

Borings, sunk through the "terre végétale" to depths of 267 feet at Cairo, 345 feet at Zagazig, and 535 feet at Abuqir, have failed to reach solid rock or a stratum of the Pliocene age or earlier; but have penetrated three distinct layers of loose material—silts, sands, and gravels—deposited successively between the Plio-Pleistocene interval and the Late Paleolithic phase of human development.

Pliocene gulf deposits and Plio-Pleistocene river gravels are well represented from the region of Cairo northwestward and northeastward along both sides of the modern Delta, the gravels rising to great heights above the present flood plain and descending toward it, as in Upper and Middle Egypt, in a series of terraces. Especially noteworthy are the implementiferous gravels of the 100-foot terrace exposed near Cairo in the sand-pits of Abbassiya and the successions of terraces identified near el-Khatatba on the west side of the Delta and, on its east side, just north of the Wadi el-Tumilat. The last-named feature, which appears itself to have been formed during the 100-foot terrace stage of Lower Egypt, is a former Nile arm linking the eastern Delta with the Isthmus of Suez. It was destined to become, in later times, one of the principal routes into northern Egypt from the east and as such, to play an important role in Egyptian history.

As the sea is approached the river gravels give way to submarine deposits of deltaic types, the well defined lines of change marking the ancient delta coast lines and enabling us to fix the positions of the old delta mouths of the river. We can, for example, follow the coast of the Plio-Pleistocene delta eastward from the Wadi el-Natrun to a point north of el-

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Khatatba at the western edge of the modern delta and pick it up again on the east side along the slopes which run from south of the Wadi el-Tumilat to the dunes and marshes of the present coast. The high-level terraces, bearing off to the east and west along the North African shoreline, pass ultimately into ancient Mediterranean Sea beaches. Remains of eight to ten such beaches or marine bars, ranging in height from more than 360 feet above sea-level down to sea-level, are to be seen to the west of Alexandria to a distance of twenty-four miles inland from the present shoreline of Arabs Gulf and in places elsewhere along the coast between Abuqir and the Gulf of Sollum.

Large remnants of the Pleistocene delta are still visible in the form of sandy islands, or "turtlebacks," which are distributed over an area of some two thousand square miles in the eastern and southern portions of the great triangular plain. These islands, capped with sands of Middle Paleolithic date, represent the more compact and resistant portions of the Plio-Pleistocene and Pleistocene deposits, between which the river arms during the late Pleistocene period lowered their beds with such rapidity that there was little energy left over for lateral erosion. The silt covering overlapping the gently sloping edges of the visible turtlebacks and concealing others completely from view is thin, and it is clear that even in fairly recent historic times these eminently habitable expanses of elevated, dry land were both more numerous and much larger in area than at the present day.

In addition to the capping of the turtlebacks fine gravel and silt deposits of the Middle Paleolithic aggradation phase of the Pleistocene are found along the western edge of the Delta, covered with wind-blown surface sand and overlapping older delta sands and terrace gravels. These deposits occur also in the Wadi el-Tumilat and in a few places along the eastern edge of the Delta. Rising to a maximum height of thirty feet above the present level of the alluvium, they contain implements of more recent types than those found in the lower terraces of Upper Egypt, but similar to those in the Middle Egyptian gravels which rise above fifteen feet and to those occurring in deposits in the Fayum basin and in the channel which connects the latter with the Nile.

In the later Paleolithic stage of human development the Nile, as we have seen, sank its channel not only deeply into the silts piled up during the preceding stage, but far below the level of the modern flood plain. Naturally, no Nilotic deposits of this period are visible on the surface of the Delta, where borings have shown that the younger of the two buried channels lies at least one hundred feet, and probably more, below the surface of the modern alluvium. Later Paleolithic and pre-Neolithic implements, however, have been found in surface washes at the east end of the Wadi el-Tumilat, in the sand dunes near el-Ismailiya, in the sites at Helwan, south of Cairo, and in surface sites on the west side of the Delta. Though these indicate people living on the slopes bordering the Delta—a state of affairs which continued during the Neolithic period—there can be little doubt that large areas of the Delta itself were at this time habitable and probably inhabited.

Between Cairo and the sea the deposition of the upper alluvium followed a somewhat different pattern than in the valley to the south. Not only was the area to be covered far broader, but the ability of the river to transport and distribute its load of silts and heavier sediments was much reduced by its division into many arms and by a marked diminution in its gradient and, therefore, in its rate of flow.

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As a result the river embankments, or levees, tend to be lower and narrower, the basins deeper, and permanent swamps and lakes somewhat more numerous, especially in the northernmost portions of the plain. Nevertheless, with silt deposition even in this area attested to a depth of more than thirty-six feet and the sea-level about 5000 B.C. more than thirty feet below its present position it is clear that in Neolithic and later prehistoric times much of the Delta plain was seasonally dry as far north as the brackish coastal lagoons, that is, as far north as the present 10-foot (3-meter) isohyp. It has been chiefly during the historic period that a gradually rising sea-level has compelled men to concentrate their settlements on the sandy turtlebacks of the southern and eastern Delta, on the silt islands which once formed parts of the elevated river banks, and on the fringe areas which now comprise the low desert.

The present-day Delta is a flat alluvial plain, roughly triangular in shape, bounded on the northwest by Abuqir, on the northeast by Lake Menzala, and on the south by Cairo. With an area of over nine thousand square miles, it represents two-thirds of the total arable land of Egypt. The altitude of the modern cultivated land at the apex of the Delta is less than sixty-five feet above sea-level, and the soil in the basin lands tends to be waterlogged at a shallow depth below the surface. Owing to some subsidence and compaction, but chiefly, it would seem, to a rise in sea-level of six and one-half to thirteen feet since classical times much of the fertile triangle as well as the coastal areas to the east and west are lower now in relation to the sea than they were in the Greco-Roman period. As a result Hellenistic structures all along the coast from Cyrenaica to Lebanon have become partially submerged and in the region of Alexandria a very marked sinking appears to have taken place since Roman times.

The most striking feature of the Mediterranean coastline of Egypt is the series of shallow lakes or lagoons, which extend from west to east across the seaward side of the Delta from Alexandria to Port Said and which in their present forms are of relatively recent origin. On the north these coastal lakes are bounded by bars of diluvial marine limestone and in places by reefs, similar to pelagic coral reefs, and on the south by low-lying marshy tracts, which separate the lagoons from the cultivated lands of the Delta. Of the four principal lakes—Maryut, Edku, Burullus, and Menzala—only Lake Maryut, at the extreme northwest corner of the Delta, by Alexandria, is completely landlocked, the bars enclosing the other lakes having broken through at one or more places. Between the lagoons, at points where the river debouches, or did debouch, into the sea through its several delta mouths, Nilotic silt has overrun the marine barriers and formed northward-projecting spurs, as at Abuqir, Rosetta, and Damietta. The small tongue of land which extends to the east from the Damietta mouth across the northern side of Lake Menzala is composed exclusively of Nile alluvium, precipitated into the sea and carried to the east by the North African coastal current. Still further to the east, where the coast of Sinai bends northward in a striking curve before turning up toward Palestine, another narrow tongue of land encloses the long, narrow coastal lake of Sirbonis, now called the Sabkhet el-Bardawil. The Egyptian shoreline to the west of the Delta and the western part of the Delta coast itself are composed to a great extent of ridges of soft oölitic limestone which, in the words of Blanckenhorn, "run parallel with the coast and to the south climb stepwise to the high ground,

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but are separated from one another by longitudinal valleys . . ." These ridges and the valleys between represent former offshore marine bars and lagoons formed in the course of the Pleistocene period by at least eight marine transgressions above modern sea-level. Important Egyptian harbors, like those of Mirsa Matruh and Alexandria, owe their existence to the breaking down, in comparatively recent times; of the outer of these coastal bars.

The courses of the Nile through its own delta have been many and various. At the present day the river divides into its two principal branches at Batn el-Baqar, ten miles northwest of Cairo. The Rosetta arm winds off toward the northwest and pours its load of silt into the sea thirty-five miles east of Abuqir, between Lake Edku and Lake Burullus. The Damietta branch bears away in a northerly and then northeasterly direction and flows into the Mediterranean close beside the western edge of Lake Menzala. Classical writers list seven principal Nile mouths, all named after important Delta towns and called, in order from east to west, the Pelusiac, Tanitic, Mendesian, Phatnitic, Sebennytic, Bolbitinic, and Canopic mouths. The Phatnitic and Bolbitinic arms appear to have corresponded respectively with the still existent Damietta and Rosetta branches. Of the other five—all now fallen into disuse—the Pelusiac mouth at the extreme eastern edge of the Delta and the Canopic mouth at its extreme western edges were the most important.

8. The Nubian Nile Valley and its Cataracts

The narrow gorge through which the Nile flows between the Sudan frontier and el-Sebaiya in southern Upper Egypt is of more recent origin than the Egyptian Nile Valley. The cutting of the latter during the Upper Miocene and Lower Pliocene periods was accompanied in Nubia by general erosion of the southern portion of the sedimentary tableland; and it was not until after the sandstone underlying the Upper Cretaceous and Eocene strata had been laid bare that the Nubian river system converged into a single stream and adopted its present course. The excavation of the Nubian Nile Valley was, then, an event of late Pliocene or post-Pliocene times.

Since the Pliocene gulf did not extend south of Aswan there are no deposits of this age in the Nubian valley; and the Plio-Pleistocene and Pleistocene river terraces here are rock platforms carved in the sandstone which forms the walls of the valley and covered with spreads of gravel derived from the sandstone plateau itself and brought in for the most part by the lateral tributaries of the river. The 300- and 200-foot terraces are preserved only in places, as at Abu Simbel and near Korosko, where high cliffs rise on either side of the river; but the 150-, 100-, and 50-foot terraces are well represented all the way between Wadi Halfa and Aswan, the last two, as in Egypt, containing in their gravels implements of Lower Paleolithic types. No traces of terraces below the 50-foot level have been observed, though Middle Paleolithic implements of types associated in Egypt with the 30-foot terrace and the 10-foot gravels have been found in surface sites and in the basal parts of the later river silt. The advent of Middle Paleolithic times appears to have been accompanied south of Aswan by a reduction in rainfall—hence, in the volume of the river and its tributaries—more marked than in the north at this period; and it is probable that in Nubia the 30-foot terrace and the 10-foot gravel platform were never formed.

The Middle-Late Paleolithic phase of silt deposition was followed, as in Egypt, by

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renewed erosion and cutting down of the river bed—the difference being that in Nubia this process of degradation has continued without interruption from the Late Paleolithic period until the construction of the modern dam at Shellal. Thus, while north of Aswan the Nile has since pre-Neolithic times been building up its bed, in Nubia it has been slowly cutting it down, a process particularly noticeable in the so-called cataracts and narrows of the river.

These "cataracts" and narrows occur along the Nubian Nile at places where the river while excavating its post-Pliocene valley, encountered at relatively shallow depths below the surface of the sandstone outcrops of igneous and metamorphic rocks, through which it has subsequently forced its way only with considerable difficulty and unaccustomed turbulence. In the region of the Second Cataract, south of Wadi Halfa, the ancient rock formations were exposed by general erosion of the thin southern rim of the sandstone plateau and are found not only along the river but over a considerable portion of the northern Sudan. A hundred and sixty miles to the north they reappear in the form of isolated spurs extending across the course of the river first at Kalabsha and then for a distance of twenty-one miles south of Aswan.

The Second Cataract may be said to include a succession of rapids extending along the river for a distance of more than thirty miles from above the Middle Kingdom forts at Semna to a point some five or six miles south of the modern town of Wadi Halfa. The name Batn el-Hagar, "Belly of Stones," is now applied to the whole of the ninety-mile stretch of river south of Wadi Halfa; but above Semna the Nile has lowered its bed and cleared its channel in the hard rock to an extent where, except at Atiri, true cataract conditions can no longer be said to exist. At Semna itself the rock barrier has been cut down some twenty-six feet during the last four thousand years as indicated by Nile marks of the late Twelfth Dynasty at that height above the present river level. North of the Semna rapids the course of the river is obstructed here and there by small islands; but it is not until the island of Shargandi, twelve miles upstream from Wadi Halfa, is reached that the cataract proper begins. Thence northward for six miles the Nile swirls and tumbles through a maze of rocky islets and giant boulders until near the towering prominence of Abusir it enters its silt-encumbered valley in the Nubian sandstone and resumes its normally steady and placid rate of flow.

Were it not for the fact that the construction and subsequent heightening of the Aswan dam have caused most of Nubia from Shellal southward to be flooded, the First Cataract and its approaches would exhibit a generally similar pattern of development. At Kalabsha, forty miles upriver from Aswan, the Nile has opened a deep though narrow gorge through the southern spur of the igneous and metamorphic complex and eroded the granite sill to a point where it no longer constitutes a serious impediment to the river's flow. Between Dehmit and Shellal the channel, though hemmed in by hard rock walls, is still relatively free of obstructions. This is far from being the case over the six-mile stretch occupied by the cataract itself between the large island of el-Heisa, southwest of Shellal, and the historically important island of Elephantine, immediately opposite the town of Aswan. Here the Nile in its early struggles to penetrate the rocky barrier split into three main channels. Through the westernmost of these it still flows below the modern dam, whirling and twisting in

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countless smaller channels around and between seven good-sized islands and innumerable glistening black boulders. The dry eastern channel, through which a railway line now runs, was blocked with sandstones, shales, and compacted silts (Pliocene?) and finally with gravels and sands of the 100-foot terrace stage and was apparently abandoned in Lower Paleolithic times, the central channel falling into disuse at a later date, following the silt-aggradation phase of the middle-late Paleolithic period. Coarse-grained red granite, also called "syenite" from the ancient Greek name of Aswan (Syene), is the dominant surface rock in the region of the First Cataract, but grano-diorites and diorites are also well represented, and the more ancient crystalline schists and gneisses are found "near the periphery of the outcrop."

Geohistorically the First and Second Cataracts and the river narrows associated with them are among the more recent additions to the physiography of the Nile Valley. Contact between the ancient river and the granitic rock barrier was not, as we have seen, established until late Pliocene or post-Pliocene times; and most of the erosion which created the present-day gorges and rapids has undoubtedly taken place within the memory of man—much of it, indeed, since the beginning of recorded history.

For a distance of eighty miles below the First Cataract the Nile follows a narrow channel in the sandstone similar in character to its Nubian valley above Dehmit and exhibiting only in the vicinity of Kom Ombo features of special interest to the student of human history. Here, between Khannak and Kagug, crustal disturbances of Miocene date opened, as we have seen, a wide triangular basin, or sunken plain, bounded on the north by a high, east–west fault scarp of hard Nubian sandstone. Flooded during the earlier phases of its existence not only by the main river, but by an important group of tributary streams flowing into it from the east, the Kom Ombo basin in Late Paleolithic times still contained an extensive, though dwindling lake or swamp, on the shores of which are the remains of human habitations.

The river meanwhile, during its Lower-Middle Paleolithic stages of bed erosion, had cut two deep channels through the sandstone barrier forming the northern rim of the basin, one on either side of the hard massif known today as Gebel el-Silsila. Owing probably to a westerly shift in the course of the river the eastern channel silted up and was subsequently abandoned; and from the end of the Paleolithic period on the Nile has flowed only through the narrow western gorge, between precipitous walls of sandstone which over a distance of almost a mile come directly down to the water's edge.

The Silsila gorge, at one time without much doubt a true cataract, was at an ancient period in Egypt's history regarded, reasonably enough, as the gateway to Nubia and was revered as one of the legendary sources of the Nile. It marks, in any case, the remains of the last serious barrier encountered by the river in its course to the Mediterranean. At el-Sebaiya, forty miles to the north, the Nile leaves the sandstone behind and passes into the softer shales and limestones characteristic of its Egyptian valley.

9. The Fayum Lake Basin

Outside of the valley and delta of the Nile no part of Egypt has played a more important role in the history and prehistory of the country than the Fayum basin and its ancient lake.

A fertile, oasis-like depression in the Libyan desert sixty miles south of Cairo

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and only some fifteen miles to the west of the river, the Fayum measures thirty-five miles in width from north to south and almost fifty miles in length from east to west. The lake which once filled it is today represented by the Birket Qarun, a relatively small, brackish body of water occupying the low-lying northwestern portion of the depression and at present used chiefly as a sump, its surface artificially stabilized at 147 feet below mean sea-level. For its water supply the old lake basin has for centuries depended on the Bahr Yusef, a brook which leaves the Nile far to the south near Asyut, winds northward parallel to the river, and enters the Fayum through the ancient Hawara channel, between Gebel Sedment and Gebel Lahun.

Geologists are not in complete agreement on the period when the Fayum depression, as such, came into existence or on the steps involved in its creation. It is, however, the opinion of the majority of observers that, following some preliminary shaping by tectonic and possibly fluviatile activity, the present basin was largely excavated by wind erosion in early Pleistocene times; and that a direct hydrographic connection between the Fayum and the Nile through the Hawara Channel had been established by the beginning of the Middle Paleolithic period. At that time the depression was occupied by a vast, high-level lake, the surface of which lay 131–138 feet above modern sea-level with storm beaches piled up along its easterly, or lee, shore to a height of 144 feet. The beach of this lake would seem to be associated with the 50-foot river terrace of northern Middle Egypt, which at nearby Beni Suef stands at 142 feet above sea-level. Though no implements have been found *in situ* in either the terrace gravels or the beach shingle it is probable that both are of early Middle Paleolithic (Lower Levalloisian) date. Sections of gravel platforms extending through the Hawara Channel show that the beach of a lake at 112 feet above sea-level is a continuation inside the Fayum of the Nile gravels of the 25-foot aggradation phase, and in this case implements of late Middle Paleolithic types common to both the river gravels and the beach shingle confirm the association.

As the Nile in final Middle Paleolithic and Late Paleolithic times lowered its bed from one level to another the Fayum lake fell with it, first to 92 feet and then to 74 feet above modern sea-level. Toward the end of the Paleolithic period the river had sunk so low that its waters no longer flowed into the Fayum, and the lake dropped to 18 feet below sea-level and appears, indeed, to have dried up altogether. Wind erosion again took charge and the dry lake basin was evidently deepened considerably at this time, surpassing in all probability its present maximum depth of 174 feet below sea-level.

During the period of transition between the Old and New Stone Ages the Nile, as we have seen, entered upon its present phase of bed aggradation and began once more to send its overflow through the Hawara channel into the Fayum, reestablishing the lake and raising its surface to 59 feet above sea-level. Soon, however, the Hawara channel itself began to be choked with silt, and this factor alone appears to have been sufficient to reduce the amount of water received by the Fayum basin below that which it lost each year through seepage and evaporation. In spite, therefore, of some local rainfall the lake early in the Neolithic period had apparently already fallen to 43 feet and this was followed by a 33-foot lake and in mid-Neolithic times by a lake only 13 feet above sea-level. With the decline

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of the so-called Neolithic Wet Phase, or Sub-pluvial, and the approach of semi-desert conditions the Fayum lake sank seven feet below sea-level, remaining at this general level throughout the balance of Egyptian prehistory and well down into historic times.

From time to time since the early years of the second millennium B.C. the level of the lake has been artificially regulated by the government of Egypt for purposes of flood control, irrigation, land reclamation, or drainage. In general the ancient lake, known in the New Kingdom as the Lake of Miwer and in Greco-Roman times as the Lake of Moeris, occupied a far greater proportion of the Fayum depression than it does now, not approaching its present restricted dimensions until the beginning of the Christian Era. In antiquity the inhabited portions of the Fayum included, besides the old lake beaches and the marginal areas of fertile lake bottom left exposed by the descending waters, a fan-shaped expanse of Nile silt extending from the inner end of the Hawara channel over most of the southeastern part of the depression. It is near the center of this "delta" that has always stood the Fayum's principal town: the dynastic Shedet, the classical Crocodilopolis (Arsinoe), and the modern Medinet el-Fayum.

10. The Oases of the Libyan Desert

Like the Fayum, the other habitable depressions of the Libyan desert—the Wadi el-Natrun and the oases of Siwa, Bahria, Farafra, Kharga, Dakhla, and others—are immense basins scooped out of the softer portions of the plateau surface chiefly by the powerful erosive action of sand-laden winds. This excavatory work, the bulk of which appears to have been accomplished between later Tertiary and Middle Pleistocene times, may have been preceded by "a vast primary marine denudation as the anticlinal areas now occupied by the oases rose from beneath the sea"; and it has been suggested that crustal movements of pre-Pliocene times determined the lines along which the softer strata were exposed to erosion and, hence, the positions and the general shapes of the depressions. Mitwally believes that "the depressions owe their origin to the action of erosion on areas of favourable geological structure and upon strata possessing a differential resistance to its power" and points out that "the position of all the depressions (Baharia and Fayum excepted) coincide with the southern limits of major geological formations" —Kurkur, Kharga, and Farafra with the edge of the Eocene limestone, Dakhla with the southern limit of the Cretaceous chalk, and Siwa with the southern limit of the Miocene formations. Said excludes the possibility of a tectonic origin for the oases and is of the opinion that they started as water-filled minor depressions which became dust-bowls and were subsequently deflated by wind. According to him the depth of their floors was "governed by the ground water level which forms, in a way, a base level for wind action." A few geologists still adhere to the belief that fluviatile erosion by Libyan branches of the Upper Eocene-Oligocene "Urnil" river system also played an important part in the initial formation of the basins of the central and southern groups.

The depressions themselves are for the most part long and narrow, extending either in a generally east–west direction, like the Wadi el-Natrun and the oases of Siwa and Dakhla, or from north to south, like Bahria and Kharga; and are either wholly or partially surrounded by steep and often lofty escarpments. Ancient torrents have furrowed the sides of these scarps in many places, and inside the depressions hard, resistant masses of rock

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have been left standing to form hills here and there on their floors. The lowest portions of the Kharga depression descend a few feet below sea-level and more than 1300 feet below the surface of the surrounding plateau, and, in the north, depths of seventy to eighty feet below sea-level have been recorded in the Wadi el-Natrun and in the oasis of Siwa. So far as actual size is concerned, the smallest and most recently formed of the depressions under consideration, the Wadi el-Natrun, has a length of about twenty-five miles and an average width of about six miles, while the largest, the oasis of Kharga, measures a hundred and fifteen miles from north to south and reaches a maximum width of almost fifty miles.

From mid-Pleistocene times, when the oases appear first to have become habitable, they have depended for their water supply chiefly on natural springs bubbling out of the upper strata of sandstone which form or underlie the floors of the depressions or (since the Sixth Century B.C.) on artesian wells sunk hundreds of feet into the lower strata of the same stone. The subterranean water tapped by these springs and wells is believed to have travelled through the sandstone for great distances, originating either in the Nubian Nile or far to the southwest in the rain-swept highlands of Chad or the Republic of the Sudan. Almost no active springs are to be found nowadays in the oases; but at Kharga groups of large mounds distributed over the floor of the depression mark the positions of "fossil springs" once used by prehistoric man and containing in their deposits implements of final Lower Paleolithic and later types similar to those found also in the wadi gravels of the depression's eastern scarp. Within the basins proper human activity appears to have been largely concentrated around these springs; and today—in contrast to the Fayum, most of which is fertile—the arable land in the oases is confined to relatively small patches immediately surrounding the artesian wells and comprising in the oasis of Kharga less than one percent of the total area of the depression. Outside of these fertile patches the floors of the depressions are often as barren as the surrounding desert plateau and in places are heavily drifted over with wind-blown sand. Unlike the Wadi el-Natrun, the vast, uninhabited Qattara Depression, and other of the more northerly depressions, the southern oases do not ever seem to have contained large lakes or extensive marshy tracts, certain deposits in Kharga oasis, once thought to have been lacustrine, being no longer accepted as such.

A study of the eastern scarp of the Kharga depression has disclosed the presence here of two classes of tufa formed during periods of relatively high humidity: the so-called Plateau Tufa, "unfossiliferous, locally pre-human, and possibly Plio-Pleistocene" in date; and the Wadi Tufa, "crammed with the impressions of fossil plants and intimately associated with Paleolithic man." Like the deposits formed around the ancient springs on the floor of the depression the fluviatile gravels underlying the layers of Wadi Tufa in the passes of the scarp were found to contain human artifacts ranging in date from late Lower Paleolithic (Upper Acheulian) down into local Neolithic. Evidences of post-Paleolithic and later prehistoric habitations occur in the silt-pans and chert quarries of the adjoining Libyan Plateau and in some of the silty basins in the depression proper.

A glance at the geographic distribution of the Libyan oases will prove helpful in understanding their economic and cultural relationships with one another and with Egypt, of which in antiquity they were not

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regarded as forming a part. This was true even of the Wadi el-Natrun which lies only sixty miles north of the Fayum and less than forty miles from the western edge of the Delta and from which the Egyptians at an early period obtained a kind of soda, called natron, used extensively by them as a detergent and preservative. Siwa, lying some two hundred and seventy-five miles due west of the Fayum, near the boundary of modern Libya, is the most remote and least "Egyptian" of all the fertile depressions, its affiliations until a relatively late period in Egyptian history having been principally with Libya and the Saharan and North African regions to the west. In antiquity it appears to have been reached from the Nile Valley by way of the oasis of Bahria, which lies a hundred and ten miles almost due southwest of the Fayum and less than a hundred miles from the Nile opposite Samalut and Minya in Middle Egypt. Bahria, in turn, is linked with the southern group of oases by the extensive, but historically unimportant, depression of Farafra, which stretches southward to within fifty miles or less of the western end of the Dakhla scarp, its principal settlement, Qasr Farafra, falling approximately on the latitude of the Upper Egyptian city of Asyut. Dakhla and Kharga form the two arms of a great ⅂-shaped depression, the whole of which was in ancient times referred to as the "Southern Oasis" and later as "the Great Oasis." Kharga, the north–south arm of the ⅂, stretches from north of the latitude of Luxor to about the latitude of Aswan, and is reached from the Nile Valley by a dozen different caravan tracks, most of them converging on one or the other of its two principal villages, Kharga and Beris. The shortest and best of these routes across the Libyan plateau to the Great Oasis is the one which leaves the Nile Valley near Girga, bears west-southwest for about seventy-five miles and enters the oasis by way of a lateral ravine known today as the Abu Sighawal pass. From Asyut the principal caravan route to the Sudan runs almost due south across the desert, passes lengthwise through the Kharga depression, and proceeds thence southward to Darfur via the small Nubian oases of Bir el-Natrun and Selima. This is the famous Darb el-Arbain, or "Road of the Forty (Days)," one of the most ancient and extensively used lines of communication linking Egypt with the African lands to the south.

Aside from their function as way-stations on the southern and western trade routes the oases have since Paleolithic times supported populations of their own and have been known for their production of wine, olive oil, dates, and other commodities. As outposts of the ancient Libyans, as havens for political refugees, and as places of exile for enemies of the state they have from time to time played a by no means negligible role in Egyptian history.

11. Climate

Variations in Egypt's normally arid climate from the beginning of the Tertiary era to the present day are to a great extent reflected in the geological and biogeographical developments outlined in the foregoing pages.

Every class of evidence—physiographical, floral, and faunal—indicates that in northeastern Africa the Tertiary was characterized in large part by warm temperatures and extended intervals of moderate to heavy rainfall, the latter reaching a peak toward the end of the Oligocene period and again in middle and late Pliocene times. Though during phases of maximum precipitation the climate apparently achieved a tropical-monsoonal character, made possible the growth of

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trees of considerable size, and supported a fauna of sub-equatorial type, the rainfall was clearly never sufficient to provide the Egyptian tableland with a thick covering of forest. We think, rather, of grassy plains fringed here and there by clumps of trees and deteriorating rapidly into treeless steppe and even desert during the periods of aridity which interrupted the stretches of more favorable climate.

In Egypt, as in other portions of the Saharo-Arabian climatic zone, the Pleistocene epoch is now generally believed to have comprised a succession of "pluvials," or periods of relatively abundant annual rainfall, separated from one another by intervals of aridity, or "interpluvials," with the former decreasing and the latter increasing in intensity with the transition to the succeeding Holocene, or recent, epoch. Investigations conducted by Professor Karl W. Butzer indicate that the Pleistocene pluvials, though associated meteorologically and chronologically with the advance of the glaciers in more northerly latitudes, "are the direct consequence of primary changes in the general circulation of the atmosphere and are not secondary effects of the presence of continental glaciation."

Evidences of erosion and deposition as studied both in the Nile Valley and on the eastern scarp of Kharga oasis have led one group of observers to limit the number of Pleistocene pluvials to two: a first, and major, pluvial extending from late Pliocene or Plio-Pleistocene times to about the middle of the Pleistocene period and witnessing, in the river valley, the earlier Lower Paleolithic stages of human prehistory; and a second and somewhat less effective pluvial beginning in later Lower Paleolithic times and reaching two or three minor peaks of precipitation during the Middle Paleolithic stages of man's cultural development.

More recently, however, the same evidence has been convincingly reinterpreted and four pluvial periods separated from one another by three interpluvials have been postulated for the late Lower to Upper Pleistocene, probably preceded during the earliest Pleistocene by still another pluvial and interpluvial. The four moist periods in question have been tentatively designated as the Mindel Pluvial, the Riss Pluvial, the Early Würm Pluvial, and the Main Würm Pluvial, the names being borrowed from the well-known Alpine glacial phases with the early stages of which these north African and southwest Asian pluvials are presumed to be associated. In Egypt the Mindel and Riss Pluvials are thought to have produced the gravel cappings of the 100-, 50-, and 30-foot Nile terraces of the upper valley and, in terms of human activity, to have embraced the whole of the Lower Paleolithic stage (Abbevillian and Acheulian), including the period of Man's first demonstrable occupation of the oasis of Kharga (Upper Acheulian) and the period of transition to the Middle Paleolithic (Acheulio-Levalloisian). The 100-foot Nile gravels of northern Egypt (Acheulian) are assigned to the Mindel-Riss Interpluvial and the 50-foot gravels and 131-foot Fayum lake (Lower Levalloisian?) to the Riss-Würm Interpluvial. The Early Würm Pluvial would have witnessed the formation of the 10-foot wadi gravels of Upper Egypt (Middle Paleolithic) and the succeeding Interpluvial the commencement of Abyssinian silt deposition in the south, the building-up of the 25-foot fine gravels and silts in the north, and the decline of the Fayum lake first to 112 and then to 92 feet above sea-level (late Middle Paleolithic–Late Paleolithic). It was apparently during the second and minor submaximum of the Würm Pluvial ("Main Würm") and during its increasingly arid

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final stage ("Late Würm") that the Nile in Late Paleolithic times degraded its bed to great depths all the way from the Second Cataract to the seacoast and that, despite some momentary increases in rainfall, the Fayum lake sank gradually below present sea-level and may have disappeared altogether.

Fossil soil profiles and other data derived from the river and wadi terraces of Egypt suggest the existence here of two types of Pleistocene pluvials and of two types of local climate occasioned by them. The sub-tropical, or Mediterranean, pluvials, during which the terrace gravels were deposited, appear to have been associated with the early, or advance, stages of the European glaciations. The climate during these relatively brief intervals was evidently moist and cool, with an annual rainfall exceeding eight inches and a landscape of moderate dry steppe or etesian steppe type with grasses, shrubs, succulents, thorny bushes, and acacias growing on the surface of the plateau and clumps of trees, such as sycamores, willows, and tamarisks, occurring along the banks of the river and its tributaries. There followed during the closing stages of each pluvial and the first half of the succeeding interpluvial an interval of climate as dry as that of the present day and perhaps even drier, when the Nile in Upper Egypt lowered its bed, the lateral wadis dried up, tree-life was confined to a few undemanding species (acacias and tamarisks?) growing along the immediate fringes of the river, and human habitation was possible only in the northernmost, coastal areas. The third climatic phase, characteristic of the late interpluvial periods, is believed to have been as warm as today's climate, but moister, with sandy red earth forming and the landscape assuming the nature of a sub-tropical steppe and supporting vegetation of thorn-savannah type and a fauna which, as in Neolithic times, may have included such animals as the elephant. the rhinoceros, the giraffe, the ostrich, the antelope, the gazelle, and several kinds of cat.

Relatively moist conditions seem to have continued into the Middle Paleolithic age as attested by the occurrence of implements of Levalloisian types scattered far and wide over the surface of the present high desert. The precipitation, however, was growing slighter and more spasmodic and the plateau landscape was changing gradually from thorn savannah to dry steppe to semi-desert. In the oasis of Kharga animal and plant remains of this period are either confined to the vicinity of the ancient springs or are of types which flourish today in regions of low rainfall, the only tree remains found in the scarp deposits being those of fig-trees, date-palms, and the like.

The onset of aridity in late Pleistocene times was evidently a gradual process, desiccation spreading slowly northward from Nubia into Upper and Middle Egypt. In Nubia the rainfall and surface run-off had begun to fail in the Middle Paleolithic period and it is probable that here, as already remarked, the 30- and 10-foot gravel platforms were never formed. In Upper Egypt the mixed gravels of the 10-foot stage seem to have been laid down by "sporadic torrents" rather than by "evenly distributed rainfall." By Late Paleolithic times the rainfall had failed completely above the First Cataract and was considerably diminished farther to the north, as attested by the presence of blown sand in the basal silts of the first aggradation phase in Upper Egypt. Sand dunes had already begun their long, slow march southward from the coastal region across the Libyan plateau, drift sand was beginning to accumulate around the springs in the Kharga depression, and a marked

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decrease in the already none too vigorous rainfall of the region of the oasis was permitting silt to be deposited in the wadis of the eastern scarp. Though fleeting intervals of more favorable climate are attested during the Late Paleolithic period men and animals tended to confine their activities to the vicinity of the river, the grassy wadi bottoms of the eastern plateau, and the springs and scarp ravines of the oases and to shun the now parched and uninviting expanses of the open plains, over which previously they had wandered at will.

Conditions even more severe than that of the present day were reached in Final Paleolithic times during the first "post-pluvial" period following the end of the Würm Pluvial. This phase, which is believed to have extended from about 16,000 to 9500 B.C., was one of high temperatures, severe wind erosion, and minimum rainfall, the last achieving its low point in or about the twelfth millennium B.C. Following a brief respite in the form of a sub-pluvial of about a millennium's duration (*ca.* 9500–8500 B.C.) desert conditions again closed in and held sway until about 6500 B.C. when a rise in precipitation reduced the extreme aridity of the land to its modern level.

Toward the end of the sixth millennium B.C. Egypt and neighboring lands appear to have enjoyed another slight, but effective increase in temperature and precipitation and to have entered upon a prolonged sub-pluvial or relatively moist phase, extending from early Neolithic times until late in the Old Kingdom (*ca.* 5000–2350 B.C.). This era of actually rather varied climate has been equated with the so-called Atlantic phase, or post-glacial Climatic Optimum, of northern Europe. In Egypt its rainfall seems to have exceeded six inches a year, reaching a peak early in the Chalcolithic period and declining sharply thereafter and again in early historic times, but maintaining, nevertheless, a general level well above that of the present day. Though probably confined to occasional thunder showers, the precipitation was sufficient to form pools of fresh water in the hollows of the Libyan plateau, to support for a while large herbivorous animals like the rhinoceros and the elephant over broad stretches of the high deserts, and to enable groves of small trees, seasonal pastures, and extensive human settlements to grow up along the fringes of the Nile Valley in areas which had previously been arid and which now comprise portions of the low desert. The river valley and Delta in Neolithic, predynastic, and early historic times evidently also showed the effects of a somewhat more moist climate, with papyrus and water-lilies growing along the waterways and in the marshy hollows of the basin-lands and aquatic animals and birds inhabiting the river and its backwaters in greater profusion than at the present day.

Since the end of the third millennium B.C. the climate of Egypt has been generally similar to that of the present day. Between 2350 B.C. and A.D. 700 the average temperature seems to have been, if anything, a trifle above and the average rainfall a little below the modern levels, but with at least two "quite moist" spells, one in late Ramesside times and one about 850 B.C.

Egypt's present climate, so frequently used as a basis of comparison in the foregoing paragraphs, is notoriously warm, dry, and clear. Mean temperatures range from a January minimum of 50° Fahrenheit at Alexandria to a July maximum of 107° at Aswan, the range being far greater on the desert plateau where the mercury soars by day and on winter nights not infrequently drops below the freezing point. The Delta coast enjoys an average annual

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rainfall of about eight inches, most of it during the winter months, but Cairo receives only about an inch a year, and Upper Egypt perhaps a single shower once every two or three years. Sporadic cloudbursts over the Red Sea hills sustain patches of green plant life and even clumps of trees in some of the rocky valleys of the Eastern Desert; and gazelles, hyenas, jackals, foxes, and jerboas inhabit the fringes of the Libyan Desert near the Nile Valley and in the vicinity of the oases. In dynastic times the presence in these areas of a more abundant and diversified animal life—lions, wild cattle, deer, and antelopes of many kinds—is evidently to be attributed to causes other than a consistently more favorable climate, such, for example, as a generally less efficient harassment of the wild life by human agencies or the maintenance of extensive reserves artificially stocked with game for the diversion of royal or noble huntsmen. With its rain-catching chain of mountains and its deep valleys sheltered from sand-laden winds the Eastern, or Arabian, Desert has always been less austere than the open, rolling plains of the Libyan Desert which nowadays alternate between bare rock surfaces, vast spreads of gravel, and long, slowly moving lines of sand dunes. The prevailing northerly winds which sweep across these desert plateaux and up the long, narrow river valley have done much to shape not only the land itself but also the lives of its inhabitants, providing a blessed relief from the heat of the day and facilitating upstream navigation on the Nile, but often driving early Man to seek shelter from their blasts behind the walls of the valley and its lateral wadis or behind primitive shelters of his own devising. In northern Egypt the winds are more variable than in the south, and during the spring the hot southerly *khamsin* blows for days at a time bringing stifling temperatures and filling the air with sand and dust.

12. Chronology

Thanks to the successions of river and wadi terraces, lake beaches, and silt layers, each with its incorporated or associated fauna and human artifacts, the relative dating and approximate durations of the successive stages in the Pleistocene and early post-Pleistocene geohistory and prehistory of Egypt can be worked out from the local evidence alone. When, however, we attempt to construct an absolute chronology of these same stages we find that in Egypt, as in other lands lying in the middle and lower latitudes of the earth's surface, our geochronologers have as yet provided us with little or nothing to go on. We are therefore forced to fall back on the chronological correlations which are generally presumed to exist between our local Egyptian stages and the successive phases of the Great Ice Age as observed in northern and central Europe, where prolonged study has produced a number of more or less dependable methods of dating these phases in terms of years before the present day.

We have already had occasion to refer to the meteorological association of Egypt's "pluvials" and "interpluvials" with the glacial and interglacial periods of more northerly latitudes. "The contemporaneity of these lower middle latitude pluvials with the world-wide glaciations," says Butzer, "has been repeatedly confirmed and accepted in the contemporary literature. . . . Consequently we are free to refer to the last phase of glaciation as the 'Last Pluvial' in the Near East, and we may speak of a 'postpluvial' as well as a 'postglacial' period." Further investigation by the same authority tends to indicate that the pluvial episodes during which the implementiferous terrace

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gravels of the Nile and its wadis were laid down were periods of relatively short duration and that they coincided chronologically not with the whole of a European glacial phase, but only—and more precisely—with its initial stage, before the ice sheet had reached its full-scale expansion. This would allow us to correlate the pluvial 100-foot terrace of southern Egypt and its contained implements with the onset of the Mindel glaciation, the 50-foot terrace with Riss I, the 30-foot wadi gravels with Riss II, and the 10-foot gravels with Early Würm, and to date these stages in the Pleistocene history of the Upper Egyptian Nile Valley accordingly.

For Lower and northern Middle Egypt the most trustworthy link with the European Ice Ages appears to be the succession of Plio-Pleistocene and Pleistocene high sea-levels as established by Depéret, De Lamothe, and others from a study of the ancient "raised" beaches, or fossil shorelines, of the Mediterranean Sea, including a series of marine bars lying inland from Arabs Gulf, a short distance to the west of the present Nile Delta. It is generally conceded that these high sea-levels must have been reached during periods of minimum glaciation in the areas bordering the sea on the north—thus, at approximately the mid-points of the European interglacial phases. The highest, or so-called "Sicilian," level (295–330 feet above present sea-level) is usually assigned to the period preceding the Early, or Günz, Glaciation; the "Milazzian" level (180–195 feet) to the Antepenultimate, or Günz-Mindel, Interglacial; the "Tyrrhenian" level (100–115 feet) to the Penultimate, or Mindel-Riss, Interglacial; and the two "Monastirian" levels (50–65 and 16–33 feet) to the Last, or Riss-Würm, Interglacial. It is also generally agreed—and here is our link—that these same high sea-levels determined the maximum heights (above flood plain) of the successive gravel terraces formed in the lower courses of all rivers flowing into the Mediterranean Sea or into bodies of water directly connected with it. In the case of the Nile there seem to be clear correspondences between the 320-foot terrace of northern Egypt and the Sicilian high sea-level, the 200-foot terrace and the Milazzian level, the 100-foot terrace and the Tyrrhenian level, the 50-foot terrace and the Main Monastirian, and the 25-foot gravels and the Late Monastirian. Presuming the correlations to be valid in both of the foregoing steps, we may then assign the 320-foot Nile terrace to pre-Glacial times, the 200-foot terrace to the Günz-Mindel Interglacial, the 100-foot terrace to the Mindel-Riss Interglacial, the 50-foot terrace and the 131-foot Fayum lake to the early part of the Riss-Würm Interglacial, and the 25-foot gravels and 112- and 92-foot Fayum lakes to the latter part of the same interglacial or, more probably, to the Gottweig Interstadial of the Early Würm glaciation; and may apply to these stages in Nile prehistory the absolute dates worked out for the corresponding subdivisions of the European Ice Age.

The early stages of the Upper Pleistocene (Late Paleolithic) degradation phase in Nile history, including the Fayum lakes at 74 feet and below, are probably to be associated with the Main Würm marine regression (low sea-level); and its later stages (evolved and Final Paleolithic), during which the Fayum appears to have been re-excavated by subaerial erosion, to the Late Würm glacial stage and the final retreat of the glaciers in Europe.

By making use of the dates for the European glacial and interglacial phases and Mediterranean high sea-levels derived by Zeuner chiefly from Penck's geological estimates and the Milankovitch curves of fluctuating solar radiation it is possible to

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draw up the following chronological table of the terrace and early post-terrace stages of Egyptian prehistory. In this table the dates are given in years B.C. to conform to the practice followed throughout the rest of the book, no adjustments in Zeuner's round figures "B.P." (Before Present) being thought necessary in the case of dates of 100,000 years and over. The dates 90,000 B.C., 50,000 B.C., and 20,000 B.C. were obtained by interpolation and adjustment of the figures given by Zeuner for the three phases of the Last Glaciation.

TABLE 1

PLIO-PLEISTOCENE AND PLEISTOCENE TERRACES	
320-foot terrace of northern Egypt (barren)	660,000 B.C.
200-foot terrace of northern Egypt (barren?)	500,000 B.C.
100-foot pluvial terrace of southern Egypt (earlier Lower Paleolithic)	476,000 B.C.
100-foot terrace of northern Egypt (middle Lower Paleolithic)	270,000 B.C.
50-foot pluvial terrace of southern Egypt (later Lower Paleolithic)	230,000 B.C.
30-foot pluvial terrace of southern Egypt (Lower-Middle Paleolithic)	187,000 B.C.
50-foot Nile gravels of Middle Egypt and 131-foot Fayum beach (early Middle Paleolithic?)	150,000 B.C.
LATE PLEISTOCENE SILTS AND GRAVELS	
Aggradation:	
10–15 foot wadi gravels of southern Egypt (Middle Paleolithic)	115,000 B.C.
Aggradation silts of Upper Egypt, 25-foot gravels of northern Egypt, and 112- and 92-foot Fayum beaches (late Middle Paleolithic–Late Paleolithic I)	90,000 B.C.
Degradation:	
74-foot Fayum beach (Late Paleolithic II)	70,000 B.C.
–18-foot Fayum beach (Late Paleolithic III)	50,000 B.C.
Subaerial erosion of Fayum basin	20,000 B.C.

Unfortunately, there is a notable lack of agreement between the last five dates given in this table and a series of probably somewhat more accurate estimates obtained from late glacial and post-glacial organic specimens by means of the radiocarbon, or "Carbon 14," method of age determination. These estimates give us dates of around 90,000–72,000 B.P. for a point towards the end of the Last, or Riss-Würm, Interglacial, 70,000 B.P. for the beginning of the Last, or Würm, Glaciation, 43,000–29,000 B.P. for the Würm I–II, or Gottweig, Interstadial, 18,250 B.C. for the maximum of Würm II, and 11,500–10,500 B.C. for the Bølling Oscillation of the Gotiglacial Retreat. Adding to these radiocarbon dates of 4430 and 4134 B.C. for the Fayum Neolithic, 3783 and 3658 B.C. for the early Chalcolithic (Nagada I), 3616 B.C. for the later Chalcolithic (Nagada II), and the end-date of 3100 B.C. for the beginning of the first historic dynasty, and we arrive at a considerably lower dating for the late glacial and post-glacial prehistory of Egypt:

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TABLE 2

Early Middle Paleolithic (10-foot gravels of southern Egypt)	Begins	70,000 B.P.
Late Middle Paleolithic (aggradation silts of Upper Egypt, etc.)	,,	43,000 B.P.
Late Paleolithic (deep Nile degradation)	,,	30,000 B.P.
Late Paleolithic (Epi-Levallois) III	,,	16,000 B.C.
Final Paleolithic, or Mesolithic	,,	10,000 B.C.
Present Silt Aggradation Phase	,,	8750–3500 B.C.
Neolithic Period	,,	5000 B.C.
Chalcolithic Period	,,	4000 B.C.
Historic Period	,,	3100 B.C.

13. Egypt at the Beginning of Human Prehistory

By way of a conclusion to the present chapter and an introduction to those to follow let us try to reconstruct a picture of the land of Egypt as it may have appeared, nearly half a million years ago, to its earliest known human inhabitants.

From the lofty chain of hills bordering the Red Sea a grassy steppe, dotted here and there with shrubs and thorny bushes, stretches away to the Mediterranean Sea on the north and, to the west and south, beyond the horizon. The Nile gorge winding northward from the neighborhood of modern Kom Ombo toward the ancient seacoast, some fifty miles below where the city of Cairo now stands, divides the land into two parts. On the east the relatively narrow strip of plateau is dissected by numerous broad valleys down which occasionally torrential streams pour into the main valley from the western slopes of the Red Sea hills. On the west the tributaries of the river, though equally numerous, have neither the length nor the volume of those on the east, the watershed on this side following the line of a low ridge which in Upper Egypt lies less than sixty miles from the Nile and which catches a far less copious rainfall than the towering heights on the east. Farther west the grassland gives way to poor steppe country interrupted by a series of huge and at the moment uninhabited depressions—the present-day oases—in the scarp valleys of which intermittent rainfall and run-off have resulted in the formation of tufa. An altogether similar basin, the Fayum, lies not more than eighty miles from the seacoast and less than twenty miles to the west of the river valley, but the ridge which separates it from the Nile is apparently not yet broken through and its lake not yet fully formed. Along the edges of the river and its tributaries, in the deep valleys on the east, and around the pools and waterholes of the Libyan plateau the vegetation resembles that of modern Cyrenaica and includes clumps of trees such as acacias, tamarisks, sycamores, and willows. Here and there the plateau landscape is relieved by such prominences as the Moqattam Hills and Gebel Abu Roash near Cairo, Gebel Ataqa and the Qallala hills to the east and southeast, the magnificent hills of the Thebaid in Upper Egypt, and far off to the west and south the distant mountain peaks of Gilf Kebir and Uweinat. To the northeast, across the Gulf of Suez, the mountains of southern Sinai tower to impressive heights; and looking southward from these along the

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coast of the Red Sea one notes that the ancient beaches are dissected in innumerable places by terraced wadis draining the eastern sides of the adjacent hills.

From southern Upper Egypt to the apex of the vast sand-and-gravel Delta of the river the valley of the Nile has not only long ago been fully scoured out in the Eocene limestone, but has subsequently become extensively choked by mixed deposits of the Pliocene gulf era. Southward, however, the Nubian valley is still in the process of its primary excavation, the river having only relatively recently adopted a single course through the tawny sandstone of the region. Above Wadi Halfa rapids are forming where the stream has come into contact with hard crystalline rock formations underlying the sandstone, and just above Aswan the river has split into three channels in its early attempts to force its way through a similar barrier. Forty miles downstream, around Kom Ombo, the valley broadens out into a wide embayment, north of which yet another cataract is forming as the river has begun to scour out two channels through the sandstone scarp at Silsila.

Since the end of the Pliocene period the huge and swiftly flowing stream has repeatedly lowered and narrowed its bed in the sandstone of its Nubian valley and in the gulf deposits choking its Egyptian valley, leaving on either side two series of gravel-coated terraces at 300, 200, and 150 feet above the flood plain of the present Nile in Upper Egypt and at 320, 255, 200, and 150 feet above the same local datum in Middle and Lower Egypt. As the mouth of the river is approached the terraces of the latter series swing outward along each side of the Delta and run eventually into the ancient shingle beaches of the Mediterranean Sea. Similar terraces, at corresponding heights, are to be seen also in the lower reaches of the lateral valleys, where the tributaries of the river traverse the gulf deposits on either side of the main stream.

At the moment with which we are concerned the bed of the Nile in Upper Egypt, having been cut down to perhaps seventy feet above modern alluvium, is in the process of being built up to the 100-foot level with layers of sands and coarse gravels brought down by the great stream itself and poured into it by its tributaries, especially by the powerful torrents rolling down from the Red Sea hills. Here in the south the river flows in broad meanders, spreading and leveling its sandy and pebbly floor and cutting away portions of the next higher terrace which forms its bank on either side. In summer, thanks to a gradually developing connection with the Atbara and the Blue Nile, it may momentarily overflow its banks, sweeping away such surface debris as the lost or discarded implements of early Man. Northward the sands and gravels taper off, and below Mallawi in Middle Egypt we find the Nile at this period, not aggrading, but eroding its bed in response to a marine regression, or low sea-level, evidently also contemporaneous with the initial stages of the Mindel glaciation. Within the confines of the river valley, the Delta, and the lower courses of the lateral tributaries, the soil is for the most part sandy and gravelly, with no traces of silt and little of any other type of fine material. Though probably supporting a gallery-forest type of vegetation it can hardly have had any special fertility of its own.

The climate is a trifle cooler than that of the present day and considerably more humid, the rainfall, as reflected in the evidently violent activity of the lateral wadis, almost certainly exceeding eight inches a year. This, combined with the presence of the great river, would have

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been sufficient to attract and support a fauna of both sub-equatorial and more northerly types, including, as elsewhere in north Africa at this time, such large animals as the elephant, the rhinoceros, the hippopotamus, and the buffalo. Though Egypt has as yet yielded no animal (or human) remains of early or middle Pleistocene date, we may be sure that its fauna and accompanying flora was at this period as copious and diversified as in later Paleolithic and Neolithic times, when conditions in northeast Africa must have been, ecologically speaking, less favorable.

Here, then, for the time being was a portion of the earth's surface affording every advantage to primitive man in his early struggles for existence and in his first steps toward the development of a civilized mode of life—a region endowed with a warm but not oppressively hot climate, an adequate but not excessive rainfall, copious and easily obtainable supplies of water and of food, choice camp sites in protected river valleys and lake basins, and all the natural materials needed to fashion simple tools and weapons, including abundant modules of chert and other hard stones lying ready to hand in the rock formations of the plateau and in the gravels of the river and its tributaries.

Here, too, was a land over most of which men and animals could roam with almost complete freedom and to which they could readily journey from other parts of the Old World, unchecked by wide expanses of open sea, trackless wastes, or ice-capped mountains. From the south the wandering bands could follow the banks of the Nile and its tributaries northward from east or central Africa. On the east the Isthmus of Suez linked the Delta with western Asia and, ultimately, with the rest of that huge continent, as well as with Eurasia and eastern Europe. From the west the stone-age nomad (or his industries) could travel in easy stages all the way across North Africa, coming even from western Europe by way of the narrow strait of Gibraltar which, though apparently open at this time, would have formed no insurmountable obstacle to human passage.

Small wonder that Egypt because of its natural endowments, its accessibility, and its central position in the ancient world was an area much frequented by earliest Man. Even when, in the millenniums to come, a failing rainfall deprived the land as a whole of many of the attributes which had first drawn men to it the Nile continued to make its lower valley and delta one of the most desirable regions on the earth's surface—a suitable cradle for one of the basic civilizations in world history.

NOTES

CHAPTER I

General

For tabulations of the geological eras and periods with their approximate dates see, among others, J. Laurence Kulp, "Geologic Time Scale: Isotopic age determinations on rocks of known stratigraphic age define an absolute time scale for earth history," *Science*, CXXXIII, No. 3459 (April 14, 1961), pp. 1105–14; and F. E. Zeuner, *Dating the Past: An Introduction to Geochronology* (4th ed. [London, 1958]), Fig. 83 (opp. p. 310).

Much of the material presented in this chapter is drawn more or less directly from Rushdi Said's *The Geology of Egypt* (Amsterdam–New York, 1962); from K. W. Butzer's "Die Naturlandschaft Ägyptens während der Vorgeschichte und der Dynastischen Zeit," *Abhandlungen der Akademie der Wissenschaften und der Literatur*, Math.-naturwiss. Klasse, 1959, Nr. 2 (Wiesbaden [1959]), pp. 45–122; from J. Ball's *Contributions to the Geography of Egypt* (Ministry of Finance, Egypt: Survey and Mines Department [Cairo, 1941]); from K. S. Sandford and W. J. Arkell's *Prehistoric Survey of Egypt and Western Asia*, published in four volumes during the years 1929–1939 by the Oriental Institute of the University of Chicago

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("OIP" X, XVII, XVIII, XLVI); and from the same authors' "First Report on the Prehistoric Survey Expedition" in "OIC" No. 3, 1928. Extensive use was also made of M. Blanckenhorn's *Aegypten* (*Handbuch der regionalen Geologie*, VII, 9, 23 [Heidelberg 1921]) and of W. F. Hume's five-volume *Geology of Egypt* (Ministry of Finance, Egypt: Survey of Egypt [Cairo, 1925–1948]). S. A. Huzayyin's *The Place of Egypt in Prehistory* ("MIE," XLIII [Cairo, 1941]), though devoted chiefly to a study of climates and cultures, is rich in material on the geohistory, physiography, and biogeography of Egypt and neighboring lands; contains summaries and assessments of the often conflicting views of geologists and prehistorians in regard to Egypt; and is provided with a seventy-page bibliography of works published prior to 1941. The 1929 English edition of Karl Baedeker's handbook, *Egypt and the Sûdân*, offers good, short treatments of the geography and geology of Egypt (pp. xlviii ff.), descriptions of individual sites and physiographical features, and an excellent series of maps; and much useful information is incorporated in the *Encyclopaedia Britannica*'s article on "Egypt" (11th ed., IX, 21 ff.). For a brief and interestingly written survey of the geohistory of the ancient world J. L. Myre's "Primitive Man in Geological Time" (*The Cambridge Ancient History*, Vol. I [1924 ed.], Chap. I, pp. 1 ff.) is still to be recommended.

In 1910 the Egyptian Government's Survey Department issued *Geological Maps* of Egypt at scales of 1:2,000,000 and 1:1,000,000; and, in 1928, an *Atlas of Egypt* comprising "A Series of Maps with Descriptive Texts illustrating the Orography, Geology, Meteorology and Economic Conditions." Thanks to the same department contoured maps of the whole or parts of Egypt at scales ranging from 1:500,000 to 1:1000 are also now available. Especially useful is the 1:100,000 *Topographic Series of the Survey of Egypt and Department of Survey and Mines*, Cairo (reprinted by the Army Map Service, Washington, D. C.). See also Rushdi Said, *The Geology of Egypt*, pp. 18 ff.

Of many periodicals in the general field the three most used by writers on the geology and prehistory of Egypt are the *Bulletin de l'Institut d'Égypte* (*BIE* [Cairo, 1859 ff.]), the *Bulletin de la Société (Royale) de Géographie d'Égypte* (*BS[R]GE* [Cairo, 1879 ff.]), and, more recently, the *Bulletin de l'Institut (Fouad I) du Désert d'Égypte* (*BIDE* [Cairo, 1951 ff.]). Important articles on the same subjects have appeared in *The Geographical Journal* (*GJ* [London, 1893 ff.)], *The Geological Magazine* (*GM* [Hertford, 1864 ff.]), the *Journal of the Royal Anthropological Institute* (*JRAI* [London, 1871 ff.]), *Man* (London, 1901 ff.), *Erdkunde: Archiv für wissenschaftliche Geographie* (Bonn, 1947 ff.), the *Geologische Rundschau* (*GR* [Leipzig, 1910 ff.]), and the *Zeitschrift der Deutschen geologischen Gesellschaft* (*ZDGG* [Berlin, 1848 ff.]). Several important monographs have been published in the *Mémoires de l'Institut d'Égypte* (*MIE* [Cairo, 1862 ff.]). The *Compte rendu* of the *Congrès International de Géographie* (Cairo, 1925) (*C.-R.CIG*, 1925) and the *Proceedings of the Pan-African Congress on Prehistory* (*PPACP* [Nairobi, 1947; Algiers, 1952; etc.]) contain a number of reports of interest and value.

Among the more useful lists of references is E. H. Keldani's *A Bibliography of Geology and Related Sciences concerning Egypt up to the End of 1939* (Ministry of Finance, Egypt: Department of Survey and Mines [Cairo, 1941]).

1. The Egyptian Tableland

This section is a shortened and simplified version of the accounts of the formation, elevation, and physiography of the tableland given by Sandford and Arkell in their "First Report," pp. 5–6, and in their *Prehistoric Survey*, I, 5–7; II, 1–5; IV, 1–10, 93; and Sandford *Prehistoric Survey*, III, 1–2, 121; Ball in his *Contributions*, pp. 13–28, presents brief and clear descriptions of the pre-Tertiary and Tertiary rock formations of the Egyptian plateau and their present distribution, as does Butzer in his "Die Naturlandschaft Ägyptens," pp. 51–55. Much more detailed descriptions will be found in Hume's *Geology*, in Said's *Geology*, in Blanckenhorn's *Aegypten*, in K. S. Sandford's "Geological Observations on the Northwest Frontiers of the Anglo-Egyptian Sudan and the Adjoining Part of the Southern Libyan Desert," *The Quarterly Journal of the Geological Society of London* (*QJGS*), XCI (1935), 323–81, and in numerous articles devoted to individual formations, such as A. R. Gindy's "The Igneous and Metamorphic Rocks of the Aswān Area, Egypt," *BIE*, XXXVII, Fasc. 2 (1956), 83–133; R. A. Higazy and H. M. Wasfy, "Petrogenesis of Granitic Rocks in the Neighborhood of Aswan," *Egy. Bull. Inst. Desert* VI (Egypt 1956) No. 1, pp. 209–48; A. Rittmann, "Some Remarks on the Geology of Aswan," *BIDE*, III, No. 2 (July, 1953), 35–64; N. M. Shukri and R. Said's "Contribution to the Geology of the Nubian Sandstone," *BIE*, XXVII (1946), 229–64,

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451; N. M. Shukri and M. K. El Ayouti, "The Mineralogy of the Nubian Sandstone in Aswan," *BIDE*, III, No. 2 (1953), 65–88; S. E. Nakkady's "The Foraminiferal Fauna of the Esna Shales of Egypt," *BIE*, XXXI (1949), 209–47; G. Andrew's "The Greywackes of the Eastern Desert," *BIE*, XXI (1939), 153–90; etc.

On Gebel Abu Roash there is a definitive study by H. J. Beadnell ("The Cretaceous Region of Abu Roash, near the Pyramids of Giza") in the *Geological Survey Report* for 1900, Part II (Cairo, 1902). See also Said, *Geology*, pp. 197–201. Descriptions of the Moqattam Hills, where for millenniums the Egyptians have quarried the fine white limestone of Tura and Masaara, are given by Said (*Geology*, pp. 97, 136, 317), by Hume (*Geology*, I, 7), by Blanckenhorn (*Aegypten*, pp. 81 ff.), by Sandford (*Prehistoric Survey*, III, 2, 4; IV, 4), and by many other writers.

The approximate positions of the Mediterranean shorelines of Egypt during successive periods of the Tertiary appear in maps prepared by Ball (*Contributions*, Pl. VIII), Myres (*Cambridge Ancient History* [1924 ed.], I, Map 1, opp. p. 16), and Beadnell (*Topography and Geology of the Fayūm Province*, p. 67, fig. 6). On the Middle Miocene shoreline see also Blanckenhorn, *Aegypten*, p. 187; and on the shoreline "in the further course of the late Tertiary," Butzer, "Die Naturlandschaft," p. 54. See also, more recently, K. W. Butzer, "On the Pleistocene Shore Lines of Arabs' Gulf, Egypt," *The Journal of Geology* (Chicago), LXVIII (1960), 626–37, and "Pleistocene Stratigraphy and Prehistory in Egypt," *Quaternaria*, VI (Rome, 1962), pp. 451–56.

In his presentation of the geology of Egypt, Said divides the land into four geologic provinces: (1) the Arabo-Nubian massif of igneous and metamorphic rock formations which comprises the Sinai Peninsula and the area between the Nile and the Red Sea; (2) the Stable Shelf, adjoining portions of this massif and characterized by minor faulting and doming, where the Nubian sandstone and overlying rocks were laid down in Cretaceous and early Tertiary times; (3) the Unstable Shelf, largely within 150 miles of the Mediterranean coast, where subsidence and folding led to the accumulation of sediments of Carboniferous to Miocene age up to 14,000 feet in thickness; and (4) the Gulf of Suez Taphrogeosyncline, where, in the paraphrasing of Conant, (1963), "extensive and irregular block faulting" "has permitted the accumulation of great thicknesses of sediments ranging in age from at least the Carboniferous to the present."

2. The Nile Valley

Ball, (*Contributions*, pp. 74–84), is inclined to believe that until Upper Paleolithic (Lower Sebilian) times the Nile system consisted, "not of a single river, but two separate rivers, one coming from Lake Victoria and ending in a lake to the south of Khartoum, the other having the Atbara for its head-waters and discharging into the sea." According to G. Andrew (*Agriculture and the Sudan*, p. 106) "it seems probable that the White Nile basin had no outlet north for a considerable time in the Pleistocene"; but that conditions "around the juncture of the Atbara with the Nile" and "in the Khashm el girba area suggest a natural evolution of the Atbara river" by Lower Paleolithic ("Chellean") times. A. J. Arkell (*Sudan Antiquities Service, Occasional Papers*, No. 1, pp. 47, 48, 51) believes that, while "the Blue Nile may be a comparatively recent river," which probably came into existence "since the Lower Paleolithic, the drainage of the Lake Tana area . . . originally reached the Nile *via* the Atbara" and that by Acheulian times "there must have been a considerable White Nile which was running at approximately the present level to the Nile." On the same subject see also Butzer, "Die Naturlandschaft," pp. 55–56, 59, 62–63; Blanckenhorn, *Aegypten*, p. 187; Sandford and Arkell, *Prehistoric Survey*, I, 7; II, 23–24, 82.

The expression *Urnil*, "Primeval Nile," and the concept of a huge predecessor of the present river flowing through what is now the Libyan desert were originated by Blanckenhorn in two articles called "Die Geschichte der Nilstroms in der Tertiär- und Quartärperiode . . ." published in the *Zeitschrift der Gesellschaft für Erdkunde* (Berlin) for 1902 (pp. 694–722, 753–62). T. Arldt in 1915 ("Aus der Entwicklungsgeschichte der Landenge von Suez und ihrer Nachbargebiets," *Naturen* (Bergen), X, 287) and again in 1918 ("Zur Paläographie des Nillandes in Kreide und Tertiär," *Geologische Rundschau*, 1918, pp. 47, 104) elaborated upon Blanckenhorn's thesis and attempted to trace the course of the Urnil from the Sudan northward through the line of Libyan oases (cf. also R. Uhden, *Geol. Rundschau*, XX [1929], 180–86; M. Pfannenstiel, *Abh. Akad. Wiss. Liter. Math.-naturw. Kl.*, 1953, Nr. 7, pp. 369 ff.). Belief in the existence of an ancient Libyan Nile with a course well to the west of the present river was subsequently reaffirmed by Blanckenhorn in 1921 (*Aegypten*, pp. 186–87); and has been shared by other geologists

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including Beadnell (*Topography . . . of the Fayum Province* [1905], p. 67, Fig. 6), and Said (*Geology* [1962]): but was firmly rejected by Ball (*The Geographical Journal*, LXX [1927], 28–32) and by Sandford and Arkell (*Prehistoric Survey*, IV [1939], 17). The word "Urnil," however, has been retained here, as elsewhere, as a convenient term for describing the Upper Eocene and Oligocene ancestor of the present Nile.

A theory that the wood which comprises the "Petrified Forests" was silicified *before* being carried downstream by the river is advanced by M. M. Ibrahim, and N. M. Shukri, in *BIE*, XXV (1943), 159–82; XXVI (1944), 71–75; and XXXIV (1951–52), 317–19. See, however, Said, *The Geology of Egypt* (1962), p. 220.

The animal remains recovered from the Upper Eocene estuarine and Oligocene delta deposits are discussed by Blanckenhorn in *Aegypten*, pp. 103–105, 110–11. To the numerous references cited by Blanckenhorn may be added C. W. Andrews, "Notes on an Expedition to the Fayūm, Egypt, with Description of some New Mammals," *The Geological Magazine*, X (1903), 337–43; Y. S. Moustafa, "An Interpretation of Arsinoetherium," *BIE*, XXXVI (1955), 111–18; and "The Fayum Fossil Bone Field," *Ibid.*, pp. 119–27. See also Keldani, *Bibliography*, Nos. 44–72, 713, 760, 1761–65, 1798, 1978–90.

Blanckenhorn (*Aegypten*, pp. 187–90) was also one of the principal proponents of the theory that the present Nile Valley is of tectonic, or rift, origin. This theory was contested by Ball and Hume in *The Geological Magazine* for 1910, pp. 71–76, 385–89 (see also Hume, *BSRGE*, XVII [1929], 1–11); and is rejected by Sandford and Arkell in the introductory chapters to the four volumes of their *Prehistoric Survey*. Though not subscribing to the rift theory, Huzayyin (*Place of Egypt*, p. 150) has suggested that the erosion of the Lower Nile Valley "might have worked along some favorable line (or lines) of structural weakness," and this appears to be admitted also by Sandford in *Prehistoric Survey*, III, 2, 4–8. According to Said (*The Geology of Egypt* [1962], p. 26) "available evidence shows that the course of the river was largely governed by a crustal disturbance," and (p. 87) that "the Nile was probably eroded on a line of faulting and rifting." An interesting explanation of the manner in which the cutting of the Egyptian Nile Valley may have been inaugurated is given by Sandford and Arkell in their "First Report," pp. 6–7, and, in slightly modified forms, in the successive volumes of the *Prehistoric Survey*. See also, more recently, Butzer, "Naturlandschaft," pp. 54–56, 58, 60; *Science*, CXXXII (1960), 1618.

The periods, or stages, in the geohistory of the Mediterranean area ("Mediterranstufe") as drawn up by Edward Suess for the latter half of the Tertiary period are defined by him in the first volume (pp. 363 ff.) of his classic work, *Das Antlitz der Erde* (3d ed. 5 vols. [Leipzig, 1885–1909])—available also in an English translation by H. G. E. Sollas: *The Face of the Earth* (5 vols. [Oxford, 1904–1909]).

The mid-Tertiary crustal movements and the resulting physiographical features in Egypt are discussed, with ample references, by Arkell and Sandford in *Prehistoric Survey*, IV, 4–10. See also Sandford, *Prehistoric Survey*, III, 3–8. For a description of the hot springs at Helwan see Hume, *Geology*, I, 138 ff.

3. The Red Sea and the Red Sea Hills

The material presented in this section is drawn chiefly from Blanckenhorn, *Aegypten*, pp. 143 (the Red Sea), 191–94 (the Eastern Desert and the Red Sea Hills), and 194–96 (Sinai); and from Sandford and Arkell, *Prehistoric Survey*, IV, 7–10 (on the Red Sea, see especially pp. 8–10), 22–36, 45–46, 60–67, 92–96, and 98; and from Said, *Geology*, pp. 15–16, 35–36, 107–26, 151 ff.). Excellent descriptions of Egypt's Eastern Desert and its chain of mountains will be found in the first volume of Hume's *Geology* (pp. 5–6, 84–87, 108); and for a detailed study of a large part of the region the reader may consult T. Barron and W. F. Hume, *Topography and Geology of the Eastern Desert of Egypt, Central Portion* (Survey Department, Public Works Ministry: Geological Survey Report [Cairo, 1902]); Shukri, *BIDE* III; No. 2 (1953), and Gindy, *BIE*, XXXVII, Fasc. 2 (1956).

4. The Pliocene Gulf

This subject is thoroughly dealt with by Sandford and Arkell in the chapters devoted to the Pliocene period in the four volumes of the *Prehistoric Survey*. The extent of the waters of the gulf to the south, east, and west and the possibilities of a connection at this time between the Nile Valley and the oasis of Kharga are discussed in Vol. II, pp. 6 ff. On the Pliocene gulf deposits in general and the formation of the low desert in particular see also Butzer, "Naturlandschaft," pp. 55 ff.

Among the detached masses of Eocene limestone slipped down from the valley sides

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is the great rock of Gebelein, a prominent feature of the river landscape some seventeen miles upstream from Luxor.

5. The River and Wadi Terraces

Here again the principal reference is Sandford and Arkell's *Prehistoric Survey*, the greater part of which is devoted to a study of the Plio-Pleistocene and Pleistocene terraces and to the Paleolithic implements found in the 100-foot and lower terraces. A short account of the terraces and of the problems connected with them, couched in non-technical language, is given by the same authors in their "First Report," pp. 10–17 (see also pp. 18–24) and includes on p. 12 (Fig. 7) a diagrammatic cross-section of the Nile Valley showing the relationship of the terraces to one another and to the present alluvial plain (see also Ball, *Contributions*, pp. 41 ff., fig. 3). An article published in 1929 by Sandford in *The Quarterly Journal of the Geological Society of London* (LXXXV, 493–548) deals in some detail with "The Pliocene and Pleistocene Deposits of Wadi Qena and of the Nile Valley between Luxor and Assiut (Qau)"—that is, with the pre-terrace, terrace, and post-terrace developments of that particular region.

Since the appearance of these publications, however, it has become clear that important revisions must be made in their over-simplified picture of a single eustatically controlled series of terraces extending from the Second Cataract to the sea and in their correlation of the Paleolithic industries of Egypt with the successive terraces (*Prehistoric Survey*, III, 126) and Mediterranean sea-levels. See, for example, H. Alimen, *The Prehistory of Africa* (London, 1957), pp. 80–82; C. B. M. McBurney, *The Stone Age of Northern Africa* (Pelican Books, A 342 [Harmondsworth, 1960]), pp. 127–28; W. B. Wright, *Tools and the Man* (London, 1939), pp. 157–58, 213–14; Huzayyin, *Place of Egypt*, pp. 153 ff. In 1941 Huzayyin (*loc. cit.*) felt that local climatic changes may have played a more important role in the formation of the terraces than is conceded by Sandford and Arkell; and in 1946 G. Caton-Thompson presented a somewhat revised picture of the industries and chronology of the 30-foot terrace and the ensuing phases of Egyptian prehistory ("The Levalloisian Industries of Egypt," *Proceedings of the Prehistoric Society* [Cambridge], new series, XII, No. 4, 57–120, see especially pp. 68–84). Alimen (*loc. cit.*) expressed the belief that "only the terraces in Lower Egypt can be reasonably equated with variations in sea-level"; and McBurney (p. 128) summed up the situation as follows: "If the older chronology for Europe and North-West Africa be adopted, then we are virtually compelled to reject the Nile evidence at its face value; either the correlation between the upper and lower reaches is defective, or else that between the lower reaches and the former sea-levels. On the whole the latter seems to be the more likely alternative."

The clearest and most convincing solution of the problems presented by the Nile terraces—and the one adopted here—is that given by K. W. Butzer in his important "Contributions to the Pleistocene Geology of the Nile Valley," in *Erdkunde*, XIII (1959), 46–67. See also the same author's *Quaternary Stratigraphy and Climate in the Near East* (*Bonner Geographische Abhandlungen*, Heft 24 [Bonn, 1958]), pp. 60–64, 75, 97–98, and "Naturlandschaft Ägyptens," pp. 56 f.; "Pleistocene Stratigraphy and Prehistory in Egypt," *Quaternaria*, VI (1962, Rome), 456–65.

The implementiferous gravels of the ballast-pits of Abbassiya are published by P. Bovier-Lapierre ("Le Paléolithique stratifié des environs du Caire," *L'Anthropologie* [Paris], XXXV [1925], 37–46; "Les gisements paléolithiques de la plaine de l'Abassieh," *BIE*, n.s. VIII (1926), 257–72) and are discussed by numerous writers including Sandford and Arkell, *Prehistoric Survey*, I, 29; II, 14, 28, 73; III, 42, 55, 110; IV, *passim* (see especially p. 95); Huzayyin, *Place of Egypt*, pp. 182–85, 192, Pls. VI–VIII; Butzer, *Erdkunde*, XIII, 49–51, cf. 53, 55, 65; Butzer, *Quaternaria*, VI, 465–66; Alimen, *Prehistory*, pp. 80–81, 88–92; McBurney, *Stone Age*, pp. 125–26.

The fossil soil profiles of the Pleistocene terraces are described, with ample references, by Butzer in *Erdkunde*, XIII, 61–65, and in his "Naturlandschaft," pp. 61–62; *Quaternaria*, VI, 460–65 and the occurrence of augite in the 100-foot terrace deposits of northern Egypt is noted (again with references) by the same author on p. 55 of the first of these three publications.

6. "Recent" Developments in the Nile Valley

In the last three volumes of their *Prehistoric Survey* Sandford and Arkell deal in considerable detail with the "post-terrace" phases of silt deposition and erosion as these phases were observed and studied by them in successive sections of the lower Nile Valley: Nubia and southern Upper Egypt

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(Vol. II, Chap. V–VII); Upper and Middle Egypt, Sandford (Vol. III, Chap. VII, VIII); and Lower Egypt, Sandford and Arkell (Vol. IV, Chap. V, VI). The same phases and their chronological, geographical, and climatic relationships one to another are summarized by Sandford in *AJSL*, XLVIII (1932), 174–83 (see especially the diagram of pp. 182–83), by Ball (*Contributions*, p. 45); by Huzayyin (*Place of Egypt*, pp. 152–54, 157); and more recently and from a significantly fresh point of view by Butzer ("Naturlandschaft," pp. 57–58, 60, 62–66; *Erdkunde*, XIII, 55, 66; *Quaternaria*, VI, 459 ff.).

The contemporaneous storm beaches of the Fayum lake and the scarp deposits of Kharga Oasis have been studied at length by G. Caton-Thompson, E. W. Gardner, H. J. L. Beadnell, and others (see below, under the sections devoted to "The Fayum Lake Basin" and "The Oases of the Libyan Desert").

The term "Sebilian," used as a convenient, if somewhat loose, designation of the industries, fauna, and deposits of final Middle Paleolithic and Late Paleolithic times in Egypt, is derived from the name of a modern settlement (Ezbet el-Sebil) in the Kom Ombo basin, near which cultural remains regarded as particularly characteristic of this period were found (E. Vignard, "Une nouvelle industrie lithique, le 'Sébilien,'" *BIFAO*, XXII (1923), 1–104; etc.).

On the late Pleistocene (Sebilian) fauna of the Kom Ombo basin and the secondary deposits of Qau and Asyut see especially C. Gaillard, "Contribution à l'étude de la faune préhistorique de l'Égypte," *Arch. Mus. hist. nat. Lyon*, XIV (1934), 1–125 (see pp. 3–58); Sandford, *Prehistoric Survey*, III, 84–87; Huzayyin, *Place of Egypt*, p. 81; and Butzer, "Naturlandschaft," pp. 63–64.

Naturally enough, neither aggradation nor degradation were uniform at any one time over the whole stretch of the river from the Second Cataract to the sea, bed erosion continuing in the north long after silt deposition had commenced in the south, and vice versa. We find, for example, that until the construction of the modern dam at Shellal the Nile was still degrading its channel in Nubia, though north of the First Cataract silt aggradation has been in progress for approximately ten thousand years.

A lucid and interesting picture of this latest aggradation phase is presented by Butzer in "Die Naturlandschaft," pp. 65–71, and in *The Geographical Journal*, CXXV (1959), 75–79 ("Some Recent Geological Deposits in the Egyptian Nile Valley"). Butzer's well supported contention that the rate of silt deposition was anything but constant over the whole of the period involved invalidates to a great extent the use of this rate as a time scale, as proposed, for example, by J. H. Breasted in his article on "The Origins of Civilization" in *The Scientific Monthly*, IX (1919), 306–308 (cf. Ball, *Contributions*, p. 176). Butzer in "Die Naturlandschaft," p. 68, n. 1, and *Geogr. Journ.*, CXXV, 78, n. 6, also casts serious doubts on the evidence advanced by Huzayyin (*Place of Egypt*, pp. 153, n. 2, 158–59, 322–23. Cf. I. Rizkana, *Bull. Inst. Desert*, II, 2 [1952], 117–30) for an interval of high aggradation followed by degradation in Neolithic and early Chalcolithic times, the evidence in question being the presence of Final Paleolithic or Pre-Neolithic implements beneath a deposit of "Abyssinian silt" rising to a height of 50 ft. above present alluvium in the neighborhood of Maadi.

The expression "terre végétale" was coined by R. Fourtau, whose "Contribution à l'étude des dépôts nilotiques" (*MIE*, VIII [1915], 57–94) is outstanding among the works devoted to the study of the current silt-deposition stage in Nile history. The chemical composition and other characteristics of the silts are discussed also by S. Passarge in *Die Urlandschaft Ägyptens* (Halle, 1940), pp. 13–15 (87–89), and their mineralogical content by N. M. Shukri and N. Azer, "Mineralogy of Pliocene and More Recent Sediments in the Fayum," *Bull. Inst. Desert*, II, 1 (1952), 10–53. Chaps. V–VII of Ball's *Contributions* provide valuable, detailed descriptions and discussions of "The Solid Matter Transported . . . by the Nile" and "The Alluvial Land of Egypt."

The early history of the Nile inundation, with special reference to the initial establishment of communication between the lower Nile and the Abyssinian and equatorial river systems, is discussed by Passarge, *Urlandschaft*, pp. 11 (85), 20 (94), 22 (96); by Butzer, "Naturlandschaft," pp. 55–57, 59, 60, 62–64, 66; *Geogr. Journ.*, CXXV, 77; *Erdkunde*, XIII, 55; and by Ball, *Contributions*, pp. 74–84. Valuable data on the same subject is incorporated in the works of A. J. Arkell and others on the prehistory of the Anglo-Egyptian Sudan (see, for example, Arkell, *Sudan Antiquities Service, Occasional Papers*, No. 1 [1949], pp. 47, 48, 51; Andrew, *Agriculture in the Sudan*, p. 106; Sandford, *Geological Magazine*, LXXXVI [1949], 97 ff.; *Geogr. Rev.*, XXVI, 67–76). The present-day relationships of these systems to the main river may be studied in H. G. Lyons' *The Physiography of the River Nile and its Basin*

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(Survey Department: Finance Ministry, Egypt [Cairo, 1906]) (see also Passarge, *Urlandschaft*, pp. 8–10 [82–84]). To the same author we owe a brief, but valuable, account of the inundation contributed to the 1929 edition of Baedeker's *Egypt and the Sûdân* (pp. lxvi–lxvii). Additional information on the subject will be found in abundance in, for example, H. E. Hurst, *The Nile* (London, 1957) F. R. Cana's article on the "Nile" in the 11th edition of the *Encyclopaedia Britannica*, XIX, 695–96; A. Reim's article, "Nilschwelle," in Pauly-Wissowa, *Real-Encyclopädie der class. Alterumswissenschaft*, XVII, 1 (1936), Cols. 571–90; Passarge's *Urlandschaft*, pp. 11–12 (85–86); Breasted's *History of Egypt*, pp. 7–8; C. E. P. Brooks' *Climate throughout the Ages* (rev. ed., 1949), pp. 329–33; and W. Pietsch's *Das Abflussgebiet des Nils* (Dr. Phil. Dissertation. Berlin, 1910).

On the late and post-Pleistocene aeolian deposits of the Egyptian Nile Valley our principal reference is Butzer, *The Geographical Journal*, CXXV (1959), 75–77.

7. Lower Egypt and the Delta of the Nile

Our picture of the geohistory and physiography of Lower Egypt in late Tertiary, Pleistocene, and post-Pleistocene times is drawn to a very great extent from Sandford and Arkell's *Paleolithic Man and the Nile Valley in Lower Egypt*—the fourth and last volume of their *Prehistoric Survey* (OIP, vol. XLVI [Chicago, 1939])—; from Said's *Geology*, pp. 151–225 *passim*; and from Butzer's "Die Naturlandschaft Ägyptens," pp. 71–78 (see also pp. 53–58, 61–62, 66; *Erdkunde*, XIII, 47, 50, 52–55). To these have been added data on Egypt's Mediterranean coast given by Blanckenhorn in his *Aegypten*, pp. 13–14; and information on the modern Delta provided by J. Lozach in *Le Delta du Nil*, a publication of the Société Royale de Géographie d'Égypte (Cairo, 1935).

A theory on the growth of the Delta advanced by Ball (*Contributions*, pp. 51 ff.) has been challenged by Zeuner (*Dating the Past*, p. 233) who, in describing the ancient marine bars of Arabs Gulf, notes that the positions of these bars "indicate clearly that the shoreline has advanced relatively little" and that "the size of the delta, therefore, has increased but moderately since early Pleistocene times." On the Pleistocene shorelines of Egypt's Mediterranean coast see especially Shukri, Philip and Said (1956), Butzer in *Quaternary Stratigraphy and Climate in the Near East* (Bonner Geographische Abhandlungen, Heft 24. Bonn, 1958); pp. 36–38; also by the same author, "On the Pleistocene Shorelines of Arabs' Gulf, Egypt," *The Journal of Geology*, Chicago LXVIII (1960), and *Quaternaria* VI (Rome, 1962) 451–56.

Among the classical writers who list and discuss the ancient mouths of the Nile are Herodotus (II. 17), Diodorus Siculus (I. xxxiii. 8–9), Strabo (XVII. i. 4), and Pliny the Elder (*Hist. Nat.*, V. 10). See J. Ball, *Egypt in the Classical Geographers* (Cairo, 1942), pp. 22–28, 48–49, 57–59, 69–70, 74–76; O. Toussoun, *Mémoire sur les anciennes branches du Nil* (*MIE*, IV [Cairo, 1922]); and *Mémoire sur l'histoire du Nil* (*MIE*, VIII [Cairo, 1925]), Chap. VIII.

On the vertebrate fauna of the Pliocene beds of the Wadi el-Natrun the basic reference is E. Stromer, "Mitteilungen über die Wirbeltierreste aus dem Mittelpliocän des Natrontales," *Zeitschrift der Deutschen Geologischen Gesellschaft*, LXV (1913), 350–72; LXVI (1914), 1–33, 420–25.

8. The Nubian Nile Valley and Its Cataracts

Besides Sandford and Arkell's *Paleolithic Man and the Nile Valley in Nubia and Upper Egypt* (*Prehistoric Survey*, Vol. II: "OIP," Vol. XVII [Chicago, 1933]) the principal works consulted in the preparation of this section were J. Ball's *The Semna Cataract or Rapid of the Nile: A Study in River Erosion* (London, 1903); the same author's *A Description of the First or Aswan Cataract of the Nile* (Cairo, 1907); O. H. Little and M. I. Attia's *The Development of Aswan District with Notes on South Eastern Egypt* (Geological Survey of Egypt [Cairo, 1944–45]); reports by Ball and H. J. L. Beadnell on the Kalabsha and Silsila gorges and the Kom Ombo plain in *The Quarterly Journal of the Geological Society*, Vols. LIX (p. 75) and LXI (pp. 670–71); Said's *Geology*, pp. 9, 50–54, 88 ff., 129 ff.; and Hume's *Geology*, Vol. II, Part II, pp. 589 ff., 604 (also I, 8). A good brief account of the geology of the Aswan region, with a useful bibliography, is incorporated in the *Report on the Safeguarding of the Philae Monuments*, prepared for UNESCO by order of the Netherlands Government (November, 1960. See pp. 19–24).

A. Rittmann in "Some Remarks on the Geology of Aswan" (*Bull. Inst. Désert*, III, No. 2 (July 1953), 35–64) disagrees with previous authorities in contending that the coarse-grained granite and the dioritic rocks of the Aswan area are not of plutonic, but of metamorphic origin; and in this he is joined by A. R. Gindy (*BIE*, XXVII, Fasc. 2, 83–120), N. W. Shukri, and others. See, how-

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ever, more recently, Butzer, "Naturlandschaft," pp. 51–52.

The relatively late period to which Sandford and Arkell (*op. cit.*, pp. 7–8, 23–24, 26, 54–59) assign the cutting of the Nubian Nile Valley and the river's initial encounter with the granite barrier of the First Cataract disposes of the old and frequently expressed theory that the so-called "rupture" of this barrier determined the course of the Egyptian Nile and led to the cutting of its valley (see, for example, J. de Morgan, *Recherches sur les origines de l'Égypte*, I, 22–23; P. Bovier-Lapierre in *Précis de l'histoire d'Égypte*, I, 11; É. Drioton and J. Vandier, *L'Égypte* ["Clio," 1, II], p. 1).

9. The Fayum Lake Basin

The observations made and views held during the last seventy years by leading geologists and prehistorians in connection with the origin and development of the Fayum and its lake may be studied in the following publications, listed here in chronological order:

Brown, R. H., *The Fayûm and Lake Moeris* (London, 1892).

Beadnell, H. J. L., *The Topography and Geology of the Fayum Province of Egypt* (Survey of Egypt) (Cairo, 1905).

Blanckenhorn, M., *Aegypten* (1921), pp. 182–83.

Caton-Thompson, G., and Gardner, E. W., "The Recent Geology and Neolithic Industry of the Northern Fayum Desert," *Journal of the Royal Anthropological Institute*, LVI (1926), pp. 301–32.

—— "The Recent Geology of the Northern Fayum Desert," *Geological Magazine*, LXIV (1927), 386–410.

—— "Recent Work on the Problem of Lake Moeris," *The Geographical Journal*, LXXIII (1929), 20–60.

Sandford, K. S., and Arkell, W. J., *Paleolithic Man and the Nile-Faiyum Divide* (= *Prehistoric Survey*, vol. I) (Chicago, 1929).

Gardner, E. W., "The Origin of the Faiyum Depression: A Critical Commentary on a New View of its Origin," *The Geographical Journal*, LXXIV (1929), 371–83.

Sandford, K. S., and Arkell, W. J., "The Origin of the Faiyum Depression: The Faiyum and Uganda," *The Geographical Journal*, LXXIV (1929), 578–84.

Caton-Thompson, G., and Gardner, E. W., *The Desert Fayum* (Royal Anthropological Institute). 2 vols. (London, 1934).

Little, O. H., "Recent Geological Work in the Faiyûm and in the Adjoining Portion of the Nile Valley," *BIE*, XVIII (1936), 201–40.

Caton-Thompson, G., Gardner, E. W., and Huzayyin, S. A., "Lake Moeris: Re-investigations and Some Comments," *BIE*, XIX (1937), 243–303.

Sandford, K. S., and Arkell, W. J., *Prehistoric Survey*, IV (Chicago, 1939), 99.

Ball, J., *Contributions to the Geography of Egypt* (Cairo, 1939), pp. 178–289.

Huzayyin, S. A., *The Place of Egypt in Prehistory* (Cairo, 1941), pp. 82–88.

Caton-Thompson, G., "The Levalloisian Industries of Egypt," *Proceedings of the Prehistoric Society*, new series, XII, No. 4 (1946), pp. 75, 83, 90, 97, 100 ff.

Huzayyin, S. A., "Le dépression de Fayyoum: un exemple d'erosion éolienne," *C.R. Congr. Int. Geogr.* (Lisbon, 1949), pp. 731–33.

Caton-Thompson, G., *Kharga Oasis in Prehistory* (London, 1952), pp. 18–19, 33, 143.

Pfannenstiel, M., "Die Entstehung der ägyptischen Oasendepressionen. Das Quartär der Levante II," *Abh. Akad. Wiss. Liter. Math.-Naturw. Kl.*, 1953, Nr. 7, pp. 344–406 *passim*.

Butzer, K. W., *Quaternary Stratigraphy and Climate in the Near East* (*Bonner Geographische Abhandlungen*, Heft 24. Bonn, 1958), pp. 68–71, 75, 99.

Forde-Johnston, J. L., *Neolithic Cultures of North Africa* (Liverpool, 1959), p. 7.

McBurney, C. B. M., *The Stone Age of Northern Africa* (Harmondsworth, 1960), pp. 78–80, 125, 145–49, 233–40.

Said, R., *The Geology of Egypt* (Amsterdam-New York, 1962), pp. 14, 99–106.

Butzer, K. W., "Pleistocene Stratigraphy and Prehistory in Egypt," *Quaternaria* VI (Rome, 1962) 467.

10. The Oases of the Libyan Desert

Among the more comprehensive and valuable general works on the Libyan Desert and its oases is the three-volume report of the Rohlfs Expedition of 1873–74: G. Rohlfs, P. Ascherson, W. Jordan, and K. A. Zittel, *Expedition zur Erforschung der libyschen Wüste* (Cassel, 1875–1883. See also Zittel, "Beiträge zur Geologie und Palaeontologie der Libyschen Wüste . . .," *Palaeontographica*, XXX [1883], 1–238). Of more recent date are E. Stromer's "Geographische Beobachtungen in der Wüsten Ägyptens," Mitteilungen F. von Richthofen, 1913 (Berlin, 1914) and his *Ergebnisse der Forschungsreisen Prof. E. Stromers in den Wüsten Ägyptens* (3 parts. Munich, 1914–19); portions of Said's *Geology* (pp. 11–14, 67–86, 197–215) and of the first volume of Hume's *Geology* (pp. 4, 7, 36, 73–74, 83); J. Ball's "Problems of the Libyan Desert," *The Geographical Journal*, LXX (1927), 21–38, 105–28, 209–24; K. S. Sandford's "Geology and Geomorphology of the Southern Libyan Desert," *The Geographical Journal*, LXXXII (1933), 213–19 (see also pp. 219–22); H. Schmitthenner's "Die Stufenlandschaft am Nil und in der Libyschen Wüste," *Geogr. Zeitschrift* (Leipzig), XXXVII (1931), 526–40; and M. Pfannenstiel's "Die Entstehung der ägyptischen Oasendepressionen. Das Quartär der Levante II.," *Abh. Akad. Wiss.*

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Liter. Math.-Naturw. Kl., 1953, Nr. 7, pp. 337–411. The opinions quoted in the first paragraph of the text of this section regarding the origin of the oases are those of Hume (*Geology*, I, p. 73). The most recent exponent of early fluviatile ("Urnil") erosion as an important factor in the formation of the Fayum, Bahria, and the southern group of oases is Pfannenstiel (*op. cit.* See especially pp. 361–62, 367–79, 382, 403–405. See also R. Uhden, "Der libysche Urnil in Oberägypten," *Geol. Rundschau*, XX [1929], 180–86; Blanckenhorn, *Aegypten* [1921], pp. 186–87; Beadnell, *Topography . . . of the Fayum Province* [1905], p. 67; and cf. Ball, *op. cit.*, p. 32).

On five of the individual oases—Kharga, Dakhla, Farafra, Bahria, and Kukur—there are excellent topographical and geological reports drawn up by H. J. L. Beadnell and/or J. Ball and published by the Survey Department of the Public Works Ministry of Egypt during the years 1900–1903. Beadnell's well known book, *An Egyptian Oasis. An Account of the Oasis of Kharga in the Libyan Desert*, etc. made its appearance a few years later (London, 1909). H. E. Winlock's *Ed Dakhleh Oasis* (New York, 1936), though chiefly taken up with the journal of a camel trip made to the oasis in 1908, contains much of interest to the geographer and prehistorian (*e.g.*, pp. 53 ff.).

In 1930–31, 1931–32, and 1932–33 the geography, geology, hydrography, paleontology, and prehistory of Kharga oasis were re-examined by G. Caton-Thompson and E. W. Gardner, *Kharga Oasis in Prehistory* (London, 1952, quoted in the fourth paragraph of this section) and in a succession of articles in *Antiquity* (V [1931], 221–26), *The Geographical Journal* (LXXX [1932] 396–409; LXXXI [1933], 134–39, 528–30), *The Geological Magazine* (LXIX [1932], 386–421), *Man* (XXXI [1931], 77–84; XXXII [1932], 129–59; XXXIII [1933], 178–80; and *The Quarterly Journal of the Geological Society of London* (XCI [1935], 479–518). Differences between the findings of Caton-Thompson and Gardner and those of Beadnell (notably, as regards the evidence for the existence or non-existence of a great prehistoric lake or lakes inside the depression) drew some "Remarks" by the latter in *The Geographical Journal*, LXXXI (1933), 128–34. "Further Remarks on the Kharga Oasis" were contributed to the same periodical (LXXXI [1933], 526–32) by O. H. Little, E. W. Gardner, K. S. Sandford, and J. Ball. The problems involved in these discussions are conveniently summarized by Huzayyin, *Place of Egypt*, pp. 89–94. Subsequent statements by Caton-Thompson concerning the oasis of Kharga will be found in two articles published in 1946 and cited in the notes to our succeeding section on *Climate*.

The topography and geology of the Wadi el-Natrun are discussed by Blanckenhorn (*Aegypten*, pp. 181–82), Hume (*Geology*, I, 161 ff.), and Sandford and Arkell (*Prehistoric Survey*, IV, 17, 92, etc.); and those of the oasis of Siwa by R. H. Forbes, "Siwa Oasis: Geology, Water Supply, Soils, etc.," *Cairo Scientific Journal*, X (1921), 1–8. See also M. A. Azadian, "L'Oasis de Siouah et ses sources," *BIE*, IX (1927), 105–14.

Blanckenhorn's treatment of the oases (*Aegypten*, pp. 180–82) is colored by his belief that the depressions are primarily the products of faulting—a view not held by most of the geologists who have studied them.

A series of books and articles on the Wadi el-Natrun and the oases of Siwa, Bahria, and Farafra prepared by A. Fakhry and published by the Service des Antiquités de l'Égypte deal chiefly with the dynastic and later histories, antiquities, and modern aspects of the depressions.

11. Climate

Since 1900 when Lt.-Col. James A. Grant ("Grant Bey") published his frequently cited article, "The Climate of Egypt in Geological, Prehistoric, and Ancient Times" (*Victoria Institute, Journal of Transactions*, XXXII, 87–105) a wealth of new evidence on Egypt's climate during the Pleistocene epoch and the periods preceding and following it has been brought to light, both in the Nile Valley itself and in other portions of the Egyptian tableland. The bulk of this material will be found collected and discussed in S. A. Huzayyin's *The Place of Egypt in Prehistory: A Correlated Study of Climate and Cultures in the Old World* (*MIE*, Vol. XLIII [Cairo, 1941]); less recently, but in somewhat more concise form in the same author's "The Place of the Saharo-Arabian Area in the Palaeolithic Culture-Sequence of the Old World: A Synoptic Review of Recent Data" (*BIE*, XX [1938], 263–95); in S. Passarge's *Die Urlandschaft Ägyptens und die Lokalisierung der Wiege der altägyptischen Kultur* (*Nova Acta Leopoldina: Abhandlungen der Kaiserlich Leopolidinisch-Carolinisch Deutschen Akademie der Naturforscher*, neue Folge, Band 9, No. 58 [Halle, 1940], pp. 75–152 [1–78]); and in G. W. Murray's "The Egyptian Climate: an Historical Outline," *Geogr. Journ.*, CXVII (1951), 422–34.

Since 1957 past climatic developments in

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Egypt, the Saharan region, and the Near East in general have been re-studied by Karl W. Butzer and his findings—on which our present section is to a great extent based—have been published in a series of important articles and monographs: "Mediterranean Pluvials and the General Circulation of the Pleistocene," *Geografiska Annaler* [Stockholm], XXXIX (1957), 48–53; "The Recent Climatic Fluctuations in Lower Latitudes and the General Circulation of the Pleistocene," *ibid.*, pp. 105–13; "Late Glacial and Postglacial Climatic Variation in the Near East," *Erdkunde*, XI (1957), 21–35; "Das ökologische Problem der neolithischen Felsbilder der östlichen Sahara," *Abh. Akad. Wiss. Liter. Math.-naturw. Kl.*, 1958, Nr. 1, pp. 20–49; *Quaternary Stratigraphy and Climate in the Near East* (*Bonner Geographische Abhandlungen*, Heft 24. Bonn, 1958); "Contributions to the Pleistocene Geology of the Nile Valley," *Erdkunde*, XIII (1959), 46–67 (see especially pp. 61–66); "Some Recent Geological Deposits in the Egyptian Nile Valley," *The Geographical Journal*, CXXV (1959), 75–79; "Die Naturlandschaft Ägyptens," pp. 56, 57, 59, 61–65, 78–116; "Environment and Human Ecology in Egypt during Predynastic and Early Dynastic Times," *Bulletin de la Société de Géographie d'Égypt*, XXXII (1959), 43–87; and "Archaeology and Geology in Ancient Egypt," *Science*, CXXXII (1960), 1617–24 (see especially pp. 1619, 1620, 1624); "Pleistocene Stratigraphy and Prehistory in Egypt," *Quaternaria*, VI (1962, Rome) 456–65; "The Pleistocene Sequence in Egypt and Its Implication for Pluvial Glacial Correlation in the Sahara," *Acts. Fourth Pan African Congress on Prehistory* (1962). The words quoted in our third paragraph are from *Quaternary Stratigraphy*, p. 138.

The development of Egypt's climate as reconstructed by G. Caton-Thompson and E. W. Gardner from their work in the Fayum and in the oasis of Kharga is discussed by them in the works cited in the notes to the two preceding sections of this chapter and is referred to again by Miss Caton-Thompson in her article on "The Aterian Industry: Its Place and Significance in the Palaeolithic World," *The Journal of the Royal Anthropological Institute of Great Britain and Ireland*, LXXVI (1946), 87–130 (see especially pp. 103 ff.). See also Caton-Thompson, *Kharga Oasis in Prehistory*, pp. 14–21.

The Pleistocene rainfall on the Kharga scarp was believed by Gardner in 1932 (*Geol. Mag.*, LXIX, 405) to have been "small in amount and seasonal in type during the periods of tufa formation, increasing in the intervening periods of erosion, but never reaching the amount typical of a Mediterranean climate" (see, however, Butzer, *Bonn. Geogr. Abh.*, XXIV, p. 73). In the same year (*Geogr. Journ.*, LXXX, 400) Caton-Thompson and Gardner together felt that "in Kharga there were no 'pluvial periods' except in a strictly limited sense, the area remaining throughout prehistoric times an arid region varying from full desert to poor steppe," but with "moist periods at intervals in the Paleolithic." In 1946, however, Caton-Thompson (*Proc. Preh. Soc.*, XII, 58, 60) represented the Pleistocene climate of the oasis scarp as embracing a first, and major, pluvial and a second pluvial, separated from one another by a period of aridity.

Climatic developments in the lower Nile Valley from Pliocene times onward have been discussed in some detail by Sandford and Arkell, *Prehistoric Survey*, I, 72; II, 85–86; III, 125–26; IV, 97–98. See also Sandford, *AJSL*, XLVIII (1932), 178–79; and "Past Climate and Early Man in the Southern Libyan Desert," *The Geographical Journal*, LXXXII (1933), 219–22. It is Sandford and Arkell who most stoutly refuse to recognize the alternation here of Pleistocene "pluvial" and "interpluvial" phases. See, for example, Sandford's concluding remarks on "Climate" in his *Prehistoric Survey*, III, 126.

Huzayyin (*Place of Egypt* [1941]), on the other hand, finds evidence in Egypt for the existence of a First, and major, Pluvial extending from late Pliocene times to the end of the Lower Paleolithic stage of human development, an Interpluvial spanning the end of the Lower and the beginning of the Middle Paleolithic periods, and a Second Pluvial, of Middle Paleolithic date, embracing two or three sub-maxima and one or two "intrapluvials" (see also Blanckenhorn, *Aegypten*, pp. 152, 241–42). These phases he regards as sufficiently well established to permit an approximate correlation, not only with the pluvials and interpluvials observed in other parts of Africa and in western Asia, but also with the glacial and interglacial periods of the Great Ice Age in Europe. Thus, he is inclined to extend his Egyptian First Pluvial over both the Alpine Mindel and Riss glaciations including the Mindel-Riss Interglacial, to correlate the Interpluvial in Egypt and Palestine with the Riss-Würm Interglacial, and to distribute the successive sub-phases of the Second Pluvial over the last glaciation (Würm) and the early stages of the Late Glacial period (Achen, Bühl, etc.). The post-pluvial dry phase would then fall in the latter part of the Late Glacial period

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and the Neolithic Wet Phase of the Saharo-Arabian belt would correspond to the post-Glacial warm phase of Europe.

In the fourth edition of his *Dating the Past* (1958) F. E. Zeuner felt (p. 232) that the Pleistocene chronology of Egypt is "still not clear" and (p. 229) that: "Among the countries bordering the Mediterranean on the south, Palestine stands out as the only one where, up to the present, thorough work has established a sequence of pluvial phases with which the succession of prehistoric industries can be correlated."

Interesting discussions of the climatic developments in other portions of North Africa and in the Saharan belt as a whole will be found in Zeuner, *op. cit.*, pp. 246 ff., 423; L. Balout, *Préhistoire de l'Afrique du Nord* (*Arts et Matiers Graphiques* [Paris, 1955]), pp. 37 ff., 76–82, 185; Alimen, *Préhistoire de l'Afrique* (Paris, 1955), pp. 63, 105 ff., 112, 203–205, etc.; J. L. Forde-Johnston, *Neolithic Cultures of North Africa* (Liverpool, 1959), pp. 7–12; O. Davies, "African Pleistocene Pluvials," *Man*, LIX (1959), 100–101; and McBurney, *The Stone Age of Northern Africa* (1960), pp. 16, 21, 24, 47–48, 57, 76, 165.

A useful general treatment of ancient climate the world over is given by C. E. P. Brooks in the revised edition of his *Climate through the Ages. A Study of the Climatic Factors and their Variations* (New York and Toronto, 1949). For Butzer's unfavorable comment on the 1926 edition of this work see *Erdkunde*, XI (1957), 21.

12. Chronology

The general conclusions and much of the material presented in this section are taken from the works of K. W. Butzer cited in the notes to the preceding section on Climate and from the fourth edition of F. E. Zeuner's *Dating the Past. An Introduction to Geochronology* (London, 1958)—see especially pp. 128 (fig. 46), 133 (fig. 47), 134–45, 229, 232–35, 246–48, 292, 341–46, 410 ff., 421–22, 423, 425, and the Bibliographies, pp. 433–90. Some additional details will be found in the first edition of the latter work, published in April 1946, and in Zeuner's *The Pleistocene Period. Its Climate, Chronology, and Faunal Successions* (London, 1945). See also Brooks, *Climate through the Ages*, pp. 95, 263–65, 269–71, 273, 276–77.

Our correlation of Egyptian and European phases follows Butzer (see especially *Quaternary Stratigraphy*, pp. 36–38, 41, 52 ff., Tables IV, VIII, and IX; "Naturlandschaft," p. 60); "On the Pleistocene Shore Lines of Arabs' Gulf, Egypt," *The Journal of Geology* (Chicago) LXVIII (1960); "Pleistocene Stratigraphy and Prehistory in Egypt," *Quaternaria*, VI (Rome, 1960) while the absolute dates are in part those of Zeuner (see especially *Dating the Past*,[4] "Table of Dates," p. 145) and in part those of Butzer (see *Quaternary Stratigraphy*, pp. 14–18; "Naturlandschaft," p. 60), emended on the basis of a recent article by H. L. Movius in *Current Anthropology*, I (1960), 355 ff. (see below).

The astronomical method of dating the phases of the Ice Age is based on periodical perturbations in the orbit of the earth as reflected in fluctuations "in the amount of radiation received by the earth from the sun." As formulated by M. Milankovitch and his predecessors its value has been questioned by M. Schwarzbach (1950), P. Woldstedt (1954), and others (see Butzer, *op. cit.*, pp. 14, 138); but has been reaffirmed by Zeuner in the most recent edition (1958) of his *Dating the Past* (pp. 412–15).

Although Huzayyin's correlation of his Egyptian "pluvials" and "interpluvials" with the European glacial phases has not been accepted by Zeuner, Butzer, and other students of Pleistocene geochronology, the dating of the 50-foot and earlier terraces obtainable from Huzayyin's reconstruction (*Place of Egypt*, pp. 156 ff. See also pp. 186–89) does not differ materially from that derived from Zeuner's tables (*Dating the Past*, pp. 145 and 235). It is with the 30-foot terrace, which Zeuner assigns to the Last Interglacial and Huzayyin to the First Stage of the Last Glaciation, that the differences of dating between the two systems begin to become striking.

Other, often widely divergent, views of the alternation of Mediterranean high and low sea-levels, the alternation of African pluvials and interpluvials, and their relationships to the glacials and interglacials of Europe and to the various Paleolithic human industries are given by Blanckenhorn, *Aegypten* (1921), pp. 152, 241–42; by R. Neuville and A. Ruhlmann, "La place du Paléolithique ancien dans le Quaternaire marocain," *Coll. Hesperis* (*Inst. des Hautes Études marocains*), No. VIII (1941), p. 124 (marine transgression = glacial period; marine regression = interglacial! See, however, Butzer, *Geografiska Annaler*, XXXIX [1957], 110); by L. Balout, *Préhistoire de l'Afrique du Nord* (1955), pp. 30 ff., 35–37, 76–82, 178, 486; and by O. Menghin in his *Weltgeschichte der Steinzeit* (Vienna, 1931), pp. 21 ff. (see especially p. 24); and an interesting discus-

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sion of the absolute chronology of the Paleolithic and succeeding periods will be found on pp. 42 ff. of the last-named volume. Also of interest are the chronologies of the Ice Age and early post-glacial times drawn up by R. Turner, *The Great Cultural Traditions*, vol. I (New York and London, 1941), opp. p. 44; and by B. A. Proosdij, "Kennen en Erkennen onze houding tegenover de Prachistorie," *Jaarbericht . . . "Ex Oriente Lux,"* No. 13 (1953–1954), pp. 271–72.

Besides its treatment by Zeuner in *Dating the Past*, the important subject of the relationship of the Nile terraces to the Mediterranean high sea-levels of Plio-Pleistocene and Pleistocene date is discussed at some length by Ball in his *Contributions to the Geography of Egypt*, pp. 46 ff., fig. 16; by Sandford in *Prehistoric Survey*, III, 43, 51–52 (fig. 13), 57; and Sandford and Arkell, *Prehistoric Survey*, I, 26–27, 31; IV, 39 (fig. 9), 46–47, 53, 59–60; and by Huzayyin, *Place of Egypt*, pp. 48 ff., 55–56. For our present understanding of the extent of this relationship see Butzer, *Erdkunde*, XIII (1959), pp. 52–53; *The Journal of Geology* (Chicago, 1960); *Quaternaria*, VI (Rome, 1962) and "The Pleistocene Sequence in Egypt and Its Implication for Pluvial Glacial Correlation in the Sahara," *Acts Fourth* Pan African Congress of Prehistory (1962).

The late Pleistocene chronology of Egypt has been carefully studied by G. Caton-Thompson in her article on "The Levalloisian Industries of Egypt," *Proceedings of the Prehistoric Society*, new series, vol. XII (1946), 57–120 (see especially pp. 68–84 and the table on p. 97). See also *Journ. Roy. Anthr. Inst.*, LXXVI (1946), 104, 107, 116; Butzer, *Quaternaria*, VI, 459, 462.

The radiocarbon method of age determination is based on the slow disintegration in organic matter of a radioactive carbon of atomic weight 14 (C^{14}) and a known half-life of about 5700 (5568 or 5800) years. The method is described and lists of radiocarbon dates are given by W. F. Libby, *Radiocarbon Dating* (2d ed [Chicago, 1959]); "Radiocarbon Dates," *Science*, vols. CXIII (1951)–CXX (1955); "Radiocarbon Dating," *ibid.*, CXXXIII (1961), 621–29; and F. E. Zeuner, *Dating the Past* (4th ed., 1958), pp. 341–46, 426–27. Of the many other works on the subject the following are of special interest: H. L. Movius, "Radiocarbon Dates and Upper Palaeolithic Archaeology in Central and Western Europe," *Current Anthropology*, I (1960), 355–91; H. Godwin, R. P. Suggate, and E. H. Willis, "Radiocarbon Dating of the Eustatic Rise in Ocean Level," *Nature*, CLXXXI (1958), 1518–19; C. B. M. McBurney, "Radio-carbon Readings and the Spread of the Upper Palaeolithic in Europe and the Mediterranean Basin," *Pro. I. N. Qu. A.* (Madrid, 1957); *The Stone Age of Northern Africa* (1960), pp. 51–52, 168, 203–204, 234; F. Johnson, "Radiocarbon Dating," *American Antiquity*, XVII, Part II (July, 1951), 1–63; R. J. Braidwood, "Über die Anwendung der Radio-Karbon-Chronologie für das Verständnis der ersten Dorfkultur-Gemeinschaften in Südwest-Asien," *Anzeiger der Österr. Akademie d. Wissenschaften*, 1958, Nr. 19; H. Junker, "Die Geisteshaltung der Ägypter in der Frühzeit," *Sitzungsberichte der Österr. Akademie der Wissenschaften*, 237. Band, 1. Abhandlung (Vienna, 1961), pp. 1–148 (see pp. 55–60); E. L. Kohler, and E. K. Ralph, "C–14 Dates for Sites in the Mediterranean Area," *AJA*, LXV (1961), 357–67. See also A. J. Arkell, *Shaheinab* (London, 1953), p. 107; *Bibliotheca Orientalis*, XIII (1956), 123, 126; R. Pittioni, "Der Beitrag der Radiokarbon Methode zur absoluten Datierung Urzeitlichen Quellen", *Forschungen und Fortschritte*, XXXI (1957), 357–64. J. Leclant, *Kush*, V (1957), 95. For the limitations and shortcomings of the method see especially W. S. Broecker and J. L. Kulp-"The Radiocarbon Method of Age Deter, mination," *American Antiquity*, XXII (1956), 1–11; and E. K. Ralph, "Double Trouble," *Expedition (Bulletin of the University Museum of the University of Pennsylvania)*, I (1959), No. 3, 24–25, and for an examination of its accuracy see W. F. Libby, *Science*, CXXXX (1963) 278.

The date 3100 B.C. for the beginning of the historic period is based largely on documentary evidence of historic time and can be explained to greater advantage in a later chapter.

13. Egypt at the Beginning of Human Prehistory

The reconstruction attempted here is drawn in large part from the studies of S. Passarge (*Die Urlandschaft Ägyptens* [1940]) and, above all, from those of K. W. Butzer ("Die Naturlandschaft Ägyptens" [1959], see especially pp. 47, 56–65; *Erdkunde*, XIII [1959], 47–67, see especially pp. 61–66, etc. [see the references listed above under "Climate"]). Also consulted were the works of Sandford, Caton-Thompson, Ball, and Huzayyin cited in the notes to the preceding sections. To these may be added J. Barthoux's "Paléogéographie de l'Égypte," a paper read in Cairo in 1925 at the Congrès

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International de Géographie and published in the *Compte rendu* of the congress, Vol. III, pp. 68–100.

The levels of precipitation required by "four indicative species" of vertebrate fauna are listed by Butzer in *Abh. Akad. Wiss. Liter. Math.-naturw. Kl.*, 1958, Nr. 1, pp. 20, 34–35. On the Pleistocene fauna of northern Africa and adjoining areas in general see Huzayyin, *Place of Egypt*, pp. 62, 64 ff., 72–73, 99–102, and the references cited there. See also L. S. B. Leakey, *Stone Age Africa*, pp. 22–25; A. S. Romer, "Pleistocene Mammals of Algeria," *Bulletin of the Beloit College*, XXVI (1928), No. 5; V. G. Childe, *New Light on the Most Ancient East*, pp. 24 ff.; McBurney, *The Stone Age of Northern Africa* (1960), pp. 16, 20, 73, 82, 88–94, 275 ff.

On pp. 172–74 of his *Place of Egypt* Huzayyin discusses the question of Pleistocene land-bridges between Africa and Europe, with special reference on p. 174 to the Strait of Gibraltar (see also Ball, *Contributions*, pp. 39–40, 62–64; Leakey, *Stone Age Africa*, p. 5); and on pp. 201–12 presents a case in favor of the Saharo-Arabian area, including Egypt, having been the principal "kernel-zone" of Lower Paleolithic culture.

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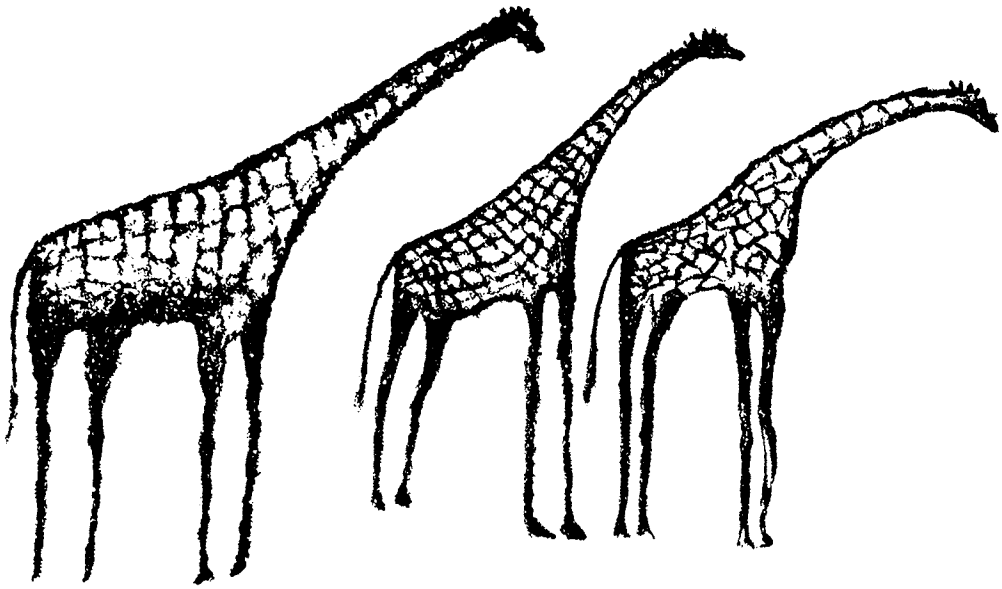

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PALEOLITHIC MAN IN EGYPT

1. The "Abbevillians"

The rather sudden appearance of tool-making man in the region of the lower Nile at a period believed to have coincided with the beginning of the second, or Mindel, glaciation is attested by the presence in the lower sands and gravels of the 100-foot wadi and river terraces of Upper Egypt and Nubia of an impressive series of primitive hand-axes, flake-tools, and "cores" resembling in their typology and technology those of the well-known Lower Paleolithic river gravels of Abbeville and Chelles in northern France and of Clacton-on-Sea in Essex. Without implying a derivation from or other direct association with their French and English counterparts it has become the general practice to designate the earliest Egyptian core-tools as Abbevillian or Chellean and the accompanying flake-tools as Clactonian and to extend the use of these names, in a very broad and loose sense, to the group or groups of hominids responsible for their production and use. Essentially the same primitive types of implements are found at this or a slightly earlier period (Günz-Mindel Interglacial) in many other parts of Africa and western Asia, notably, along the Lebanese littoral, near Oran in Algeria and Casablanca in Morocco, in the Nilotic gravels of the Republic of the Sudan, and in Bed II of the famous Olduvai Gorge deposits in northern Tanganyika, where, as on a number of other African sites, they are preceded by even more primitive "pebble-tool" industries, the so-called Kafuan and Oldowan.

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In Egypt, as elsewhere, the lithic tool-kit and armory of Abbevillian Man consisted in the main of a single multiple-purpose implement variously known today as a hand-axe, a fist-wedge, a cleaver, a coup-de-poing, a core-biface, and a Boucher, the last in honour of the Nineteenth Century French prehistorian, Boucher de Perthes, who himself called it a "hache diluvienne." As first encountered in the lower levels of the 100-foot Nile gravels it is a thick triangular or ellipsoidal implement, lenticular or triangular in cross-section and some five to ten inches in length, provided around the greater part of its perimeter with a serviceable, if somewhat wavy, working edge and ending in a more or less pronounced point—more, in fact, like an edged pick than what we should normally describe as an axe. Basically the tool is a natural nodule or chunk of flint, chert, quartzite, or other, usually siliceous, stone, worked to shape on both faces by the removal from its margins—evidently by direct blows from a hammerstone—of a few short, massive flakes, the marginal flake-scars on one side falling between those on the other side so as to produce the characteristic zigzag working edge already referred to. Often on these early hand-axes the butt-end of the nodule is left unworked to provide a comfortable, rounded grip for the user's hand. The shaping of the implements depended almost entirely on simple, but skillful, primary flaking, and there are only rarely any signs of secondary working, or retouching, of the points or edges. Their exact forms were determined primarily by the shapes of the nodules or chunks of stone selected, some being long trihedrons with prominent rounded butts, others bi-facial and more pear-shaped or oval in outline. There appears to be little basis for the belief that the trihedral hand-axes are an earlier and more primitive form than their lenticular mates and no reason for applying to them the name Chalossian, derived from a doubtfully dated group of implements found at La Chalosse in south-western France. "Marked recesses" in the edges of a few of the early hand-axes have suggested the possibility of their having been lashed to a wooden haft, but as a general rule there is no evidence of hafting. On the contrary, a major advantage of the implement is that it can be held in the hand in several different ways and so made to perform a variety of different tasks. Its uses, in any case, were evidently many and various—cleaving, chopping, digging, scraping, sawing, skinning, crushing, and stabbing—and it is not surprising that in Egypt it remained throughout the whole of the Lower Paleolithic period Man's favorite tool and weapon.

It was not, however, his only stone tool nor was the technique which produced it the only one employed by the earliest Egyptian tool-makers. Not only were the flakes sheared off in the process of producing the hand-axes themselves used as implements, but similar flakes were produced for their own sakes from cores which were subsequently either discarded or retained as reserves of raw material. In the early, "block-on-block," or Clactonian method of flake-tool production the flakes were simply struck from the margins of natural, unworked cores, probably by striking the latter against the edge of a large anvil-stone, the flake-scars left on one side of the core serving as the "striking-platforms" for the flakes removed from the opposite side. The resulting, for the most part unretouched, tools, though capable of performing tasks for which the massive hand-axe was unsuited, are usually clumsy and irregularly shaped and the Clactonian technique in general is primitive and wasteful of raw material. Less copiously represented in the 100-foot

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Nile gravels than the hand-axes with which they occur, the flake-tools represent at this time a subsidiary, though by no means negligible, Lower Paleolithic industry.

From the cultural point of view the most significant aspect of both the hand-axes and the flake-tools is that they were predetermined forms made in accordance with set traditions which we have no difficulty in identifying and relating to those followed in other parts of the ancient world. As such they reflect a definite and widely recognized step forward in Man's early struggles toward developing a civilized mode of existence. This is not the case with the so-called eoliths, or "dawn-stones," alleged predecessors of the Paleolithic implements, which in the Nile Valley, as elsewhere, appear for the most part to have been produced by purely natural agencies, such as "thermal flaking or abrasion against their neighbors." Even if it were possible to substantiate the claims that these "haphazardly flaked stones" were used by an ancestor of Paleolithic Man, the infinite and aimless variety of their forms and their presence in deposits of almost every conceivable date make them of little value as documents in the story of human progress.

The expansion of the makers of the Clacto-Abbevillian implements throughout the Egyptian area is to some extent reflected by the geographic distribution of their artifacts. From Tumas in middle Nubia to Beni Adi, near Asyut, the latter have been found *in situ* in the 100-foot Nile and wadi gravels and in rolled condition in the 50-foot terrace. At Ashkeit, on the east side of the river, just north of Wadi Halfa, 50-foot wadi gravels contain numerous well rolled Abbevillian hand-axes, presumably derived originally from a higher level. The fluviatile deposits of the Republic of the Sudan from Wadi Halfa to beyond Khartoum have produced a fine series of Clacto-Abbevillian (Pre-Chellean and Chellean) implements, notably in the stratified gravels of the Khor Abu Anga, an ancient tributary which joins the main river a short distance below the confluence of the Blue and White Niles. Also reported are "rough flake artifacts *in situ*" in the 150-foot terrace near Wadi Halfa "with pebble tools of Pre-Chelles-Acheul type on the surface" and "a little above present high river" near the mouth of the Atbara. From north of Mallawi in Middle Egypt to the tip of the Delta Abbevillian hand-axes and Clactonian flakes and cores occur in heavily rolled condition in redeposited sands and gravels of the 100-foot Upper Egyptian stage which in the Rus Channel, beside the Fayum, have been built up eustatically to a level of 70–85 feet above modern alluvium and in the plain of Abbassiya, east of Cairo, to a maximum height of 104 feet. Since, however, these implements and the deposits containing them appear to have been carried down by the river at a later time and from considerable distances upstream they are not in themselves evidence that Abbevillian Man ever reached northern Egypt.

That he did is indicated by numerous surface finds of Abbevillian and Clactonian implements, usually mixed with those of later date, in both the Libyan and Eastern Deserts in the region of Cairo. Such finds, often described as "stations," occur on the slopes of the Gebel el-Ahmar, in the Wadi Lablab, on the crest of the Gebel Moqattam, and in the Wadi el-Tih, east of Tura, and, on the west side of the Nile, between Saqqara and Abu Roash, including a stretch of desert surface north of the pyramids of Giza. Collections of flint implements picked up on the desert fringes along the east and west sides of the Delta by members of the Deutsches

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Institut für ägyptische Altertumskunde in Cairo include hand-axes of "Chellean" and "Chalossian" type. In Upper Egypt Abbevillian and later Lower Paleolithic implements, often deeply patinated by long exposure to the elements, litter the surfaces of the valley sides and the heights above. They are particularly numerous in western Thebes, where Arcelin, Schweinfurth, Seton-Karr, Currelly, and others have identified a number of "stations"—some perhaps halting places of early Paleolithic Man, others undoubtedly dumps of implements abandoned by modern peasant flint-collectors. Several Lower Paleolithic surface groups have been recorded by Vignard near Nag Hammadi, including, on the slopes of the eastern cliffs opposite Khoderat, what he calls a "Chelleo-Acheulean encampment." Bovier-Lapierre describes a Clactonian "atelier" and both he and Schweinfurth have noted several stations with crude hand-axes of quartz and quartzite to the south and east of Aswan. Among the numerous finds of Lower Paleolithic implements in the Eastern Desert mention may be made of groups of Chellean hand-axes discovered not many years ago on the heights around the wells of Laqeita. The spread of Abbevillian Man over what is now the Libyan Desert is attested by finds of his implements and those of his successors not only scattered throughout the broad area between the Nile and the Great Oases, but also in the wadis leading from the river to the Nubian oasis of Kurkur, in the Wadi Abu el-Agag, north of Aswan, around the springs of Dalla, west of the oasis of Farafra, between the northern oases of Bahria and Siwa, and westward all the way to Gebel Uweinat. Huzayyin's map showing the distribution of the early hand-axe industries over the present-day deserts confirms Hume's statement that "Worked stone implements are found over a vast area extending from the sand-masses beyond the western confines of the most distant oases to the barren shores of the Red Sea."

Much of our story of the earliest recognizable human inhabitants of the Egyptian tableland and its river valley must at present be based on what we know of their contemporaries in other portions of the Old World, for until Late Paleolithic times all that has survived of these ancient sojourners on the Lower Nile are their stone implements. Even the latter, as we have just seen, have been found only in geological deposits or scattered over the surfaces of the river terraces and the high desert without culturally significant groupings or contexts which would permit them to be spoken of as "assemblages" or "industries."

Lacking skeletal remains, graves, habitation sites, works of art, and all tools and weapons save only those made of flint and other hard stones, the task of drawing a significant and trustworthy picture of the Nilotic peoples of the early Old Stone Age would seem to be well nigh hopeless. The stone implements themselves, however, tell us much of the men who made and used them. Furthermore, the similarity of these implements in type and technique of manufacture to those of early Paleolithic sites in other parts of Africa, in western Europe, and southwestern and south central Asia suggests that in all these areas we are dealing with men endowed with similar mental capacity and similar manual dexterity, standing at much the same level of cultural development, and adhering to the same general habits of life. Add to these clues the indications which we possess concerning the natural conditions amid which the primaeval "Egyptian" lived—the type of

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country, the climate, the probable fauna and flora—and we find that we have still another means of reconstructing with some degree of accuracy the nature of his existence.

Though there is no local evidence, there is some probability that the Lower Paleolithic inhabitants of northeastern Africa—the creatures whose stone artifacts are found imbedded in the gravels of the 100-foot Nile terrace—closely resembled, if, indeed, they were not identical with, the so-called "Chellean Man" of northern Tanganyika, a sub-human contemporary of Java Man (*Pithecanthropus erectus*) and Pekin Man (*Sinanthropus pekinensis*), but with a larger head and somewhat less ape-like appearance than these early far eastern hominids. The upper part of a skull of this predecessor of *Homo sapiens*, found in Bed II of the Olduvai Gorge deposits in association with implements of Chellean (Abbevillian) type, shows him to have had a "wide forehead," an "immense" brow ridge, and a "relatively straight" face without the projecting muzzle characteristic of the so-called ape-men. A thick neck and massive jaw are suggested "by the formation of the skull at the points of attachment" for the jaw and neck muscles, and two gigantic milk teeth belonging to a child of the same species show that he "must have had permanent dentition of huge dimensions." Rabat Man, another near-contemporary and likely relative of our Egypto-Abbevillian tool-maker, is represented by a mandible and a fragmentary maxilla found near Rabat in the coastal area of Morocco in a geological deposit datable to the period of the Post-Sicilian (Mindel) Regression. Though in this case there was no directly associated industry, implements of Chelleo-Acheulian and Tayacian types were discovered at the same general level. An archaic type characterized by a receding chin and enormous teeth, Rabat Man has also been linked with the *Sinanthropus-Pithecanthropus* group and with the slightly later *Atlanthropus mauritanicus* of Morocco and Algeria.

In common with their contemporaries the world over these earliest tool-making inhabitants of Egypt and Nubia unquestionably possessed the power of exchanging ideas through some form of speech and perhaps the ability to control, if not actually to produce, fire. Otherwise they appear to have lived in a state of savagery not far above that of some of the other species of animals. Like all Paleolithic peoples they were certainly incapable of producing their own food supply and were—to borrow Professor Childe's expression—merely "food-gatherers." This means that they depended for their sustenance entirely upon what they could find and collect among the wild plant and animal life about them; and that when for any reason these sources failed or were exhausted in the locality which they happened to be occupying it was necessary for them to move on to another part of the country or even to another part of the world. Other causes aside from imminent starvation could also have prompted their wanderings, such as influxes of large numbers of dangerous, predatory animals against which their primitive weapons would have afforded them little or no protection.

Within the pluvial periods which witnessed the formation of the Pleistocene river terraces of Upper Egypt the variations in the generally warm and pleasant climate of northeastern Africa would probably have been insufficient to occasion wholesale emigrations of men and animals from the area; and the population of this part of the world during the early stages of the European glaciations, though

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nomadic, was presumably fairly constant. There is every probability that, as elsewhere in these early times, it was also extremely sparse. The hunter and food-gatherer requires a large foraging area in which to live, and a few relatively small groups of such people can, and undoubtedly did, occupy a very considerable amount of territory. Though thousands of Abbevillian and Clactonian stone implements have been found in Egypt and Nubia, these may well represent an average output by each inhabitant of as many as three or four implements a week over a period of some sixty thousand years.

The equipment of the earlier Old Stone Age people of Egypt almost certainly comprised, besides their stone tools, weapons and implements made of wood and of the bones of antelopes and other large animals. These would have included the pointed wooden throwing-spear, a most effective weapon in the hands of an expert, and formidable clubs made of the shoulderblades and thigh bones of some of the bigger animals, as well as smaller and more delicate implements of the same materials. By "mid-Chellean" times the people of Olduvai in northern Tanganyika seem to have developed the bola, a missile weapon used to entangle the legs of fast-moving animals and comprising rough stone balls tied together in groups of two or three by lengths of sinew or hide.

Provided with such an armory and with a cunning and ability to plan and organize superior to those of other animals, it is probable that the Clacto-Abbevillians were fairly successful as hunters, capable on occasion of laying low even such beasts as the huge and dangerous elephant and the fleet and wary antelope. Operating on foot without long-range missile weapons we may suppose, however, that their daily bag was for the most part small and uncertain and consisted chiefly of easily caught and relatively defenseless types of animals or of young, aged, or sick individuals of the more formidable or elusive species. In the case of a big carnivorous beast like the lion it is probable that Man was not infrequently the quarry rather than the hunter. Thus, though meat may have been the Paleolithic Egyptian's favorite food, it would seem that a substantial part of his diet must have consisted of fruits, nuts, and berries which he—or, more likely, his womenfolk—gathered from trees and shrubs, tubers and grubs dug out of the ground, eggs stolen from birds' nests, shell-fish, and perhaps other types of fish caught in the shallows of the river and its subsidiary streams and lakes. Happily for him he had found a region which for the time being appears to have been richly endowed with natural foods of many different kinds, and was, like his modern descendants, practically omnivorous.

Blessed during Pleistocene times with a warm and never excessively rainy climate it is unlikely that the Paleolithic inhabitants of northern Africa ever felt the need for clothing or for covered shelters in which to live, but went about "in a state of nature" and camped for the most part under the open sky. Though natural caves are fairly numerous in the cliffs bordering the Nile, in the Red Sea hills, and in other parts of Egypt and Nubia none of these has as yet yielded any evidence of prehistoric human occupancy. To escape the strong winds of the plateau and to have ready access to supplies of water the early camps were probably more often than not pitched in the lee of the rocky scarps which fringe the valley of the Nile and those of its ancient tributaries, on sheltered lake or sea beaches, or in the rain-pans and larger depressions which dotted the surface of the tableland. It is, in any case, along the river valley and its lateral

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wadis and, later, around the Fayum and other ancient lake basins and in the vicinity of the fossil springs in the oases that the greater number of Paleolithic stone implements have been found. The presence of Abbevillian hand-axes and Clactonian flakes and cores in what were then the subaqueous bottom gravels of the Nile and its tributaries indicates a population living immediately along the banks of the river and the lateral streams, well within the confines of their sheltering valleys, and evidently venturing frequently into their shallows. Similar artifacts scattered far and wide over open and featureless terrain show, however, that during the earlier Paleolithic phases of his existence Man did not confine his activities to specific localities, but with the changing seasons ranged as freely over the grassy uplands as the herds of wild game which he hunted.

For protection and for greater success in hunting and other pursuits calling for co-operation and concerted action Paleolithic Man in this part of the world, as elsewhere, undoubtedly lived and traveled in groups which have been variously described as tribes, clans, hordes, packs, and even herds. Whatever the exact nature of these primitive social units it is generally believed that by Lower Paleolithic times they were already larger and more complicated than the simple family; and were probably composed of a number of families related by blood or drawn together by mutual interests or mutual fears. We know nothing of the internal organization of these units or of their group or tribal customs and beliefs. It is, for example, entirely uncertain whether Lower Paleolithic Man buried his dead or, like most other animals, left them to be disposed of by nature's scavengers.

During the period of aridity preceding the onset of the Mindel Pluvial it is probable that northeastern Africa, except for the coastal area, was uninhabited and that tool-making Man first entered the region in early Mindel times bringing with him already standardized methods of producing implements and weapons of hard stone. Whence he came is of course uncertain, but investigations of recent years point more and more clearly to East Africa (Kenya, Uganda, and Tanganyika) as the "kernel zone" and dispersal point of the hand-axe industry and of one group, at least, of its earliest users. From the great lakes in the center of this area the Albert and White Niles must have provided, even in those remote times, an almost unbroken thoroughfare to the north, along which men and animals could have traveled with relative ease. In Egypt the apparently greater concentration of Abbevillian and Clactonian implements in the southern portions of the country may also be indicative of the direction from which their originators came, though here allowances must be made for the continued denudation and less extensive exploration of early Paleolithic sites in the north. It is significant, in any case, that the earliest stone implements found *in situ* in the Egypto-Nubian area occur in the gravels of the 150-foot terrace near Wadi Halfa, at the extreme southern limit of that area.

2. Growth and Development of the Acheulian Tradition

In the course of the Mindel Pluvial, a period involving tens of thousands of years, Paleolithic Man in the Nile Valley followed a pattern of development discernible in many other parts of the Old World and passed very gradually from the initial Abbevillian level into a slightly more advanced cultural stage. For us this advance is evidenced chiefly by improvements and refinements in the form of his

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principal stone tool, the hand-axe, which, thanks to a growing sense of design and an increased use of secondary flaking, or retouching, became more symmetrical in shape, straighter edged, and somewhat thinner in cross-section—in general a handsomer and more efficient implement. As the Nile and its tributaries in Upper Egypt and Nubia slowly aggraded their beds to the 100-foot level, this development of the hand-axe can be followed through transitional stages which prehistorians classify as evolved Abbevillian, or Chellean, Chelleo-Acheulian, and, finally, early, or Lower, Acheulian.

Named for the type-site of St. Acheul on the Somme near Amiens, the Acheulian tradition was destined to cover "by far the longest time span of any of the various Paleolithic subdivisions," surviving in Egypt for approximately 300,000 years, from the latter part of the Mindel Pluvial until the final stage of the Riss Pluvial and being represented in the 100-, 50-, and 30-foot terraces of Upper Egypt, the 100-foot gravels of the north, the Wadi el-Natrun, the Fayum lake basin, the spring and scarp deposits of Kharga Oasis, and numerous surface finds in both the eastern and western deserts. It is characterized in general by the use of two additional techniques in the finishing of core-tools, namely, the flaking of the edges of the roughed-out tool "in order to build up preliminary striking platforms set at the correct angle to the face to be flaked" and the use of a baton of hard wood, bone, or horn, which, being of softer material than stone, could be "struck directly against the edge of the nodule without crushing it." The flakes detached in this manner are long and shallow and the resulting implement is straight-edged, thin in cross-section, and evenly tapered. "Some of the later Acheulian bifaces," says Jacques Bordaz, "are the most perfect expressions of the core-tool concept," and a number of those found in the Nile terraces have been described by Sandford and Arkell as of "beautiful workmanship and symmetry," showing "a real mastery" of the craft and "complete mastery of the material," or as "beautiful example(s) of Acheulean skill," recalling "some of the more highly developed forms of Europe." Clearly the Paleolithic tool-maker had reached the stage where he was interested not only in the functional efficiency of his implements, but also in their appearance—had, indeed, achieved an aesthetic approach to his product which allows us to see in the creation of these superb artifacts the beginnings of world art. Writers on prehistory do not hesitate to refer to some of the Acheulian core-tools and even to some of their evolved Abbevillian predecessors as "works of art," and to this the majority of their readers will probably not take exception.

By no means all Lower Paleolithic bifaces were made from pebbles, nodules, or nuclei of flint. Where these were not available tabular chert was used (Kharga) or simply rough chunks of stone broken away from the standing rock and—especially in Upper Acheulian times—there was a tendency to fashion the small, thin hand-axes out of large flakes. Besides flint and chert the materials used in various parts of the Egyptian area include quartz (near el-Kab), quartzite (Gebel el-Ahmar, Aswan), and ferricrete sandstone, or ironstone (Republic of the Sudan), the last being an exceedingly difficult stone to work.

The Chelleo-Acheulian and earliest Acheulian implements of the 100-foot wadi and river terraces of Upper Egypt consist chiefly of plano-convex hand-axes, still rather coarse in appearance, but showing definite efforts to straighten the edges, develop the point, and achieve bilateral

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symmetry of shape by secondary flaking of Acheulian type. With these were found somewhat more advanced almond-shaped, ovate, and semi-ovate (chopper) forms with lenticular cross-sections and one extraordinary three-sided "pick" which has been compared with the so-called "anvils" of the upper gravels of Abbassiya. Occasionally the heels, or butts, of the hand-axes are left unworked, a carry-over from Abbevillian times. This stage is best represented in the gravels of the Wadi Qena, at Bir Arras, between Abydos and Sohag, and at Beni Adi, near Manfalut.

The capping of the 100-foot terrace in Upper Egypt was followed, as we have seen, by a prolonged interpluvial, or arid period, during which the Nile eroded its bed in the south and, under the influence of the Mindel-Riss, or Tyrrhenian, high sea-level, redeposited the same implementiferous gravels in the north to levels of 70 feet and more above modern alluvium, notably in the Rus Channel and at Abbassiya. Above these ancient gravels with their heavily rolled Abbevillian, Chelleo-Acheulian, and early Acheulian artifacts lie wadi and river deposits of more recent (Mindel-Riss) origin containing fresh or only slightly rolled implements of typical Lower and even Middle Acheulian forms. These forms, which indicate an Acheulian date for the 70–100-foot terrace of northern Egypt, include symmetrically pointed ovates with slightly sinuous edges and thin, evenly tapered cross-sections, which are described by their finders as "rare examples of beautiful Acheulean work" bringing "us to a fairly advanced stage of Acheulean culture." To the same stage probably also belongs a somewhat elongated hand-axe with a reverse S-twist from the floor of the Wadi el-Natrun near Bir Hooker.

It was during the formation of the 50-foot terrace of Upper Egypt and Nubia, probably in early Riss times, that the Acheulian tradition in Egypt reached its full expression. In the gravels of this terrace from Ashkeit on the Sudan frontier to Beni Adi, north of Asyut, occurs a rich variety of developed Acheulian bifacial implements—ovates, *limandes*, disks, waisted points, and miniature hand-axes—exhibiting the remarkably thin sections, the sharp, straight edges, the complete bilateral symmetry, the fine "fish-scale" flaking, and the meticulous retouching characteristic of good "evolved" Acheulean work the world over.

The Upper Acheulian industry is best represented and best recorded in Kharga Oasis and constitutes there the earliest evidence of human occupation of the great depression. An "assemblage" of Upper Acheulian implements in the deposits of a fossil mound-spring on the floor of the depression comprises a great variety of forms, among which lanceolate and pear-shaped bifaces predominate, followed in order of frequency by *limandes*, "V-shape butted" tools, and triangular hand-axes. The mound-spring referred to (KO 10) probably represents a "home site, to which the large majority of the hand-axes were brought ready-made," but the Acheulian finds around the other mound-springs and in the gravel-silt-tufa deposits of the passes of the eastern scarp consist chiefly of flaking sites with cores and "waste parings" forming a high percentage of the material and finished implements being relatively few in number. Here, as in the earlier stages of the Acheulian in Egypt, the hand-axes and other bifacial tools are accompanied by small and rather thick flake-tools (scrapers, piercers, notched blades) still produced by the old block-on-block, or Clactonian, method, but showing occasionally extensive re-working of the points and edges. In this Upper Acheulian horizon we also encounter a few specimens

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with traces of incipient Levallois, or "faceted platform," technique, an advanced method of flake-tool production which, as we shall see, dominates the industries of the Middle and Late Paleolithic phases of Egyptian prehistory.

The Upper Acheulian of Kharga has been compared with that of Tabun in Palestine; but Miss Caton-Thompson, who makes the comparison, also insists that "Egypt's palaeolithic sequence is an autochthonous, auto-generic development, partaking of certain generalised African characteristics in its earlier stages, but becoming increasingly Nilotic in a specific sense later on; untroubled by rival discoveries and inventions by eastern neighbours . . ." Huzayyin, on the other hand, has this to say: "A comparative study of this industry and the Up. Acheulean of Palestine (especially that of the Umm Qatafa Cave) reveals a remarkable degree of similarity between the two. Apart from ordinary similarities in the technique, the most characteristic (new) feature of the two industries is the *coup de burin* on some of the *coups-de-poing*. So far as is known this is the earliest occurrence of the burin technique, and in all probability it corresponded to some technological connection between Egypt and Palestine."

The Micoquian, a Final Acheulian industry named after the site of La Micoque in the Dordogne section of France, is not clearly represented in Egypt, but handsome hand-axes of Micoque type have been found at Kharga "in Upper Acheulian typological contexts" and on or just below the surface in the plain of Abbassiya.

At Kharga the Upper Acheulian stage is followed by a mixed and evidently transitional industry described as "Acheulio-Levalloisian," in which Acheulian hand-axes "showing less directional retouch than formerly" occur together with discoid cores, flakes with faceted butts, and flake-blades of rudimentary but distinct Levalloisian character. Much the same industry is found in the 30-foot Nile terrace, which is preserved today chiefly between Luxor and Asyut and which appears to have been formed during the second stage of the penultimate glaciation (Riss II). The gravels of this terrace contain not only small triangular hand-axes of advanced Acheulian type, but also characteristic Levalloisian tortoise-core flakes and flake-blades. Here, then, we take leave of Lower Paleolithic man and pass gradually into the *milieu* of his Middle Paleolithic successor.

To judge from the surface finds on either side of the Nile Valley the Acheulian tool-maker seems to have covered much the same area and used in general the same stopping places and flaking sites as his Abbevillian predecessor. Their implements are found together at Gebel el-Ahmar, Gebel Moqattam, the cliffs at Thebes, and the quarry of Abu el-Nur, near Nag Hammadi. In the Eastern Desert the Acheulian is encountered alone near Aswan, above Gebel Silsila, at Mahamid, near el-Kab, and at Rabah and Wassif, in the vicinity of the Red Sea; and, in the Libyan Desert, north and west of Abydos and between the Nile Valley and Gebel Uweinat.

A survey of the Republic of the Sudan has disclosed the presence of the Acheulian industry in one or more of its stages at many different points along the river valley, all the way from the region of the Second Cataract to Wadi Afu on the White Nile, fifty miles upstream from Omdurman, and also at a number of sites on the lower reaches of the Atbara. Paleolithic implements have not been recorded south of Wadi Afu as far as the Uganda border or anywhere west of the Nile in Kordofan or Darfur; and, further north, Lower Paleo-

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lithic industries are lacking between the Second Cataract and Abri and between the mouth of the Atbara and the Sixth Cataract; but in the Ennedi region of northern Chad, six hundred and fifty miles west of Dongola, ancient stream and lake beds have yielded spreads of hand-axes and an occasional cleaver of developed Acheulian type as well as "small hand-axes intermediate between Acheulean and Aterian."

Egypt has as yet produced no human remains of either Abbevillian or Acheulian date; but off to the west, in Algeria, Lower Acheulian Man, in the person of *Atlanthropus mauritanicus*, is represented by three mandibles and a parietal bone found at Ternifine, near Palikao. Possessed of "teeth of great size" and being in general "nearer the condition of the apes than either modern man or the Neanderthaloids," this ancient tool-maker has been linked "very closely indeed to the *Sinanthropus-Pithecanthropus* group of the Far East" and is described as belonging to a "widespread evolutionary stage in the emergence of man." In 1955 the mandible of a more evolved specimen "of the same generic type" was found near Casablanca, in Morocco, "associated with numerous bifaces or hand-axes of classical Mid-Acheulian type." At Swanscombe in Kent, tools of Upper Acheulian type are linked with what has been thought to be an early form of *Homo sapiens*, or modern man. In view, however, of the Ternifine remains McBurney, for one, regards it as doubtful if the makers of the hand-axe industries were "precocious *Homo sapiens*." Serious doubts, in any case, have been raised regarding the dating of the *Homo sapiens* remains of Kanam and Kanjera in Kenya which were once associated with, respectively, the Kafuan and Acheulian industries of that part of Africa.

Since in Egypt the Acheulian tradition is seen to develop gradually out of the preceding Abbevillian and over most of its long history to exhibit recognizable local characteristics it would seem to be unnecessary to look for a source of this tradition and its practitioners outside of the Egyptian area itself. During the Acheulian period, however, it is practically certain that Egypt's food-gathering human population was not constant, but came and went, retreating to more hospitable climatic zones during the long, dry Mindel-Riss Interpluvial and the Riss Interstadial and returning in force at the beginnings of the Riss pluvial phases, bringing with them—perhaps from great distances—new methods of making stone tools. There would appear, then, to be some justification for attributing the marked typological and technological advances in the manufacture of bifacial implements to outside influences or to intrusions of new groups of tool-making hominids. If we choose to do so we should probably once again look southward to the great center of the hand-axe industries in East Africa, where the Acheulian tradition, like its forerunners, is represented in all its stages by a concentration of material unparalleled in any other part of the world. A southern source for the Egyptian Acheulian is further suggested by the extraordinary richness and wide distribution of this industry in the Republic of the Sudan. In Upper Acheulian times "startling resemblances" are seen to exist between the Sudanese implement forms and those of Kharga Oasis, both areas having yielded the rare ovate celtiform tools and "choppers of . . . Oldowan technique." Less significance is probably to be attached to the already-mentioned resemblances between the Upper Acheulian of Kharga and that of Palestine, where the hand-axe industries seem never to have been very firmly established and the

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Acheulian tradition occurs only in its evolved stage.

It is an enlightening commentary on the tempo of early cultural development that during a period sixty times as long as all recorded history Acheulian man adhered with little change to the food-gathering economy and nomadic existence of his Abbevillian forbears. Our picture of him may well be distorted by our lack of knowledge; but it would appear that, despite his more varied and more efficient tool-kit and an awakening aesthetic sense reflected in the symmetry and beauty of some of his implements, he remained at a cultural level generally classified as "the lower savagery." He was, however, evidently a more accomplished and successful trapper and hunter than his predecessors, and this may be attributed in part to a slowly increasing ability to plan and organize his projects and in part to his development of important additions to his hunting armory. Evolved Acheulian lanceolates and other elongated points with waisted sides or tapered butts, found at Kharga and near Nag Hammadi, for example, were almost certainly designed to be provided with hafts of wood, bone, or horn which would have added immeasurably to their range and effectiveness. Faceted stone balls of Acheulian date occur on a number of sites in Europe and Africa—including an example in quartzite from Kharga—and their presence in groups of three at Olorgesaillie in Kenya has suggested their use in bolas. This missile weapon, attested at Olduvai in mid-Chellean times, enjoyed apparently a greatly expanded use in the hands of the Acheulian hunters. Large animals were probably captured in drop-traps, or game-pits, or by being driven into swamps "where they could easily be despatched." At Olorgesaillie the Acheulian hunter's favourite food-animals were a giant baboon (which Cole thinks "must have tasted very nasty"), a large "and probably very tough" horse, and an enormous pig about the size of a rhinoceros; and at Torralba in Spain his quarry included the rhinoceros, the wild ox, the stag, the horse, and the elephant. These he apparently ate raw, splitting the bones to extract the marrow and smashing the skulls to remove the brains. In Egypt the teeth of a wild ox and an equine animal, probably a zebra, have been found in deposits of Acheulian and early post-Acheulian date.

3. The Middle Paleolithic Age

The advent of the Middle Paleolithic stage of Egyptian pre-history is characterized, as elsewhere, by the gradual disappearance of the hand-axe and other bifacial core-tools from man's lithic equipment and the widespread use of the "faceted platform," or Levalloisian, technique of flake-tool production. The latter, named for the Parisian suburb of Levallois, consists of preparing the convex dorsal surface of each flake and adjusting the angle and shape of its striking platform by minute faceting before it is detached, by a single blow, from its core. The resulting flake is large and characteristically oval or circular (polygonal) in outline, though triangular and elongated forms also occur; and the resulting core, being typically oval and plano-convex, is called a "tortoise-core." In western Europe Levalloisian flakes and tortoise-cores have been found "in direct and indisputable association with Early-Middle Acheulian materials," and Movius has been led to ask whether there the "concept of a Levalloisian tradition as an entity separate and distinct from an Acheulian tradition" has "any real validity."

In Egypt a "latent Levalloisian technique," represented by a single "triangular tortoise-core and two thin flakes with

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faceted butts," crops up first during the early stage of the Riss Glaciation (Riss I) in the Upper Acheulian deposits of Kharga oasis. Definite early Levalloisian forms, as we have seen, occur in late Riss times (Riss II) in the 30-foot wadi gravels of Upper Egypt and in the Refuf Pass of the Kharga scarp in association with hand-axes of very late Acheulian type. In this "Acheulio-Levalloisian" horizon, which we have already had occasion to discuss, the adoption of the new method of producing flake-tools is accented by the complete absence of Clactonesque flakes and cores.

The Lower Levalloisian industry of Kharga is described by Miss Caton-Thompson as "of normal Egyptian character, with a large proportion of tortoise-cores of skilled technique, and a contradictory poverty in the range and retouch of flake implements." No hand-axes or other bifacial tools were found in association with it and, as represented at Locus IV in the Refuf Pass, the industry is seen to have "freed itself from the last vestiges of Acheulian influence." The earlier Lower Levalloisian has not yet been recorded *in situ* in the Nile Valley, but the physiographical features in which we should expect to find it are the 50-foot terrace of northern Middle Egypt and the beach of the 131-foot Fayum lake, both of which appear to have been formed during the Last, or Riss-Würm, Interglacial period. In view of their date it is, in any case, unlikely that these two features belong, as has been thought, to the Upper Acheulian or "evolved hand-axe" stage of Egyptian industrial development; and the presence in the Fayum of some low-level Levalloisian surface finds would not seem to warrant the invention of a 40-foot lake of Lower Levalloisian date to fill an assumed cultural gap between the 131-foot beach and its 112-foot Upper Levalloisian successor.

The 10–15-foot pluvial terrace of Upper Egypt is assigned to the early phase of the Last Glaciation (Würm I) and its contained industry is identified as Late Lower Levalloisian. Here, as McBurney points out, "the Levalloisian flaking technique has reached a mature stage of development" in "a varied assemblage of light and effective flake tools," including now the elongated flake-blade, a significant Middle Paleolithic innovation destined to survive far down into historic times. Movius summarizes this industry, which he prefers to call Middle Levalloisian, as one "in which a reduction in size and an increase in the delicacy of the flakes may be noted." Among the abundant implements found in the 10-foot terrace Sandford draws special attention to "thin, leaf-shaped flakes of great beauty" and the cores from which they were produced; and goes on to say, "In these flakes and cores artistic skill seems to find by simple form-lines as high an expression as it does in Acheulian technique." Some of the cores were prepared on both sides and their points subsequently used for boring or chipping, while others may have served as scrapers. It is evident, then, that in certain instances the cores as well as the flakes are to be regarded as implements. In Nubia, where the 10–15-foot gravels either were never formed or are now hidden beneath the later silts, Levalloisian implements typical of this stage are found in the base of the silts and in flaking sites on the surfaces of the higher terraces and the slopes of the adjoining hills, notably in the neighborhood of Abu Simbel, Faras, and Ashkeit. At Kharga the "Earlier" (Late Lower) Levalloisian is characterized, as in the Nile Valley, by triangular and sub-triangular cores, narrow flake-blades, broad pointed, sub-rectangular, and sub-discoidal flakes, and end-scrapers, all except the last

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distinguished by a general absence of retouch.

By Upper Levalloisian times (Würm Interstadial?) conditions in the Nile Valley both climatically and physiographically had begun to approximate those of the present day (see Chapter I). Fine gravels and silts brought down by the annual summer floods from the Abyssinian highlands were beginning to cover the valley bottom in Nubia and Upper Egypt and downstream, north of Sedment, were building up into a terrace-like feature 25–30 feet above modern alluvium. The latter can be traced through the Hawara Channel into the Fayum, where the corresponding level is represented by the beach of a lake 112 feet above sea-level. In all of these deposits and in the passes of the Kharga scarp are found implements of highly evolved Levallois type and distinct local Egyptian character. Oval and discoid cores of relatively small size now tend to replace the triangular forms and among the flakes the more interesting shapes include thin, sharp points with constricted butts, evidently designed as missile or lance heads. A bifacial lanceolate from the 112-foot Fayum beach resembles the work of the so-called Aterian industry of northwestern Africa (see below) without, however, any suggestion of "formal correspondence." "Sporadic examples" of "Mousterian typology and technique" occur in the Upper Levalloisian of Kharga and the Fayum, notably in a series of "neatly made cutting or scraping tools" showing a well-developed secondary retouch and inviting comparison with the so-called Levalloisian-Mousterian of Palestine and Cyrenaica. On the whole, however, the term Mousterian, derived from the French village of Le Moustier and formerly applied somewhat indiscriminately to the Middle Paleolithic industries of Egypt has in recent years been generally abandoned in favor of the more accurate "Levalloisian." One of the more significant characteristics of Egypt's Upper, or Late, Levalloisian industry is the now marked tendency towards a reduction in the average size of the implements—a tendency which heralds the approach of the so-called "diminutive Levalloisian," or Epi-Levalloisian, industries of Late Paleolithic times.

The wide distribution of Levalloisian flaking sites and other surface finds over areas which are now absolute desert confirms the physiographical evidence that in northeast Africa portions of the immensely long span of time which we call the Middle Paleolithic period were substantially moister than the present day. In the vicinity of the Nile Valley important groups of Levallosian or "Levalloiso-Mousterian" implements have been recorded by Bovier-Lapierre in "ateliers" at Abbassiya, Gebel el-Ahmar, and Wadi el-Tih, by members of the German Institute along the eastern fringe of the Delta, by Vignard at Abu el-Nur (west of Nag Hammadi) and Gebel Silsila, and by Seligman and others in the neighborhood of Thebes. Middle Paleolithic work- or camp-sites in the Eastern Desert have been observed northeast of Aswan, near an outcrop of quartz at the mouth of the Wadi Abu Agag, in the vicinity of Gebel el-Silsila and Naga ed-Deir, and at Rabah and Wassif, near the coast of the Red Sea. In the Libyan Desert evidence of the Levalloisian tool-maker's presence is found to the west of el-Sebaiya, Esna, Sohag, and Abydos, on the heights of western Thebes, north of the Fayum and north of the Giza pyramids, off to the west in the oasis of Siwa and between Siwa and Bahria, near wells to the north and south of the oasis of Farafra, a few miles east of the village of Kharga, and along the railway line extending between the Nile Valley and the oasis of Kharga.

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The identification of some of the groups of Levallois surface finds as flaking sites, where implements were actually manufactured, rests on more substantial evidence than is the case with many of the so-called "stations" of Lower Paleolithic times. On the surface at Abbassiya Bovier-Lapierre found not only as yet unretouched flakes, but also the cores from which they had been detached and the hammerstones used in their production, the latter showing numerous evidences of use. Middle Paleolithic flaking sites on the surfaces of the higher-level terraces in western Thebes contained discarded flakes which, according to Sandford and Arkell, "may sometimes be fitted together round the core from which they were struck off" and which undeniably "have lain undisturbed since the day they were made." In general the Levalloisian working floors both in and near the Nile Valley and at Kharga are characterized, as would be expected, by a sparsity of finished flakes and an abundance of cores and broken pieces of cortex.

A similarly broad expansion of the practitioners of the "faceted-platform technique" has been noted in the Republic of the Sudan. Here, besides Ashkeit, Tangasi, and other sites in the river valley, areas far from the Nile in what is now "100 per cent desert" have produced implements of Levalloisian types, notably the region between Nuri and Dongola and the neighborhood of the Abu Tabari well, the latter lying a good three hundred and sixty miles out in the Libyan Desert. That none have been found further to the west, in the well-explored vicinity of Ennedi, suggests that conditions there were less favorable than in the late Lower Paleolithic period, which is represented in that area, as we have seen, by hand-axes and other artifacts of developed Acheulian type.

The relatively moist periods when Middle Paleolithic man found it both possible and profitable to seek his livelihood on the present-day desert plateaux may be correlated with the late Kanjeran and early Gamblian Pluvials of East Africa and assigned to late Riss and early Würm times, the industrial stages embraced within these periods being, respectively, the Acheulio-Levalloisian and the Middle Levalloisian. During the dry Riss-Würm Interpluvial and the Würm I–II Interstadial (Lower and Upper Levalloisian, respectively) it is unlikely that men and animals could have survived for any length of time away from the river, the shores of the Fayum lake, or the springs and scarp valleys of the oases.

The absence of securely dated human remains, the fallacy of tying a particular type of stone industry to any one species of early man, and the fact that both Acheulian and early Levalloisian implements appear to have been produced and used by the same groups of people should warn us against being too positive in identifying the makers of the Egypto-Levalloisian artifacts or in differentiating between them and their Lower Paleolithic predecessors. There are, however, not entirely negligible reasons for supposing them to have belonged to the most prominent and most widely-distributed stock of Middle Paleolithic hominids, the Neanderthaloids. In Europe Neanderthal Man, a thickset, large-brained predecessor of *Homo sapiens* named for the Neander valley in western Germany, is firmly associated with flake-tools of Mousterian technique and "the early neanderthaloids of Steinheim and Ehringsdorf were accompanied by 'Levalloisian' industries." In both Palestine and Cyrenaica a taller, hybrid or transitional form of the same human species is linked with a Levalloiso-Mousterian industry, which McBurney believes to have been "a tradition of

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African ancestry," "superimposed by a process of migration on a belated hand-axe culture in Palestine." Since such a migration could only have taken place by way of Egypt the presence in this area of both the industry and its Neanderthaloid producers seems assured. Moreover, in the spring of 1958 Dr. Andrej Wiercinski of the University of Warsaw announced the discovery in a wadi near Maadi, a suburb of Cairo, of "three fossilized skulls of very primitive nature," the "general features" of which "resemble those of Neanderthal man." Elsewhere in Africa human remains of Neanderthal or Neanderthaloid type, usually in association with a Levalloisian or Levalloiso-Mousterian industry, have been found not only in Cyrenaica, but also near Tangier in Morocco, near Lake Eyasi in Tanganyika, and at Broken Hill in Northern Rhodesia. The Neanderthaloid jawbone of Cyrenaica comes from the stratified cave deposits of Haua Fteah, less than 500 miles west of Alexandria, where it was found together with Lower Levalloiso-Mousterian stone implements and some charcoal which has been dated by radiocarbon tests to approximately 43,000 B.C. As McBurney points out, the Haua Fteah mandible is "the first human fossil securely associated with the Middle Paleolithic in Northern Africa, and the only human fossil at the time of writing" (1960) "to be dated in years."

Occupying the long and loosely defined zone of human development transitional between the lower and upper savagery Middle Paleolithic man's most notable advance over his predecessors was his new-found ability to produce, by a complicated and sophisticated technical method, a wide variety of specialized tools and weapons, each designed and produced for an individual purpose and therefore infinitely more efficient than the few generalized implements of Lower Paleolithic times. Under a chapter heading, "Man Begins to Specialize," Cole notes that in Upper Pleistocene times "Chisels, gouges, and awls were invented; knife blades undoubtedly had as many uses then as they have today; hollow-scrapers were used as spoke-shaves, while end- and side-scrapers were more finely finished for dressing leather for bags or clothing." Equipped with the hafted dagger and the stone-tipped lance, as well as with bolas and perhaps other missile weapons, the Neanderthaloid hunter did not hesitate to tackle the most formidable of animals, including on the icy slopes of western Europe the mammoth and the huge and fierce cave-bear with which he successfully disputed the possession of the caves themselves. On Egypt's western plateau his quarry is known to have comprised a fleet horse-like animal, perhaps a zebra, and either a wild ox or a large antelope with bovine characteristics. The ample brain which devised the Levallois and Mousterian techniques of tool manufacture and designed the many implements produced by these methods led its owner forward in other and diverse ways along the long, slow road toward civilization. In Europe and Asia Neanderthal men "made regular use of fire" to keep themselves warm and perhaps even to cook their food, and may have worn simple clothing made of animal skins. They buried their dead in the caves in which they lived, ceremonially preserved and stacked the skulls and limb-bones of the great beasts which they had killed, practiced simple surgery, and cared for the aged and infirm members of their communities. These evidences of solicitude for the welfare of both the living and the dead, of a belief in the efficacy of ritual and magic, and of anxiety and speculation regarding the future denote, as Coon has repeatedly pointed out, beings already far

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removed from the "insensate brutes" of the popular Neanderthal image.

Far from lagging behind their European and Asiatic contemporaries in the climb to this new cultural plateau, the peoples of Africa in general and of northern Africa in particular seem, to judge from the quality and originality of their stone industries, to have been among its leaders. "It is probably true," says McBurney, "that nowhere in the Palaeolithic world as at present known did this 'Middle Palaeolithic' evolution of flake-tool traditions reach a higher state of development than in North Africa. This is perhaps the one stage at which this area was the scene of cultural innovations in advance of similarly derived traditions elsewhere."

4. The Cultures of Late Paleolithic Times

In Egypt the industrial and artistic achievements of the great Upper Paleolithic cultures of Europe—the Périgordian, the Aurignacian, the Solutrean, and the Magdalenian—are for the most part lacking, and we find, instead, a number of indigenous local industries, sharing in common a Levalloisian ancestry and retaining throughout a Levalloisian character, but exhibiting with time pronounced and clearly differentiated regional developments. McBurney deals with these "Epi-Levalloisian" industries in his chapter on "The Middle Palaeolithic" and Miss Caton-Thompson includes them in her monograph on "The Levalloisian Industries of Egypt." The period during which they flourished, however, corresponded approximately with that of the Upper Paleolithic elsewhere, extending from the Würm I–II Interpluvial (Gottweig Interstadial) to Late Würm times and covering, therefore, the closing phases of both the glacial epoch and the Old Stone Age, the immediately succeeding cultural stage, as represented at Helwan and elsewhere, comprising a microlithic industry of very late glacial (post-pluvial) age and Mesolithic type. Thanks to a series of radiocarbon readings from associated areas the "Late Paleolithic" period in Egypt can be dated in terms of years from approximately 30,000 (before 23,000) to approximately 10,000 B.C.

The so-called Sebilian cultures are, properly speaking, confined to southern Upper Egypt and Nubia, the type site lying, as we have had occasion to remark, near the Ezbet el-Sebil in the Kom Ombo basin, some thirty miles downstream from the First Cataract. Here in 1920 Edmond Vignard found the chipping floors and camp sites of groups of Late Paleolithic people who occupied the area toward the end of the late Pleistocene silt aggradation phase and during the ensuing stages of riverbed degradation and whose activities, owing to an increasingly arid climate, seem to have been restricted to the immediate vicinity of the Nile and its subsidiary streams, lakes, and marshes. The first group of "Sebilians" lived apparently on the margins of the great reed swamp which at that time filled a large part of the basin, and their implements are found in the uppermost levels of the aggradation silts, separated by a great thickness of sterile silt—and an evidently considerable interval of time—from the Upper Levalloisian implements at the base of the same deposits. Their stone industry, generally designated as Lower Sebilian or Sebilian I, differs from the parent Levalloisian in several respects. These include the use of a steep secondary retouch along the lateral edge of the normal Upper Levalloisian flake to produce a triangular or trapezoidal "backed" tool or other geometric form, a tendency to shorten the striking platform and to trim, or truncate, the bases of the flakes, and a notable increase in the

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production of flake-points and elongated flake-blades. Breuil is inclined to derive this industry from the Mousterian, but McBurney and others have pointed out that "the secondary work appears to be more abrupt and discontinuous" than that of either the Mousterian of Europe or the Levalloiso-Mousterian of Palestine. Despite a further marked reduction in the average size of the tools and cores, as compared with those of the Upper Levalloisian, Sebilian I remains an industry of fairly large implements and can in no wise be described as microlithic. Disks occur and on the high-level sites Vignard also found a number of hammer-stones, a sandstone anvil, some animal bones, and fragments of burnt clay which he took to be portions of cooking hearths. The materials used by the Lower Sebilian tool-maker are confined, in rather striking fashion, to quartzite, quartz, and diorite. Outside of the Kom Ombo basin his handiwork occurs in the high silts at several places between Luxor and the Second Cataract, notably, near Wadi Halfa in the northern Sudan and Toshka in Nubia and near Edfu and el-Kab in southern Upper Egypt. The northward expansion of the earlier Sebilian culture seems to have ended in the vicinity of el-Kab and the use of the name to designate the more or less contemporaneous, but otherwise distinct, Epi-Levalloisian industries of Middle and northern Egypt is inaccurate.

As the Nile in response to the Main Würm marine regression lowered its bed in the recently aggraded silts men followed the declining waters far out into the great Kom Ombo marsh and by Middle Sebilian times had established their camps "around channels and swampy lakes and ponds" at a general level somewhat below that occupied by the earliest Sebilians. Here they subsisted on fresh-water mollusks deposited in thousands by the waters of the annual inundation, on fish caught in the river and its backwaters, on river animals and on plains animals which came down from the now parched plateaux to drink. Their camp sites are marked by quantities of burned clay hearths, by sandstone mills with grinding stones for grinding apparently not only coloring matter (ochre, limonite) but also wild-growing cereal grains, and by mounds of refuse, or kitchen middens, several yards in height, composed of mollusk shells, fish bones, broken and sometimes burnt animal bones, human bones, ashes, flint chips, and fragments of hard stone and Red Sea coral, but no pottery—in short, the typical living debris of a pre-Neolithic riverside population of hunters and fishermen. The Middle Sebilian, or Sebilian II, stone-tool industry which has been associated with this level is made up in general of smaller and more varied implements than those of Sebilian I. The true Levalloisian flake has disappeared and in its place we find the now very common flake-point and various sub-geometric forms "steeply retouched on one or more margins." Triangles, trapezoids, and semicircular or crescentic shapes were produced by suppression, or truncation, of both the bases and the tops of the flakes and a number of flakes and flake-blades were evidently deliberately broken to shorten them. Of the new forms the lunate backed implements are perhaps the most striking. Double-ended flake-blade cores and multiple cores worked on both sides are found, but true blades are rare until late Middle Sebilian times. Implements identified by Alimen as burins, or small graving chisels, have been compared by her with those of the Tardenoisian industry of Mesolithic Europe, but Vignard doubts that the flakes in question are in fact real burins. McBurney is inclined to regard many of the geometric forms of

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both Sebilian I and II, classified and illustrated by Vignard, as "dubious," "arbitrary," and of "fortuitous," or unintentional, origin. Flint is now the favorite material, being evidently readily available locally and having gradually taken the place of the harder stones employed by the earliest Sebilians. Though Caton-Thompson in 1946 limited the expansion of the Middle Sebilians to the area between Wadi Halfa and Esna their implements have in fact been found in wadi deposits as far north as Qurna in western Thebes. At Dibeira West in Nubia they occur at a level of 68–73 feet above modern alluvium and in the district of Edfu a Middle Sebilian flaking site has been identified at an elevation of 45 feet. The so-called Middle Sebilian implements found by Sandford at el-Sheikh Timai in Middle Egypt and at el-Hibah, south of the entrance to the Fayum, are considered by Caton-Thompson as "not characteristic" or, at best, doubtful; and it would appear that this culture, like its predecessor, was confined to southern Upper Egypt and Nubia. In the Eastern Desert near Laqeita, Debono has found small groups of Epi-Levalloisian implements which he compares with those of Levels I and II of Kom Ombo.

By Upper Sebilian, or Late Glacial, times (16,000–10,000 B.C.) the Nile in Upper Egypt had lowered its bed to more than 100 feet below its present level and desert conditions in northeastern Africa had reached a degree of severity as great, if not greater, than at the present day. The region had long since ceased to attract immigrants from other parts of Africa and from western Asia, and the dwindling native population, more or less cut off from the rest of the world, clung precariously to the much reduced habitable areas along the Mediterranean coastline, on the banks of the river, and around the Fayum lake and the springs and scarp valleys of the Great Oasis. Near Sebil the streams from the east which had for so long fed the great marsh had dried up and to find water men were forced still further down into the Kom Ombo plain where what McBurney cautiously refers to as "surface concentrations more or less suggestive of individual camping sites" are found grouped around a series of small, low-lying basins. The work and habitation sites of the Sebilian III people are generally similar to those of Sebilian II, comprising, besides the flaking floors themselves, large hearths ringed with lumps of ochreous clay and containing red or black ash depending on whether the fuel used was grass or wood, and kitchen middens built up largely of broken and charred bones, the opened shells of freshwater mollusks, bits of flint, sandstone, and various hard stones, and ashes. Mixed in with the latter were sandstone mills and grinding stones, pebbles stained red, shells pierced with holes for suspension as ornaments (?), a slab of schist also drilled with a hole which Vandier has taken to be a cosmetic palette, fragments of red ochre coloring matter, what Vignard describes as small vases and cups of sandstone, and quantities of smoothed but undecorated bone points, perhaps the tips of javelins or arrows, perhaps implements used in the pressure flaking of stone tools. There are still no traces of pottery vessels or of ground or polished stone implements. The kitchen middens are neither as large nor as numerous as those of the Sebilian II encampments, and this suggests that the sojourn in this area of the Upper Sebilian hunters and fishermen—though estimated, as we have seen, at six thousand years—was not as long as that of their predecessors.

The stone implements of this lowest and latest level, made exclusively of flint or

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chalcedony and designated generally as Sebilian III, are such a disparate lot that McBurney feels that "in the absence of stratigraphical proof or of circumstantial details, photographs, etc., of individual sites," "the true association of these diverse elements may well be doubted." Caton-Thompson, on the other hand, accepts them as a single "backed blade and trapeze industry" of "microlithic character," "derived from Sebilian II," and Huzayyin sees in them "essentially a continuation and perfection of the industry of Level II." There are miniature cores of Levalloisian type, others from which small flake-blades were evidently produced, and still others designed for the production of elongated blades and bladelets. True blades occur and both these and the flakes are in many cases of such small size as to be justifiably described as "submicrolithic." Many have been converted into a variety of geometric forms by the same steep marginal retouch and the same mutilation (truncation) of the bases and tops noted in the preceding Sebilian stage. The types include notched blades, tanged blades, lunates, end-scrapers, and augers, some of the fine, specialized small tools being quite evidently intended for working in ivory, bone, or wood. Small rectangular blades with one serrated edge may have been set into primitive wooden sickles for reaping the wild cereal grains which apparently formed part of the Upper Sebilian's diet and small points and spurs of flint are believed by Vignard to have been imbedded in lumps of gum or clay to form composite arrow heads. Notched or tanged arrow heads of both unilateral and bilateral type suggest, in any case, that the Sebilians—thanks perhaps to the recent Aterian invasion of the Libyan oases (see below)—were by now in possession of that most revolutionary of all ancient weapons, the bow and arrow. The so-called "micro-burins" on which (to quote Huzayyin) "Vignard bases his assumption that the Kom Ombo Basin was the centre of dispersal for the whole of the Final Palaeolithic (Mesolithic) cultures of the Old World" are identified by Caton-Thompson as by-products, or *débitage*, of the triangular and trapezoidal implements; and it is the opinion of the English prehistorian that from beginning to end the Sebilian culture "is valid only for Upper Egypt and Nubia" and that "to regard it as the vehicle of transmission of Asiatic blade and burin culture to northwest Africa is both fantastic and reprehensible." McBurney also casts doubt on Vignard's belief that there is evidence here of "an actual transition from a flake-industry to a blade industry" of true Upper Paleolithic type, since such a transition would on the geological evidence be "actually *later* than the earliest Upper Palaeolithic of Europe." At the same time he points out that "in Europe, Asia, and elsewhere in Northern Africa" the microlithic elements of the so-called Sebilian III assemblage "only make their appearance at the very end of the blade succession, in the post-glacial epoch"; and Huzayyin remarks that the preparation of the striking platforms of some of the Sebilian III cores by means of a single blow ("plane transversal facet") "is a Final Palaeolithic (Mesolithic) rather than a true Up. Palaeolithic feature." All in all, it seems wisest to regard the implements of Vignard's Level III as representing, in part, the terminal phase of a local Late Paleolithic industry of Levalloisian antecedents and, in part, groups of "intrusive" microliths and other artifacts of possibly Mesolithic or pre-Neolithic date.

In the Fayum and in the stretches of the Nile Valley adjoining it we find another Late Paleolithic culture developing in a more conservative and quite different

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fashion towards a microlithic and/or pre-Neolithic culmination. Geologically and chronologically the 92- and 74-foot Fayum lake beaches, some wadi terraces in the northern rim of the depression, and the corresponding Hawara Channel and Nile gravels and silts belong to the Lower and Middle Sebilian periods, but typologically the industry found in these deposits and designated by G. Caton-Thompson as Fayum Epi-Levalloisian, exhibits clear differences from the Sebilian. Small double-ended oval cores of Levalloisian type, pointed, triangular, and ovoid flakes, and narrow "flake-blade-like forms" show none of the special features—the reduced butts and other mutilations, the backed lateral edges, and the steep retouch —which characterize the Sebilian. Indeed, retouch of any type is rare in these implements. The prevalence of double-ended cores might be taken as a link with the earlier Sebilian, but even here there is no exact correspondence. Miss Caton-Thompson finds a monotonous lack of variety in the implement types and is prone to regard the industry as "a stage of attested development from the Late Levalloisian of the 34 m. [112 ft.] lake level" with "no innovations whatsoever." The "Epi-Levalloisian II" industry of the 74-foot Fayum beach and associated Nilotic deposits is seen as a direct descendant of that of the 92-foot level with the diminution in the average size of the implements having now become more marked, but without having as yet attained a true microlithic character.

Huzayyin, on the other hand, notes a pronounced tendency in this industry, which he proposes to call the "Qarounian," toward the production of core tools, bifacially flaked and including triangular core-points, choppers, and primitive forms of axes and adzes. These he believes may be the precursors of the triangular and hollow-based arrowheads and the large axes, tranchets, adzes, and other bifacial tools of the Fayum Neolithic, and in them he is inclined to see a local evolution from the Upper Paleolithic into the Neolithic without an intermediate microlithic—i.e., Final Paleolithic, or Mesolithic—phase. With the fall of its lake to eighteen feet or more below present sea-level the Paleolithic history of the Fayum is "lost to view" and with it the final stage of the local industry, Miss Caton-Thompson's largely hypothetical "Epi-Levalloisian III."

Other local facies of essentially the same Late Paleolithic industry of northern Egypt have been exposed in wadi deposits and surface washes on the eastern fringes of the Delta, the sites including Abu Suwair, on the northern rim of the Wadi Tumilat, Shibeem el Qanatir, near the Ismailia canal, and Heliopolis and Abbassiya, northeast of Cairo. Here, too, we find what would appear to be two lines of development, one a diminutive or "prolonged" Levalloisian flake tradition characterized by small but broad flakes with faceted butts and tending in its latest phase towards the microlithic, the other a reversion to a bifacial core-tool tradition featuring ancestral forms of the "axes and similar implements of the Neolithic and later cultures." Among the four thousand artifacts found in 1940 at Abu Suwair are cores with microlithic features, such as the single-faceted striking platform, others showing axe or chopper-tool tendencies, and still others prepared in such a way as to suggest possible use as sling-stones. The industry is relatively poor in flakes and among the latter the proportion of narrow blades is somewhat higher than it is, for example, at Sebil in southern Egypt. Burins are almost completely lacking. At Heliopolis and Abbassiya cores and core-tools are less

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predominant and microlithic tendencies less clear than at Abu Suwair. Bifacial axes, reminiscent of typologically similar tools of Neolithic and later times, occur, as do also "re-edging flakes," struck off transversally from the working edges of such axes.

Collections of implements made by Junker and Menghin in the vicinity of Abu Ghalib, on the western edge of the Delta, and variously described as Sebilian, Capsian, or Neolithic, have, upon further study, proved to be either Upper Levalloisian or, in the case of a microlithic industry, of protodynastic, early Old Kingdom, or even Middle Kingdom date. Debono has reported the discovery of Epi-Levalloisian implements in eastern Sinai, 180 miles from the Nile Valley, but, so far as is known, has not yet published his finds.

In general, it is felt that, despite some local differences, the Delta industries and those of the Fayum can be grouped together and regarded as jointly representative of the last surviving stages of the Paleolithic in northern Egypt.

The third principal sub-area of Late Paleolithic regional specialization centers around the oasis of Kharga and the adjoining portions of the Nile Valley in southern Middle Egypt. Here there existed in Sebilian times a diminutive Levalloisian industry to which Miss Caton-Thompson has given the name "Khargan" and which she describes as being made up for the most part of "very thick, short flakes, reduced by steep or even vertical retouch of their edges to a variety of usually asymmetric forms." Besides normal Levalloisian flakes, cores, and discs and some well-developed end- and side-scrapers the "Khargan" and a preceding, transitional stage, the so-called "Levalloiso-Khargan," are represented as including "diminutive types, characterized by bulb reduction or truncation, steep marginal trimming, improvisation of forms, and an addiction to snapping larger flakes and multilating them." Though it is conceded that many of the diminutive implements may be merely the results of prolonged use and that on the whole they are typologically unrelated to true blade-microliths, it is suggested that they may have given rise to some of the thick, backed microliths produced in Egypt at a later period. The implements designated as Levalloiso-Khargan were found *in situ* in the gravels of Kharga's eastern scarp valleys, below the Aterian level, and can be dated to the latest period of stream activity in these wadis. Those classed as Khargan, however, are surface finds, picked up in and around solution pans and water-sheds of the scarp valleys, as well as near Qara in the Nile Valley, and cannot be positively dated, even their chronological relationship to the intrusive Aterian industry being a matter of uncertainty. Miss Caton-Thompson feels sure "that both Aterian and Khargan lay at or near the end of the Paleolithic succession in the scarp" and suggests the possibility that the Khargan is "that final degeneration of the local Levalloisian sequence" which "gave way before the higher intrusion," i.e., the Aterian. Because of its "progressive" character and the nature of its "secondary work" both Miss Caton-Thompson and Huzayyin are inclined to associate the Khargan with the Sebilian and to bracket the two industries together as a "southern group," distinct from the more conservative, or backward, cultures of northern Egypt. McBurney, on the other hand, points out that the distinctive secondary "work" of the "Khargan" implements "wears a singularly haphazard appearance," exhibits a multiple patination, and could, as in the case of other surface finds, have been produced by accidental or natural agencies over ex-

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tended periods of time. He is therefore inclined to place both the Khargan and the Levalloiso-Khargan "in a suspense account," conceding only "the survival into the final stage of major activity in the wadis of a well-characterized Levalloisian of small dimensions."

It was apparently during this phase of Kharga's prehistory that the oasis was invaded by a colony of desert dwellers who had migrated eastward from their homeland around the Atlas Mountains bringing with them the bow and arrow and a highly developed stone industry of Levalloiso-Mousterian type generally known as the Aterian after the type-site of Bir el Ater in southern Tunisia. Having passed through Cyrenaica, the Oasis of Siwa, and the Oasis of Dakhla, the intruders entered the Kharga depression near its extreme northwest corner, leaving examples of their remarkable tanged points on the surface near Ain el Amur, an uninviting region, avoided by other Paleolithic peoples less well versed than the Aterians in the art of desert living. Elsewhere the intrusive industry is widely distributed over the oasis, occurring *in situ* on the floor of the depression, at mound-spring KO 6E, and on the eastern scarp, at Site A of the Bulaq Pass, where, as we have seen, it overlies the local "Levalloiso-Khargan" industry. The eastward expansion of this relatively late phase of the Aterian culture does not seem to have extended much beyond the region of Kharga, Aterian implements being exceedingly rare in the Nile Valley, though a few have been picked up at scattered sites between Thebes and Asyut and near the Laqeita Wells, to the east of Qus. The industry in general is characterized not only by highly evolved methods of core preparation in the best Levalloisian tradition, but also by extraordinarily skillful secondary work, or trimming, reminiscent of the highest achievements of the Levalloiso-Mousterian of Palestine or the Mousterian of Europe. Using for the most part tabular chert the Aterian of Kharga shaped his thin, flat cores with great precision and from them produced his famous tanged and laurel-leaf points, large and expertly retouched end-scrapers, and magnificent bifacial spear-blades up to nine inches in length. The last, which are of elongated foliate form, were finished not only by shallow percussion scaling but also by fine marginal "pressure flaking," a recently developed technique in which small, carefully controlled flakes were detached from the edges of an implement simply by pressing against them the end or edge of a flaking tool of stone or, more frequently, of wood, bone, or horn. The great spearheads and the tanged javelin points, designed for efficient hafting to shafts of wood or reed, are accompanied, in the words of Miss Caton-Thompson, "by unmistakable arrow-heads of more than one sort," some provided with stem barbs or wings, "the certain criterion of a stone arrow-head." With the Gravettians and Upper Solutreans of Europe the Aterians may, then, lay claim to the discovery and earliest use of the bow and arrow, a weapon of far greater range and accuracy than the slings and bolas of the earlier Paleolithic peoples and one which endowed its inventors with an overwhelming superiority both in warfare and in hunting over their less ingenious contemporaries. There can, in any case, be little doubt that the Aterians were responsible for introducing this formidable arm into northeastern Africa, where it was to remain throughout the rest of prehistory and most of recorded history the principal weapon of the Egyptian warrior and huntsman. Moreover, in the Aterian foliates Miss Caton-Thompson is "tempted to see the origins of the Egyptian Neolithic

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and early Predynastic (Badarian) bifacial tools." Though they do not seem to have reached the Nile Valley itself in any numbers, it is clear that this vigorous and obviously highly intelligent people exerted a not inconsiderable influence on the future course of Egyptian civilization.

At Kharga their arrival brought to a premature end the development of the local diminutive Levalloisian tradition, the adherents of which appear to have emigrated or been driven from the oasis before their industry reached a microlithic or sub-microlithic stage. Moundspring KO 5B, in the Bellaida area, has produced a puzzling mixed industry of very small flakes and flake-blades, backed-blade transverse arrow-heads, and large tubular artifacts, which seems to be not directly related to either the "Khargan" or the Sebilian, but which, in theory, is what is needed "to bridge the transition from epi-Levalloisian to Microlithic culture groups." The next recorded industry in the Kharga succession, the so-called Bedouin Microlithic, belongs well down in post-Paleolithic times, having flourished in all probability during the interval of slightly increased rainfall known as the Neolithic Wet Phase.

Though blades, as we have seen, occur with some frequency among the flake-tools which are the dominant elements of Egypt's Late Paleolithic, or Epi-Levalloisian, industries, there is at present no positive evidence for the existence in the Egyptian area of a true blade industry before Final Paleolithic, or "Mesolithic," times. In such an industry the elongated flakes, or blades, are produced, usually from conical or cylindrical cores, with the aid of a wood or bone tool called a flaking punch, which is either struck with a mallet or operated by pressure. The end-scraper, the burin, and the blade, often "backed" for mounting in a wooden handle, are the prevailing forms, the last-named degenerating with time into the minute sections of blade known as microliths. Among the leading blade cultures of Upper Paleolithic times we may cite the Aurignacian of Europe and western Asia, the Capsian of southern Tunisia and Algeria, and the Oranian, or Ibero-Maurusian, of the North African coastal region from the Maghreb to Cyrenaica. Despite the assertions of a number of writers on Egyptian prehistory neither the Aurignacian nor the Capsian, *sensu stricto*, have yet been found in northeastern Africa. The industry of the Champ de Bagasse, near Nag Hammadi, identified by Vignard as Aurignacian, is probably Neolithic or Predynastic, the absence of pottery notwithstanding. Though the Capsian may at one time have crossed northernmost Egypt en route between Cyrenaica and the Levant, true Capsian tool types and techniques are not present in the existing Late or Final Paleolithic industries of the lower Nile Valley and the immediately adjoining desert areas. McBurney believes that the Earlier Oranian spread "eastward along the coast as far as Cyrenaica, . . . ultimately, perhaps, colonizing Lower Egypt"; but he points out, at the same time, that "no significant finds of blade-industry have yet been recorded" between Cyrenaica and the Nile Delta and notes in general "the absence of adequate surface collections from the coastal regions east and west of" the Delta.

What we find, then, in Late Paleolithic Egypt are chiefly Epi-Levalloisian flake industries "with restricted blade element," some of which, in northern Egypt, tend gradually to revert to a bifacial core-tool tradition of "pre-Neolithic" type. All (in the words of H. L. Movius) "developed along indigenous lines almost completely undisturbed by contemporary developments from outside the area except for the

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appearance of the Aterian in the Kharga oasis," and because, according to G. Caton-Thompson, "increasingly Nilotic in a specific sense . . ., untroubled by rival discoveries and inventions by eastern neighbours . . ." From their latest, or sub-microlithic, phases some of these industries, like the more or less contemporaneous Capsian and Oranian, seem to have passed gradually, and without a discernible gap, into the microlithic stage which in Egypt characterizes the so-called Final Paleolithic, or Mesolithic, cultures of late Glacial and post-Glacial times, the latter, in turn, continuing until "the onset of the Neolithic, or Late Stone Age, and the so-called 'rise of civilisation.'" Others, in the north, appear to have graded directly into the large bifacial tool tradition of the pre-Neolithic and Neolithic without passing through a Mesolithic stage. To Miss Caton-Thompson the regional differences in Egypt's Late Paleolithic industries reflect the disintegration of the country at this time into "district tribal groups," and in the existence of a southern and a northern group of cultures she discerns "the origins of Predynastic dyarchy and the beginnings of the strongly local flavour of the tribal and religious systems of pre-Menic civilisation."

By Late Paleolithic times *Homo sapiens*, or "Modern Man," moving into the area from western Asia and southwestern Europe, had ousted and replaced his Neanderthaloid predecessor throughout the greater part of northern and eastern Africa. In Cyrenaica, where he is associated with Upper Paleolithic blade industries, his advent can be dated to between 29,000 and 26,000 B.C. In Egypt his fossilized and waterworn remains have been found in the Sebilian silts of the Kom Ombo plain and, in association with gravel deposits of apparently similar date, near Qau el Kebir, in Middle Egypt. These remains, which comprise "portions of human skulls, jaws and other bones," have, upon examination by a number of eminent anatomists, proved to be "more akin to the predynastic Egyptian than to any other race of which we have full knowledge"—a fact striking not only because of the great span of time separating the Late Paleolithic from the earliest Predynastic, but also because it implies the existence at this early period of identifiable racial types, in this case a Hamitic or semi-Hamitic branch of the so-called Mediterranean Race. Elsewhere in North and East Africa more completely preserved skeletal remains attest the presence of tall, dolicocephalic men of non-negroid type, related to the Cro-Magnon people of Upper Paleolithic Europe and, like them, "often interred in a flexed position and sprinkled with red ochre."

At both Kom Ombo and Qau the bones of *Homo sapiens* were accompanied by those of the animals which he hunted and among which he lived. This interestingly varied fauna of both river-valley and marginal desert types included the cave hyena (*Hyaena crocuta*), the lion (*Felis leo*), the donkey (*Equus asinus*), the horse (*Equus caballus*), great quantities of hippopotami (*Hippopotamus amphibius*), the pig (*Sus* sp.), an early type of ox, now extinct (*Bos primigenius*), the long-horned African ox (*Bos Africanus*), the short-horned ox (*Bos brachyceros*), and another breed (*Bos* cf. *Laini*), two extinct species of buffalo (*Bubalus* nov. sp.* and *Bubalus vignardi*), a variety of hartebeest (*Bubalis buselaphus*) and a similar large antelope (*Bubalis* sp.), the Isabella gazelle (*Gazella isabella*), the ostrich (*Struthio* sp.), the Nile crocodile (*Crocodilus niloticus*) and a second species (*Crocodilus* nov. sp.), turtles (*Testudo* sp.), and several kinds of fish, including *Synodontis schall*, *Clarias anguillaris*, and *Clarias lazera*. The list as drawn

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up by Léonce Joleaud comprises also the camel (*Camelus* sp.), the deer (*Cervus* sp.), and a number of small rodents, and contains such variants as *Hippopotamus* (*Hexaprotodon*) cf. *sivalensis*, *Equus sivalensis*, *Crocodilus* (cf. *indicus*), *Sus* cf. *hysudricus*, *Bos* (*Bibos*), and *Emys* cf. *sivalensis*. Near el Sheikh Timai, between Asyut and Samalut, the blackened, mineralized, and water-worn bones of hippopotami, crocodiles, oxen (*Bos* sp.), and siluroid fish were found in gravels of Lower or Middle Sebilian date, accompanied by water-worn stone implements of Epi-Levalloisian types; and near Edfu the silt fifteen feet above the Middle Paleolithic level yielded the remains of *Hippopotamus*, *Equus* sp., *Bos* sp., siluroid fish, and the dermal plates of a crocodile. Fauna from silt deposits southwest of Wadi Halfa includes "*Equus* sp., a gigantic hippopotamus, a deer, and an antelope." The Nubian and Upper Egyptian silts and the Sebilian kitchen middens also contained, as we have seen, innumerable shells of edible, fresh-water mollusks: *Unio willcocksi*, *Unio* (*Caelatura*) *nilotica*, *Nodularia* (*caelatura*) *nilotica*, *Viviparus unicolor*, *Corbicula consobrina artini*, *Cleopatra bulimoides*, and the so-called Nile "oyster," *Aetheria elliptica*. At Qau the only shell found was that of *Aetheria elliptica*. Butzer characterizes this fauna as of "gallery-woodland" or "levee-woodland" type—"forest and marsh animals with some species which are more likely to be encountered on the edge of the desert"—and Professor D. M. S. Watson describes some of the mammals from Qau as "northern forms of southern and central African types."

Confined by similar climatic conditions to those areas where water is still found today—the banks of the river and its backwaters, the shores of the Fayum lake, the springs and scarp ravines of the oases —the Late Paleolithic inhabitants of Egypt, like their European contemporaries, the Aurignacians and the Magdalenians, formed a less nomadic, more settled population than had the far-ranging hunting bands of the Lower and Middle Old Stone Age. Their habitation sites in the Kom Ombo basin, with their large clay-walled hearths, heavy stone mills, and towering mounds of food refuse give evidence of prolonged and continuous occupation by sizeable communities of people and constitute logical forerunners of the permanent settlements of Neolithic times. On these sites the growth and development of new industries is attested by the number and variety of new and highly specialized types of small tools, including, perhaps, in the pointed bone implements of the Upper Sebilian level, tools for making tools. Unlike the more or less contemporaneous cave dwellings of France, Spain, and Italy, however, the open camps of Egypt's Late Paleolithic people have preserved no paintings or reliefs nor any of the small works of sculpture and decorative art carved of bone, tusk, or antler for which the Upper Paleolithic cultures of Europe are deservedly famous. Their failure to develop an effective graving tool, or burin, suggests that they did not, in fact, work in bone, ivory, or horn to any notable extent. It is possible that the mere struggle for existence of these hunting and food-gathering communities in a land where a deteriorating climate was making the wild fauna and flora increasingly sparse left them little or no leisure for the development of the arts or any but the simplest of the crafts. The fact that they were able to survive at all is attributable in part to marked advances in their hunting techniques and hunting weapons, which included by Upper Epi-Levalloisian times the bow and the stone-tipped arrow, and

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in part to other improvements in methods of food-gathering and food preparation, such as the use of the stone-edged sickle for harvesting wild-growing cereal grasses or other edible plants and of sandstone mills for converting the grain into flour. That such mills were used also for grinding red ochre and other mineral pigments suggests that, like other Upper Paleolithic peoples, the Egyptians of this time were in the habit of painting their bodies and perhaps their faces either for adornment or, more likely, to indicate their tribe, affiliation, sex, or social status. In the colored pebbles and pierced shells of the Upper Sebilian kitchen middens we may perhaps recognize a primitive form of jewelry and in the presence in these middens of bits of Red Sea coral the beginnings of trade with adjoining areas. Unfortunately, none of the many rock drawings which flank the desert trails to the east and west of the Nile Valley can with any assurance be assigned to this period, few if any of them being pre-Neolithic in date. No burials have been preserved and, as we have already noted, there are no traces on any of the Egyptian sites of this time of pottery vessels or ground and polished stone implements. Food production through agriculture and the domestication and breeding of animals was apparently as yet undreamed of. As elsewhere, the Late Paleolithic inhabitants of the Kom Ombo basin, the Libyan oases, the Fayum, and the fringes of the Delta lived in a state which has been described as "the higher savagery," a stage transitional between the nomadic "lower savagery" of earlier Paleolithic times and the sedentary "barbarism" of the Neolithic period. Lest it be felt that "savagery" is too strong a word to apply to groups of people at this stage of development, it should be pointed out that the presence of human bones among the remains of game animals and fish in the Sebilian refuse heaps suggests that cannibalism was among their less attractive and less progressive institutions.

Since the neanthropic colonizers of northeastern Africa did not bring with them from their homeland in western Asia one of the characteristically Upper Paleolithic blade industries, but simply adopted and maintained, with some alterations and additions, a local Middle Paleolithic tradition of tool making, it would appear that their immigration into the Egyptian area must have taken place before Upper Paleolithic times. In this connection it is interesting to note the discovery at Singa on the Blue Nile of a "primitive *sapiens*-like skull apparently associated with Levalloisoid industrial material." Following their establishment in the Nile Valley and the oases the newcomers evidently lost touch with neighboring areas of the Near East and remained largely unaffected by the significant cultural developments which were taking place in these areas. Until Final Paleolithic times their own cultural evolution, as we have seen, was to a great extent independent, indigenous, and determined, not by foreign influences, but by changing natural conditions within the boundaries of the land itself, such as the steady encroachment of the desert on the already narrow strips of habitable land, the gradual decline in the vegetation, and the decrease in the quantity, character, and size of the wild fauna. To Miss Caton-Thompson Egypt at this period provides "instances of the capacity of a specific Stone Age industry to transform itself" without outside human influence "into something totally different." To Vaufrey, on the other hand, "the cultures of the Egyptian Upper Paleolithic are, like those of the Maghreb, delayed cultures displaying the characteristics of long lasting survivals"; and to Grahame Clark Upper Paleolithic Africa as a whole

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appears as "something of a backwater, where cultures of Middle Paleolithic origin continued to develop, throwing off variants like the Aterian and Sebilian, . . . inspired, it may be, to a greater or lesser degree by neoanthropic influences." The most striking of the Late Paleolithic trends in Egypt —and on this there is no disagreement— was the emergence of clearly differentiated regional cultures associated with geographically definable division of the country: Upper Egypt and Nubia, the Fayum and northern Egypt, and Middle Egypt and the Libyan oases; for herein lie, without doubt, the origins of the local cultural, religious, and, eventually, political units which throughout most of her subsequent history so deeply influenced the course of Egypt's development.

5. The Final Paleolithic, or Mesolithic, Stage

In Egypt the stage of cultural development which corresponded in a general way to the so-called Mesolithic, or Middle Stone Age, of other portions of the ancient world began about 10,000 B.C.—toward the end of the glacial period—and extended, in some localities, well down into Neolithic and even post-Neolithic times. As in Europe, it witnessed a dwindling population of "terminal food-gatherers" struggling to sustain itself in a natural environment no longer suited to this fundamentally parasitic mode of existence. Despite an interval of slightly increased rainfall extending from about 9500 to about 8500 B.C. and corresponding to the final re-advance of the disappearing Würm glaciers, northeast Africa was now largely desert, abandoned by the larger plains animals; and the hapless Nilot was reduced to subsisting chiefly on small game, wildfowl, fish, mollusks, and the scanty plant life which still survived in the much reduced habitable areas along the edges of the river and other remaining bodies of water. Like his European contemporaries he had probably reverted to a migratory existence, moving frequently from one place to another in search of food. He was fortunate, however, in possessing the bow and arrow and probably by this time that most expert of hunting companions, the dog, the domestication or semi-domestication of which is well attested on Mesolithic sites elsewhere in the world.

The type and size of quarry hunted by the Egyptian of late glacial and early postglacial times, his other sources of livelihood, his nomadic habits, and, indeed, the whole mode and pattern of his life are reflected in his stone implements, the more typical of which are microliths evidently used as points, cutting edges, or barbs in composite tools and weapons made chiefly of wood, bone, or horn. As in the Upper Capsian and Oranian of northern and northwestern Africa these miniature points and blades are likely to be mingled, on the same sites, with larger implements of Neolithic form and technique.

This is the case with the best known of Egypt's mesolithic industries, that of Helwan, on the east side of the Nile some sixteen miles south of Cairo. Here, in the plain between the river and the town of Helwan, Dr. Wilhelm Reil in 1871 discovered the first of a series of surface stations, or camps, containing for the most part minute blades of both irregular and sub-geometric forms, some showing little or no retouch, others with deliberately blunted backs or ends. Among the more characteristic geometrical shapes, which include trapezes and triangles, are slender lunates, or segments of circles, their curved backs blunted for mounting (as arrow barbs?), their cutting edges straight and sharp. Sickle blades with serrated edges occur in some quantity as do also

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minute implements made from the "waste" (*déchets de taille*) of the geometric forms and identified by Debono as microburins, or miniature graving tools, a typical mesolithic form which, however, happens to be extremely rare on most of the Egyptian sites so far explored. Some of these microliths show affiliations with the terminal Upper Paleolithic, or Epi-Levallosian, of the region. Associated with them on a station now covered by the rapidly expanding town of Helwan was found a distinctive type of elongated bifacial arrowhead of decidedly Neolithic aspect, provided near the base with a pair of deep, skillfully formed lateral notches, evidently for the lashing by means of which the long, graceful point was attached to its shaft. Since this type of point has not been found on other Egyptian sites it has come to be known as "the Helwan arrowhead." It occurs, however, in the Mesolithic of nearby Palestine, the so-called Natufian, together with bifacially trimmed microliths and other forms which seem to link the two industries and which in both areas survived into Neolithic times. J. de Morgan and D. A. E. Garrod are inclined to attribute the Helwan industry to immigrants from Palestine. S. A. Huzayyin concedes the resemblance between the two industries, but points out that the Natufian of Palestine "was somewhat more specialized" and tends to favor "a spreading from Egypt into Palestine." Since, however, it is difficult to derive the industry of Helwan directly from the Diminutive Levalloisian of northern Egypt and since it differs in a number of important respects from the Capsian of North Africa and the Sebilian of southern Upper Egypt, we would seem to be left with no choice but to regard it, with Garrod, de Morgan, McBurney, and others, as—in part at least—an importation from southwestern Asia.

As in the Kom Ombo plain some of the Final Paleolithic and Mesolithic camp sites near Helwan are marked by kitchen middens, or refuse heaps, made up chiefly of ashes, flint implements, and animal bones, among which have been recognized those of a pig and of a horse-like quadruped. No pottery vessels were found, but in their stead these pre-Neolithic hunters and fishermen used as containers and cookpots the shells of ostrich eggs, many of which were charred from the heat of the cooking fires. Like their Natufian contemporaries the Helwan people wore jewelry made up of strings of marine shells, pierced or trimmed for the purpose, the favorite type being the tubular *Dentalium*, or tooth-shell.

Similar camps with comparable stone industries of apparently both Upper Paleolithic and Mesolithic age have been noted by Debono in the neighborhood of the Laqeita Wells, in the desert to the east of Qus in Upper Egypt. Here the implement types included, according to their discoverer, both burins and microburins, sickle flints, tanged arrowheads of seemingly Aterian ancestry, plain and retouched blades and bladelets of various geometric forms, and the cores from which they were struck. Hearths were found and, near them, beads and receptacles of ostrich eggshell, the last, as at Helwan, often blackened by fire. Groups of microliths from the vicinity of Aswan and from the depression of Ain Dalla in the Libyan Desert, where they were associated with small hearths and fragments of ostrich eggshell, are said by P. Bovier-Lapierre to resemble closely those of Helwan.

Microlithic implements from a site immediately north of Helwan—now usually called "el-Omari" in honor of its discoverer—from the Wadi Angabiya, on the Suez Road, sixteen miles east-northeast of Cairo, and from the Fayum lake basin show similarities with those of Helwan and, being in all instances surface

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finds, are similarly difficult to date. Like the Helwan sub-facies these other northern industries persisted into the late Neolithic or post-Neolithic cultural phase without, in the words of Huzayyin, becoming "overwhelmed by the contemporary and more advanced culture." They are characterized by small blades, either simple or "backed," and by the absence of burins, microburins, and true geometric forms of Capsian type. In the Wadi Angabiya the shapes include lunates and elongated triangles and, in the Fayum, single-backed shanked, or tanged, blades and blade-points, and slender little trihedral rods, pointed at both ends. Far off to the west, near the border of Libya, the oasis of Siwa has yielded microlithic, or semi-microlithic, implements of comparable type and date, among which long backed blades and elongated triangles tend to predominate.

Of the more or less contemporaneous cultures of the northeastern African region in general the most remarkable and most completely preserved is the Mesolithic of Khartoum in the Republic of the Sudan. Here were found the riverside settlements of a negroid fishing people whose industries included the production of multi-barbed bone harpoons and decorated pottery vessels and among whose microlithic stone implements are chisel-shaped arrowheads of a type favored by the Egyptians of Neolithic and later times.

A comparison of the groups of implements from northern Egypt with the already discussed microlithic and, in part at least, Mesolithic industries of the Kom Ombo basin ("Sebilian III"), the oasis of Kharga, and the adjacent portions of the Upper Egyptian Nile Valley discloses, if anything, an even more pronounced "regionalism" than was apparent during the preceding stages of the Late Paleolithic era. At Sebil the microlithic facies appears to have developed more or less directly out of the local Epi-Levalloisian flake tradition. At Kharga this tradition was cut short by the Aterian invasion, and the somewhat belated microlithic industries of the area, though evidently also of Levalloisian ancestry, are distinct in many details from their counterpart in the Kom Ombo basin. In the north affiliations with the Egypto-Levalloisian flake-tool tradition can still be recognized, but the closest association of the partly microlithic and partly pre-Neolithic cultures of the region was, as we have seen, with the Mesolithic of Palestine, whence, indeed, at least one of the interrelated industries, that of Helwan, may have been brought into the country by "a final wave of hunters from the Levant."

The Mesolithic population of Egypt seems, then, to have comprised a number of different groups or tribes of semi-nomadic fisher-folk and hunters, each of which tended to confine its activities to an individual section of the land and did not under normal circumstances come into prolonged or frequent contact with the other groups. Within the general confines of their own territories, however, all the groups seem to have moved about freely in search of game and other sources of food, everything which has survived of their material equipment, from their light, composite tools to their ostrich-egg containers and cooking vessels, being of either a disposable or readily portable nature. Despite the hardships and precariousness of their existence these relics of the Old Stone Age survived the stretch of extreme aridity which marked the post-pluvial stages of Egypt's climatic history and were still present in the Egyptian area long after the advent of the so-called Neolithic Wet Phase, or Subpluvial, had brought into the land a new and sedentary population of herdsmen and farmers. By 5000 B.C., however, it has been estimated

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that the total population of the Egyptian Nile Valley and Delta had dropped to one thousand; and it is believed that when Neolithic man first reached the newly re-established Fayum lake he found its shores uninhabited. While it serves to bridge the chronological "gap between the end of the Palaeolithic and the rise of civilisation," in no sense does the Mesolithic phase in Egypt or elsewhere constitute a stage of transition from the Old to the New Stone Age; but, rather, the prolongation of an essentially Paleolithic mode of life and industrial tradition into a new cultural milieu of quite a different nature and origin. The co-existence of the two traditions, however, was not without its lasting effect, for, as Butzer has pointed out, the Egyptian civilisation was the "product of a fruitful contact between an endemic Final Palaeolithic hunting and fishing folk on the one hand, and new cultural and ethnic groups originating from the area of the Fertile Crescent on the other." Furthermore, though the use of microliths "tended to become more extensive during the Final Palaeolithic (or Mesolithic) stage," they are by no means confined to this era, recurring frequently in Egypt from Upper Paleolithic times well down into the New Kingdom, when we find them still being employed as the points and barbs of hunting arrows.

It is tempting to identify the late survivors of the Mesolithic hunting bands with the authors of the oldest series of rock drawings preserved to us on the cliffs edging the Nile Valley and along the desert trails of southern Upper Egypt and Lower Nubia. The people in question, Winkler's "Earliest Hunters," Caton-Thompson's "Bedouin Microlithic" folk, lived apparently during the Neolithic or early Predynastic ("Amratian") stage of Egyptian prehistory. Their crude pictures, usually hammered out, but sometimes also incised with a pointed tool, on the surfaces of the desert rocks, have been recorded at several places in the Eastern Desert in the vicinity of the Laqeita Wells, at five sites on the west side of the Nile between Hosh and Aswan, in the Libyan Desert sixteen miles west of Naqada, and at three points along the desert track between the Libyan oases of Kharga and Dakhla. The naked hunters portrayed in these drawings are equipped with large, C-shaped bows and elaborately fletched arrows with broad, probably poisoned points, which, for lack of quivers, they sometimes carry stuck into their evidently long, thick hair. For capturing and killing the giraffe use was also made of the lasso and a mace with a heavy circular head. Some of the figures wear feathers in their hair and the heads of others are surmounted by curious horizontal wavy lines. Occasionally the huntsmen are accompanied by large dogs, in one instance held on a leash. In the spasmodically rainswept hills to the east of the Nile the favorite quarry is the African elephant, while on the more barren plains to the west the giraffe, less demanding in its need for food and water, is the animal most frequently represented. Other beasts encountered in these drawings are the antelope, the gazelle, the ibex, the barbary sheep, the ostrich, a wolf-like animal, a lizard, a snake, a bird with four claws, and the crocodile, the prevalence and evident importance of the last-named indicating a people of riverain origin and affinities. Large rectangular objects have been thought to be game-nets and heart-shaped enclosures may well be fish-traps. A belief in magic as a means of achieving success in hunting is reflected in the frequent representation of the tracks of animals and of their entrails, or "spirits," in the form of spirals issuing from their mouths, such pictures presumably giving the hunters "control" over their prey in

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accordance with a familiar primitive tenet. Parts of animals, such as the bushy tails of giraffes, depicted in exaggerated detail, may have been used as amulets or ornaments. A group of eight men surrounding a larger man apparently wearing an animal mask has been interpreted as a magical dance, the central masked figure, in any case, recalling the well-known Magdalenian "sorcerer" of a painted engraving in the cave of the Trois Frères at Ariège in France. The adoption by the Earliest Hunters of a pregnant female deity (?) found chiefly in the drawings of Winkler's "Early Oasis Dwellers" (Caton-Thompson's "Peasant Neolithic" people) may reflect the type of religious tolerance and hospitality toward "foreign" divinities which characterizes the Egyptians of later times and, with other bits of evidence, speaks for the existence of a close and friendly relationship between the nomadic hunting folk and the more settled peasant population of this formative period. Regrettably, not much can be said for the former's artistic achievements. Unlike some of the spirited, naturalistic, and admirably executed engravings and paintings of the western and southern fringes of the Sahara, these earliest Egyptian drawings are coarse, crudely schematized, and lacking in detail. In the words of Winkler, they seem to have been produced by a people "devoid of any artistic sense"; while McBurney finds them "suggestive of an impoverished marginal tradition far removed from the main centre of development."

NOTES

CHAPTER II

General

At present the most extensive and detailed accounts of Paleolithic Man in the Nile Valley are those provided by K. S. Sandford and W. J. Arkell in the four volumes of their *Prehistoric Survey of Egypt and Western Asia* (Chicago, 1929–1939). Here the treatment is regional, starting with the *Nile-Faiyum Divide* ("OIP," Vol. X) and proceeding thence to *Nubia and Upper Egypt* ("OIP," Vol. XVII), *Upper and Middle Egypt* ("OIP," Vol. XVIII), and *Lower Egypt* ("OIP," Vol. XLVI). Brief but valuable discussions of the subject, with important re-assessments and re-interpretations of the material, have more recently appeared in S. A. Huzayyin's *The Place of Egypt in Prehistory* (Cairo, 1941). See pp. 151 ff., 164–65, 181–94, 221–23, 225–26, 251–64) and in such general books on African prehistory as L. S. B. Leakey's *Stone Age Africa* (London, 1936), pp. 114–20; H. Alimen's *The Prehistory of Africa* (London, 1957), pp. 77–103; and C. B. M. McBurney's *The Stone Age of Northern Africa* (Harmondsworth, 1960), pp. 121–28, 135–62. Useful compilations of the material, with particular accent on the work of the French prehistorians in Egypt, are provided by P. Bovier-Lapierre, "L'Égypte préhistorique" (*Précis de l'histoire d'Égypte*, I [Cairo, 1932], pp. 6 ff.; R. Cottevieille-Giraudet, "L'Égypte avant l'histoire. Paléolithique-Néolithique-Âges du Cuivre," *BIFAO*, XXXIII (1933), 16–36, 42, 46; O. Menghin, "The Stone Ages of North Africa with Special Reference to Egypt," *Bull. Soc. roy. Géogr. d'Égypte*, XVIII (1934), 9–15; É. Massoulard, *Préhistoire et protohistoire d'Égypte* (*Travaux et mémoires de l'Institut d'ethnologie* [Université de Paris], LIII [Paris, 1949]), pp. 1–27; and J. Vandier, *Manuel d'archéologie égyptienne*, I (Paris, 1952), 25–61. See also A. Scharff, *Grundzüge der aegyptischen Vorgeschichte* (*Morgenland*, Heft 12 [Leipzig, 1927]), pp. 10–15; *Die Altertümer der Vor- und Frühzeit Ägyptens* (*Staatliche Museen zu Berlin, Mitteilungen aus der ägyptischen Sammlung*, IV, 1 [Berlin, 1931]), pp. 1–7, Pl. 1.

Among the more significant of the earlier works on the Paleolithic period in Egypt are those of such pioneers in the field of Egyptian prehistory as Godefroy Arcelin (1869), Ernest Hamy and François Lenormant (1869) (See Keldani, *Bibliography*, Nos. 98–101, 1182–87); Augustus Pitt-Rivers ("On

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the Discovery of Chert Implements in Stratified Gravel in the Nile Valley, near Thebes," *Journal of the Royal Anthropological Institute*, XII [1882], 382–400); Haynes, "Discovery of Palaeolithic Flint implements in Upper Egypt," *Memoires of the American Academy of Arts and Sciences* (Cambridge, Mass.), I, Part 2 (1882), pp. 357–61; Jacques de Morgan (*Recherches sur les origines de l'Egypte*, I [1896], 47–66); Georg Schweinfurth ("Kiesel-Artefacte in der diluvialen Schotter-Terrasse und auf den Plateau-Höhen von Theben," *Zeitschrift für Ethnologie*, XXXIV [1902], 293–310; "Steinzeitliche Forschungen in Oberägypten," *ibid.*, XXXV [1903], 799–822; XXXVI [1904], 766–830 [devoted chiefly to the so-called "eoliths"]; XLIV [1912], 627–58); Max Blanckenhorn ("Die Geschichte des Nil-Stroms . . . sowie des paläolithischen Menschen in Ägypten," *Zeitschrift der Gesellschaft für Erdkunde zu Berlin*, XXXVII [1902], 694–722, 753–62; *Die Steinzeit Palästina-Syriens und Nordafrikas*. [*Land d. Bible*, III Leipzig, 1921]); Charles Currelly (*Stone Implements* [*CCG*, Nos. 63001–64906] Cairo, 1913); and Charles Seligman ("The Older Palaeolithic Age in Egypt," *Journal of the Royal Anthropological Institute*, LI [1921], 115–53).

The materials and techniques employed by the Paleolithic toolmakers are described in detail by Jacques Bordaz, "First Tools of Mankind," *Natural History Magazine* (New York), January, 1959, pp. 36–51; by K. P. Oakley, *Man the Tool-Maker* (London, 1950), pp. 5–49; by H. L. Movius, "The Old Stone Age" (in H. Shapiro, *Man, Culture, and Society* [New York, 1956], pp. 49–93), pp. 52 ff.; and by C. B. M. McBurney, *The Stone Age of Northern Africa*, pp. 26–30, 130–32. See also A. J. Arkell, "The Sudan. Archaeology and Excavation," *The Archaeological News Letter*, Vol. II, No. 8 (January, 1950), pp. 124 ff.

Out of the rich general literature on the Old Stone Age and succeeding periods of world prehistory the following books were consulted in the preparation of this chapter: G. G. MacCurdy, *Human Origins: A Manual of Prehistory* (2 vols. New York and London, 1924), Vol. I; W. J. Sollas, *Ancient Hunters and their Modern Representatives* (3d ed. [London, 1924]); O. Menghin, *Weltgeschichte der Steinzeit* (Vienna, 1931), pp. 87–135; M. C. Burkitt, *The Old Stone Age. A Study of Palaeolithic Times* (Cambridge, 1933), pp. 7–113 *passim*; V. G. Childe, *Man Makes Himself* (*Library of Science and Culture*, No. 5 [London, 1936]), pp. 9–72; *What Happened in History* (Pelican Books, A 108 [Harmondsworth, 1942]), pp. 23–47; W. B. Wright, *Tools and the Man* (London, 1939), pp. 8–195 *passim*; R. Turner, *The Great Cultural Traditions. The Foundations of Civilization*, I (New York and London, 1941), 22–26; G. Clark, *From Savagery to Civilization* (London, 1946), pp. 26–68; R. J. Braidwood, *Prehistoric Men* (*Chicago Natural History Museum, Popular Series*, No. 37. 2d ed. [Chicago, 1951]), pp. 19–61; H. Shapiro (ed.), *Man, Culture, and Society* (New York, 1956), Chaps. I–III, VII; C. S. Coon, *The Races of Europe* (New York, 1939), pp. 16–55; *The Story of Man* (New York, 1958), pp. 9–113 *passim*; M. Ebert (ed.), *Reallexikon der Vorgeschichte* (15 vols. [1924–1932]).

Also consulted was a series of articles of more general scope which appeared in the *Scientific American* for September 1960, under the title "The Human Species" and which include E. S. Deevey, Jr.'s "The Human Population"; C. D. Hockett's "The Origin of Speech"; M. D. Sahlin's "The Origin of Society"; and S. L. Washburn's "Tools and Human Evolution."

To the bibliographies of E. H. Keldani and S. A. Huzayyin cited in the notes to Chapter I may now be added: H. L. Movius, *Recent Publications, Mainly in Old World Paleolithic Archaeology and Paleo-Anthropology* (*American School of Prehistoric Research, Old World Bibliography*), 1948–1956 (mimeographed); and C. Bachatly, *Bibliographie de la préhistoire égyptienne (1869–1938)* (*Publications de la Société royale de Géographie*), Cairo, 1942. Recent publications, chiefly in the field of anthropology and related subjects, are listed two or three times a year in the *Anthropologischer Anzeiger: Bericht über die biologisch-anthropologische Literatur*, edited

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in recent years by W. Gieseler and E. Breitinger and published in Stuttgart, Germany.

1. The "Abbevillians"

The European type-sites of Abbeville, Chelles, and Clacton-on-Sea are situated, respectively, on the lower Somme, the Marne near Paris, and the Thames estuary. The sites themselves and the classes of implements found on them have been studied and discussed by Boucher de Perthes in his epoch-making *Antiquités celtiques et antidiluviennes* (Paris, 1847), and the Abbé (H.) Breuil in a series of important articles, including "Le vrai niveau de l'industrie abbevillienne de la Porte du Bois (Abbeville)," *L'Anthropologie*, XLIX (1939), 13–34; "Le gisement de Chelles; see phénomènes, ses industries," *Quartär*, II (1939), 1–21; and "Les industries à éclats du palèolithique ancien. I. Le Clactonien," *Préhistoire*, I (1932), 125–90. See also Zeuner, *Dating the Past*, pp. 166 ff.; Movius, "The Old Stone Age" (Shapiro, *Man, Culture, and Society*, Chap. III), pp. 55–59; Wright, *Tools and the Man*, pp. 8–9, 38–45, 87 ff.; H. Obermaier, *Der Mensch der Vorzeit* (*Der Mensch aller Zeit*, I. Berlin-Munich [1912]), pp. 113–22, 149; Sollas, *Ancient Hunters*, pp. 68 ff.; McBurney, *Stone Age of Northern Africa*, pp. 27–30; Huzayyin, *Place of Egypt*, pp. 166 ff.; etc.

On the numerous sites in Africa and southwestern Asia which have yielded industries of Abbevillian ("Pre-Chellean" and "Chellean") and Clactonian type see especially: A. J. Arkell, *The Old Stone Age in the Anglo-Egyptian Sudan* (*Sudan Antiquities Service, Occasional Papers*, No. 1), Khartoum, 1949; "The Sudan. Archaeology and Excavation," *The Archaeological News Letter*, Vol. II, No. 8 (Jan., 1950), pp. 124–28; L. Balout, *Préhistoire de l'Afrique du Nord*, Part II, Chap. VI (pp. 159–268); McBurney, *Stone Age of Northern Africa*, pp. 88–128 *passim*; S. Cole, *The Prehistory of East Africa* (Pelican Books, A 316 [Harmondsworth, 1954]), pp. 121–48; Alimen, *Prehistory of Africa*, see Index (p. 431) under "Chellean," "Clactonian," and "Clactonian-Abbevillian" and cf. pp. 12, 35; Leakey, *Stone Age Africa*, pp. 22, 26, 41 ff., 47, 100 ff., 104, 115 ff., 121 ff., 181 ff.; H. Fleisch, "Dépôts préhistoriques de la côte libanaise et leur place dans la chronologie basée sur le Quaternaire marin," *Quaternaria*, III (1956), 101–32; and K. W. Butzer, *Quaternary Stratigraphy . . . in the Near East*, p. 97 and Table II. The Kafuan and Oldowan industries (named for the Kafu valley in Uganda and the Olduvai [Oldoway] gorge in northern Tanganyika) are discussed and their distribution indicated by Alimen, *Prehistory of Africa*, pp. 210 ff., 433, 436, and by Cole, *Prehistory of East Africa*, pp. 125 ff., 131 ff., 298, 300. See also Säve-Söderbergh, "Preliminary Report of the Scandinavian Joint Expedition: Archaeological Survey between Faras and Gamai, January–March, 1961," *Kush* X 1962), 84–85.

Descriptions, drawings, and photographs of the Abbevillian and Clactonian implements of the 100-foot Nile gravels will be found in Sandford and Arkell, *Prehistoric Survey*, I, 29–31, figs. 8–9; II, 26, 29–31, 72–75, 86, Plates XIII–XIX; III, 110–12, 126, Plates XV–XIX; IV, pp. 89–91, Plates XVII, XVIII; in Huzayyin, *Place of Egypt*, pp. 181–94, Plates VI–VIII; in Massoulard, *Préhistoire . . . d'Égypte*, pp. 1–10; and in Alimen, *Prehistory of Africa*, pp. 88–90, fig. 35. On the re-deposited lower gravels of the Rus Channel and the rolled Abbevillian implements contained in them see Sandford and Arkell, *Prehistoric Survey*, I, 28–31, and Butzer, *Erdkunde*, XIII (1959), 52–53; and on those of the ballast-pits of the plain of Abbassiya: P. Bovier-Lapierre, "Le Paléolithique stratifié des environs du Caire," *L'Anthropologie*, XXXV (1925), 37–46; "Les gisements paléolithiques de la plaine de l'Abassieh," *BIE*, n.s. VIII (1926), 257–72; Sandford and Arkell, *Prehistoric Survey*, I, 29; II, 14, 28, 73; III, 42, 55, 110; IV, *passim* (especially p. 95); Huzayyin, *Place of Egypt*, pp. 182–85, 192; Butzer, *Erdkunde*, XIII, 49–51; Alimen, *Prehistory*, pp. 80–81; McBurney, *Stone Age*, pp. 125–26.

The distribution and nature of the surface finds of early Lower Paleolithic implements

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in the Egyptian area are recorded in the "earlier works" cited above, in the *General* notes, and by P. Bovier-Lapierre, "Stations préhistoriques des environs du Caire," *Congrès International de Géographie, Compte rendu*, IV (Cairo, 1926), 298–308 (see 301–308); "Industries préhistoriques dans l'île d'Éléphantine et aux environs d'Assouan," *BIE*, XVI (1934), 115–31; "Les explorations de S. A. S. le Prince Kemal el Din Hussein: Contribution à la préhistoire du désert libyque," *BIE*, X (1929), 33–44 (see pp. 38–39); "Récentes explorations de S. A. S. le Prince Kemal el-Din Hussein dans le désert libyque: Contribution à la préhistoire," *BIE*, XII (1930), 121–28 (see p. 125); "L'Égypte préhistorique" (*Précis de l'histoire d'Égypte*, I, 1–50), pp. 22–25; S. Schott, E. Neuffer, K. Bittel, "Bericht über die zweite . . . nach Ostdelta-Rand und in das Wadi Ṭumilât unternommene Erkundungsfahrt," *MDIK*, II (1931), 39–73 (see pp. 45 ff.); E. Vignard, "Stations paléolithiques de la carrière d'Abou el-Nour près de Nag-Hamadi (Haute Égypte)," *BIFAO*, XX (1922), 89–109 (see pp. 92 ff.); Sandford and Arkell, *Prehistoric Survey*, II, 30; IV, 90; F. Dobono, "Expédition archéologique royale au désert oriental (Keft-Kosseir)," *ASAE*, LI (1951), 59–110 (see 60–61); R. Cottevieille-Giraudet, "L'Égypte avant l'histoire," *BIFAO*, XXXIII (1933), 1–168 (see figs. 26 and 29); J. Vandier, *Manuel d'archéologie égyptienne*, I, 27–33; Massoulard, *Préhistoire . . . d'Égypte*, p. 9; MacCurdy, *Human Origins*, I, 124–29; Ebert, *Reallexikon*, I, 48.

The possibility of some of the early hand-axes having been hafted is discussed by Sandford and Arkell, *Prehistoric Survey*, III, 111; and the techniques which produced the Abbevillian and Clactonian implements are described by the same authors, *op. cit.*, Vol. II, pp. 72–75; III, 110–12; IV, 89–91; by J. Bordaz, *Natural History* (*Magazine*), January, 1959, pp. 38–42; by Oakley, *Man the Tool-maker*, pp. 23 ff., 40 ff., 48 ff.; Burkitt, *The Old Stone Age*, pp. 33 ff., 110–13; McBurney, *Stone Age of Northern Africa*, pp. 26–27, 30, 130–32; and Arkell, *Archaeological News Letter*, II, No. 8, p. 124.

The largest group of Egyptian "eoliths" is published by G. Schweinfurth, "Steinzeitliche Forschungen in Oberägypten," *Zeitschrift für Ethnologie*, XXXVI (1904), 766–825. The problem of the eoliths has been discussed by many writers, including Sandford and Arkell, *Prehistoric Survey*, II, 15–16; Bovier-Lapierre, *L'Anthropologie*, XXXV (1925), 39; *BIE*, VIII (1926), 265; Braidwood, *Prehistoric Men*, pp. 37–38; Burkitt, *The Old Stone Age*, pp. 99–109; MacCurdy, *Human Origins*, I, 25, 86–102; Menghin, *Weltgeschichte der Steinzeit*, pp. 88–89; Movius, "The Old Stone Age," p. 51; Oakley, *Man the Tool-maker*, pp. 5–10; Obermaier, *Der Mensch der Vorzeit*, pp. 383–84; Sollas, *Ancient Hunters*, pp. 68–106 *passim*; Huzayyin, *Place of Egypt*, pp. 164–65; C. H. Read, in *The Encyclopaedia Britannica* (11th ed.), II, 344–45. See also Ebert, *Reallexikon*, III, 99–107.

The so-called "Chellean Man" of the Olduvai gorge deposits of Tanganyika has been the subject of a preliminary report by L. S. B. Leakey in *The Illustrated London News* for March 4, 1961 (No. 6344, Vol. 238), pp. 335, 347–48 ("New Links in the Chain of Human Evolution: Three Major Discoveries from the Olduvai Gorge, Tanganyika"). See also Leakey in *ILN* for June 28, 1958; and the *National Geographic Magazine* for October 1961, pp. 576 ff. Also Leakey in *Nature* CLXXXIX, 649 (1961); *National Geographic* CXXIII, 132 (1963) and *The Progress and Evolution of Man in Africa* (Oxford University Press [1962]); G. H. Curtis and J. F. Everden, *Nature* CLXXXXIV, 610 (1962); R. L. Hay, "Stratigraphy of Beds I through IV, Olduvai Gorge, Tanganyika," *Science*, CXXXIX, No. 3557 (1963), pp. 829–33. The skull of this man, which Leakey compares not only with that of Java Man and Peking Man, but also with the Steinheim skull and the Broken Hill skull of Rhodesia, was found at "Site LLK II" in Chellean Stage 3 of Bed II. The Chelleo-Acheulian man of Rabat in Morocco is discussed by Alimen, *Prehistory of Africa*, pp. 329–30 (see also the bibliography, p. 350, under Marçais, J., and Vallois, H.); by McBurney,

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Stone Age of Northern Africa, p. 118; and by Balout, *Préhistoire de l'Afrique du Nord*, pp. 202–208.

The life and activities of Lower Paleolithic Man have been convincingly reconstructed for us by a number of prehistorians, among whom may be cited H. Obermaier, *Der Mensch der Vorzeit* (1912), pp. 418 ff.; W. J. Sollas, *Ancient Hunters* (1924), pp. 107–39; M. C. Burkitt, *The Old Stone Age* (1933), pp. 7 ff., 33, 54; R. Turner, *The Great Cultural Traditions*, I (1941), 22–26; G. Clark, *From Savagery to Civilization* (1946), pp. 26–39; S. Piggott, *Prehistoric India to 1000 B.C.* (*Pelican Books*, A 205 [Harmondsworth, 1950]), pp. 23–24, 33–34; V. G. Childe, *What Happened in History* (*Pelican Books*, A 108 [Harmondsworth, 1952]), pp. 27–33; *Man Makes Himself* (*A Mentor Book*. 7th printing [New York, 1960]), pp. 45–49; C. S. Coon, *The Story of Man* (New York, 1958), pp. 43–69. An interesting account of the bone tools and weapons used by the earliest man-like inhabitants of South Africa was contributed by R. A. Dart to the *Illustrated London News* for May 9, 1959, pp. 798–801 ("The Ape-Men Tool-Makers of a Million Years Ago: South African Australopithecus —His Life, Habits, and Skills"). On the use of the bola by Chellean man at Olduvai see Leakey, *National Geographic*, CXX, No. 4 (October 1961), 579, 583–84.

The probability that the "kernel zone" of the hand-axe industry lay within Africa itself is discussed by Huzayyin, *Place of Egypt*, pp. 205–12. See also McBurney, *Stone Age of Northern Africa*, pp. 53–54. On p. 128 of the latter work McBurney expresses the opinion now generally held by prehistorians when he says: "Although the case cannot perhaps be regarded as yet absolutely proved, it will probably be admitted by most readers that the evidence in favour of a centre of dispersal of hand-axe industries somewhere in Central Africa is certainly very strong." The presence of the same types of implements in Central and Northeastern Africa at approximately the same time does not necessarily imply the presence in these two widely separated areas of the same species of hominids, but, on the other hand, it certainly does not militate against the supposition that this was the case.

The occurrence of Pre-Chellean pebble-tools and other early implements in the 150-foot river terrace in the Egyptian-Sudanese border area is reported by A. J. Arkell, *Archaeological News Letter*, II, No. 8, p. 124; *The Old Stone Age in the Anglo-Egyptian Sudan*, pp. 2–3, 45.

2. Growth and Development of the Acheulian Tradition

Brief general treatments of the Acheulian stage of Egyptian prehistory are provided by É. Massoulard in his *Préhistoire et protohistoire d'Égypte* (Paris, 1949), pp. 10–12 (with a useful listing of the sites on which the industry occurs), and by S. A. Huzayyin, *The Place of Egypt*, pp. 188–91. Selected implements and the geological settings in which they were found are dealt with in some detail in the four volumes of Sandford and Arkell's *Prehistoric Survey* (I, 28, 29, 31, 36, 71; II, 25, 30, 32, 34, 37, 44, 74–77, 83, 85, 86; III, 59, 61, 63, 64, 66, 69, 74, 76, 110–14, 123; IV, 50–53, 59, 89, 90, 95, 98); but, as we have seen, the dating of the 100-, 50-, and 30-foot terraces by these authors and their identification of the industry of the 30-foot terrace require revision (Butzer, *Erdkunde*, XIII, 52–53; "Naturlandschaft," p. 57; Caton-Thompson, *Proc. Preh. Soc.*, XII, 80). For discussions of the Acheulian tradition as a whole and the techniques which characterize it we may turn to some of the general works cited in the preceding sections, notably, Movius, "The Old Stone Age," pp. 59–60; Bordaz, "First Tools of Mankind," pp. 39–43; Oakley, *Man the Tool-maker*, pp. 43–46; MacCurdy, *Human Origins*, I, 116–29; Burkitt, *The Old Stone Age*, pp. 110–12. See also Vignard, *BIFAO*, XX, 93 ff., fig. 2. On the duration of the Acheulian phase in Egypt see especially Butzer, *Quaternary Stratigraphy*, pp. 64, 75, 100–102 (Tables IV, VIII, and IX); and on its duration in general, Zeuner, *Dating the Past*[4], pp. 285–92.

An Acheulian hand-axe from the floor of

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the Wadi el-Natrun is published by Sandford and Arkell, *Prehistoric Survey*, IV, 50, Plate XXII, 7; and the few scattered examples from the Fayum are referred to by O. H. Little, *BIE*, XVIII (1936), 207–208; by Caton-Thompson and others, *BIE*, XIX, 249, 287; and by Caton-Thompson, *Proc. Preh. Soc.*, XII, 92, n. 6. To the references on the Lower Paleolithic surface finds in the Eastern Desert given in the preceding section may now be added F. H. Sterns, "The Paleoliths of the Eastern Desert," *Harvard African Studies*, I (1917), 48–82, which deals in particular with implements from the sites at Hammamat, Wassif, and Rabah. Massoulard discusses Sandford's three-sided Acheulian pick and the anvils of Abbassiya on p. 12 of his *Préhistoire . . . d'Égypte*.

The Upper Acheulian industry of Kharga is described in detail and fully illustrated by G. Caton-Thompson in her *Kharga Oasis in Prehistory* (London, 1952), pp. 22–26, 54–73, 95–98, Plates X–LVI. See also McBurney, *Stone Age of Northern Africa*, pp. 59 ff.; Alimen, *Prehistory of Africa*, pp. 90–92. The opinions of Miss Caton-Thompson and S. A. Huzayyin quoted in the seventh paragraph of this section are from *Proc. Preh. Soc.*, XII (1946), 58, and *Place of Egypt in Prehistory*, p. 190, respectively.

The existence in Egypt of a well-defined Micoquian industry (Bovier-Lapierre, *BIE*, VIII, 268; Vandier, *Manuel d'archéologie égyptienne*, I, 37) has been questioned by Sandford and Arkell (*Prehistoric Survey*, II, 75), by Caton-Thompson (*Kharga Oasis*, pp. 19–20), and by Massoulard (*Préhistoire . . . d'Égypte*, p. 12). See also Huzayyin, *Place of Egypt*, p. 188, n. 4; Alimen, *Prehistory*, p. 92.

The industry of the 30-foot Nile terrace, described by Sandford and Arkell (*Prehistoric Survey*, III, 114, 126) as Early Mousterian or Levalloisian, has been reidentified by Miss Caton-Thompson as Acheulio-Levalloisian and compared to the similar industry of Kharga (*Proc. Preh. Soc.*, XII [1946], 61, 69–81; *Kharga Oasis*, pp. viii, 20, 26–28, 92–94, 99–103). Her conclusions have been accepted by Huzayyin (*Place of Egypt*, pp. 190–91, 193), McBurney (*Stone Age*, pp. 135–38, 153–55, figs. 9, 14), Butzer (*Erdkunde*, XIII, 55, 66), and others.

For the Acheulian finds in the Republic of the Sudan and in the vicinity of Ennedi the principal references are A. J. Arkell, *The Old Stone Age in the Anglo-Egyptian Sudan* (1949), *passim*; *The Archaeological News Letter*, vol. II, No. 8 (1950), pp. 124 ff.; *A History of the Sudan from the Earliest Times to 1821* (London, 1955), pp. 8–9; "Preliminary Report on the Archaeological Results of the British Ennedi Expedition, 1957," *Kush*, VII (1959), 15–26 (see pp. 16–19, 21, 23).

The hominid remains from Ternifine in Algeria and the Sidi Abderrahman quarry, near Casablanca, are discussed, with references, by Alimen, *Prehistory*, pp. 330–31 (see the Bibliography, p. 349, under "Arambourg, C."); Balout, *Préhistoire*, pp. 123–24, 262; and McBurney, *Stone Age*, pp. 99–101, 118 (see the Bibliography, p. 275, under "Arambourg, C."). On the Kanam mandible and the Kanjera skull fragments see Cole, *The Prehistory of East Africa*, pp. 82–88; Leakey, *Stone Age Africa*, pp. 165–66; and, on the question of their dating, P. G. H. Boswell, "Human Remains from Kanam and Kanjera, Kenya Colony," *Nature*, March 9, 1935. See also Alimen, *Prehistory*, pp. 331–32.

The fluctuations in Egypt's climate referred to in relation to the comings and goings of Acheulian man have been outlined in Chapter I, above (see especially the text and notes of the sections on *Climate* and *Chronology*). On the important hand-axe industries of East Africa we may consult Alimen, *Prehistory*, pp. 201–202, 212–14; Leakey, *Stone Age Africa*, pp. 41–47; Cole, *Prehistory*, pp. 117–49; Huzayyin, *Place of Egypt*, pp. 196–97, 206–209; and, on that of the Republic of the Sudan, the works of A. J. Arkell cited above. The quotations regarding the points of resemblance between the Upper Acheulian of Kharga and that of the Sudan are taken from Caton-Thompson, *Kharga Oasis*, pp. 26, n. 2, 67, 72, n. 2. The Lower Paleolithic of Syria and Palestine is

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conveniently summarized by Huzayyin, *Place of Egypt*, pp. 191–92. See also the references cited in an earlier paragraph in connection with the Upper Acheulian of Kharga.

Under the heading, "the Lower Savagery," Grahame Clark (*From Savagery to Civilization*, pp. 26–43) groups all the pre-Upper Paleolithic stages of man's development, including the Acheulian and the succeeding Mousterian or Levalloisian. On the hafting of certain types of Acheulian implements or weapons the clearest statements are those of Caton-Thompson, *Kharga Oasis*, p. 62 ("It is impossible to avoid the conclusion that these forms were for hafting") and Vignard, *BIFAO*, XX, 94–98. The use of the bolas by Acheulian hunters is discussed by Cole, *Prehistory of East Africa*, pp. 142–43, and by Oakley, *Man the Tool-maker*, pp. 43–45. See also Balout, *Préhistoire*, p. 166 (cf. pp. 164–72; Alimen, *Prehistory*, pp. 28–29, 33, 213; Arkell, *Old Stone Age in the . . . Sudan*, p. 10). The Upper Acheulian deposits around mound-spring KO 10 at Kharga yielded a quartzite ball, 2½–3 in. in diameter —perhaps a bola or a sling-stone (Caton-Thompson, *Kharga Oasis*, p. 71). On Acheulian man's methods of hunting, his probable use of drop-traps, or game-pits, and the formidable animals which in Kenya and in Spain formed part of his diet see Cole, *Prehistory*, p. 144; Oakley, *Man the Tool-maker*, pp. 43–46; and Clark, *From Savagery . . .*, p. 38; and on the animal remains found in Paleolithic deposits at Kharga, Caton-Thompson, *Kharga Oasis*, pp. 72, 79, 146, n. 1.

3. The Middle Paleolithic Age

Our three principal sources of material on the Middle Paleolithic age in the lower Nile Valley and adjoining areas are Sandford and Arkell's *Prehistoric Survey* (I, 28, 34–52, 71, figs. 12–19; II, 16, 17, 25, 35–46, 57, 59, 76–78, 84, 86, Plates XXIX–XL; III, 64, 66–80, 114–18, 126, Plates XXXI–XXXVII; IV, 54–68, 89–91, 98, Plates XXII–XXX); Caton-Thompson, "The Levalloisian Industries of Egypt," *Proceedings of the Prehistoric Society*, XII (1946), No. 4, pp. 57–120 (see pp. 57–98); and the same author's *Kharga Oasis in Prehistory*, pp. 26–29, 54, 57, 58, 73–80, 108–16, 139–44, 148, Plates 57–72. See also Huzayyin, *Place of Egypt* pp. 212–29, Plates IX, X. Chapter IV (pp. 129–89) of McBurney's *Stone Age of Northern Africa* contains a valuable discussion of the Middle Paleolithic of this area with sections devoted to "Egypt" (pp. 135–49) and "The Egyptian Oases" (pp. 149–62), preceded on pp. 31–34 by a survey of the Levalloisian and Mousterian industries in general. Massoulard deals with "Le Paléolithique moyen" on pp. 13–15 and 25–26 of his *Préhistoire et protohistoire d'Égypte* (Pls. II–III); as does Vandier on pp. 37–43 of his *Manuel d'archéologie égyptienne*, Vol. I (figs. 18–24). Among the more important works on individual sites with Middle Paleolithic material are Vignard, "Stations paléolithiques de la carrière d'Abou el-Nour," *BIFAO*, XX (1922), 96–105, figs. 4–12, Plates X–XIX; Seligman, "The Older Palaeolithic in Egypt," *Journal of the Royal Anthropological Institute*, LI (1921), 115–43; and the reports of Bovier-Lapierre on the plain of Abbassiya (*BIE*, VIII [1926], 268–70, 274, 275; *L'Anthropologie*, XXXV [1925], 43 ff.; etc.).

The views of H. L. Movius, cited in the first and third paragraphs of our text and based in part on the indices obtained by F. Bordes on Paleolithic techniques in Europe, are drawn from his chapters on "Old World Prehistory: Paleolithic" (in *Anthropology Today, an Encyclopedic Inventory*, ed. by A. L. Kroeber [Chicago, 1953], pp. 163–92), p. 164, and "The Old Stone Age" (in *Man, Culture, and Society*, ed. by H. L. Shapiro [New York, 1956], pp. 49–93), pp. 60 ff. To be noted is the fact that Movius groups the Levalloisian tradition under "*Lower Paleolithic.*" See also Cole, *Prehistory of East Africa*, p. 156. Other good general treatments of the Levalloisian technique and industries will be found in Oakley, *Man the Tool-maker*, pp. 49–52; Bordaz, *Natural History Magazine* for February 1959, pp. 43–46; Zeuner, *Dating the Past*[4], pp. 288 ff.;

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Cole, *op. cit.*, pp. 154 ff.; and McBurney, *Stone Age of Northern Africa*, pp. 132 ff.

On the probability of a Lower Levalloisian (Riss-Würm) date for the 50-foot terrace of northern Middle Egypt and the 131-foot Fayum beach see above, Chapter I, pp. 90, 94, 98, 106; and cf. Butzer, *Quaternary Stratigraphy*, Table IV (p. 75), Egyptian Stage 7, and Table VIII (p. 100), "Riss/Würm" (= "Lower Levallois") and "Riss II" (= "Upper Acheulian" = Egyptian Stages 8 and 9 of Tables IV and IX). Miss Caton-Thompson's sequence of Fayum lakes, including her hypothetical 40-foot (10-metre) Lower Levalloisian lake, is presented in some detail in *Proc. Prehist. Soc.*, XII (1946), 90–97 (see also Huzayyin, *Place of Egypt*, pp. 84 ff.). It has been accepted by, among others, McBurney, *Stone Age of Northern Africa*, p. 146; Alimen, *Prehistory of Africa*, p. 82 (for "40-metre beach" read "10-metre [or 40-foot] beach"); and Ball, *Contributions to the Geography of Egypt*, pp. 192–94. Cf., however, Sandford and Arkell, *Prehistoric Survey*, I, 73; Butzer, *op. cit.*, pp. 68, 71.

The quotations in the fourth paragraph of our text come, respectively, from McBurney, *op. cit.*, p. 139; Movius, "Old World Prehistory: Paleolithic" (in *Anthropology Today*), p. 176; and Sandford and Arkell, *Prehistoric Survey*, II, 77; and those in the fifth paragraph from Caton-Thompson, *op. cit.*, pp. 58, 84; and McBurney, *op. cit.*, p. 155.

The Mousterian, or "discoidal nucleus," technique of flake-tool production has "very little in common" with the Levalloisian technique and at least "in its developed form represents a distinctly different process" (Movius, "The Old Stone Age," pp. 62–63; McBurney, *Stone Age of Northern Africa*, pp. 133–34). It is described in some detail by Bordaz, *Natural History Magazine*, February 1959, pp. 43–46; by Movius, *loc. cit.*; and by McBurney, *loc. cit.*; and the differences between it and the generally earlier and to some extent ancestral Levallois method are clearly pointed out by these authors. See also, more recently, F. Bordes, "Mousterian Cultures in France," *Science*, Vol. CXXXIV, No. 3482 (Sept. 22, 1961), pp. 803–810. Alimen (*Prehistory of Africa*, p. 92) remarks that in Egypt "generally speaking, real Mousterian artifacts with fine secondary retouching are not to be found"; Caton-Thompson (*Proc. Prehist. Soc.*, XII, 58) states that "'Mousterian' typology and technique" are "on the whole absent in Egyptian groups"; and, according to Huzayyin (*Place of Egypt*, pp. 221–22), "The Mousterian technique *sensu stricto* appears to be very little represented (if at all) in Egypt" and "Among the various finds from Egypt, hardly any (or only very rare) flakes exhibit the typical surface retouch of the Mousterian proper." Prior, however, to 1930, when the Abbé H. Breuil (*L'Afrique préhistorique* [*Cahiers d'Art*. Paris, 1930, 1931], p. 71) suggested the terms Levalloisian and Levalloiso-Mousterian as the appropriate designations of Egypt's Middle Paleolithic industries, the latter were generally referred to as Mousterian and are so described in the works of Bovier-Lapierre, Vignard, Seligman, and Sandford cited above (see, however, Sandford and Arkell, *Prehistoric Survey*, IV, 89). The expression is still retained by Massoulard for reasons set forth in his *Préhistoire et protohistoire d'Égypte*, p. 13, and—perhaps inadvertently—by Vandier in his *Manuel d'archéologie égyptienne*, I, 37 ff.

Between them the two last-named works pretty well cover the distribution of Middle Paleolithic implements (especially surface finds) in the Egyptian area, the references cited being in the main those listed above, in the notes to our section on the "Abbevillians" (p. 178). To these may be added Sandford and Arkell, *Prehistoric Survey*, II, 16, 17, 35, 37; III, 64, 66; IV, 90, 91; Vignard, "Le Levalloisien du Guébel-Silsilé . . .," *Bull. Soc. préh. franç.*, LII (1955), 214–18; Alimen, *Prehistory*, p. 92; McBurney, *Stone Age*, p. 161; Butzer, "Naturlandschaft," p. 62; Caton-Thompson, *Man*, XXXI (1931), 77–84; Huzayyin, *Place of Egypt*, Plate II.

Details of the Levalloisian flaking sites, or working floors, at Abbassiya, Abu el-Nur, Thebes, and Kharga are provided by Bovier-

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Lapierre, *BIE*, VIII, 274–75; Vignard, *BIFAO*, XX, 96 ff.; Sandford and Arkell, *Prehistoric Survey*, II, 29 (see also I, 45); McBurney, *op. cit.*, p. 125; and Caton-Thompson, *Kharga Oasis in Prehistory*, pp. 76–78, 96–97, 104, 109 ff., 142.

On the character and distribution of the Middle Paleolithic industries of the Republic of the Sudan we may refer to A. J. Arkell, *The Old Stone Age in the Anglo-Egyptian Sudan*, pp. 2–3 (map and table), 37, 45; *The Archaeological News Letter*, Vol. II, No. 8, p. 124; Cole, *Prehistory of East Africa*, pp. 37, 45, 160. Arkell's "Preliminary Report on . . . the British Ennedi Expedition, 1957" was published in *Kush*, VII (1959), 15–26. Here no Levalloisian finds are recorded, but only implements described on pp. 19, 21, and 23 as "early Aterian" or as "intermediate between the Acheulean and the Aterian." Incidentally, it should be noted that at the First Pan-African Congress on Prehistory, held at Nairobi in 1947, "it was decided . . . to use the term 'faceted platform'" to describe what we have been calling the Levalloisian technique (Cole, *op. cit.*, p. 154) and that this is the expression employed by Arkell in the works just cited. Cole, however, retains the more convenient term "Levalloisian" (*op. cit.*, pp. 155 ff.). For our purposes the related Middle and post-Middle Paleolithic industries of Central, East, and South Africa—the so-called Proto-Stillbay, Stillbay, Fauresmith, and Sangoan (Tumbian)—are adequately dealt with by Cole in the sixth chapter of her *Prehistory of East Africa*, pp. 152–82).

The relationship of the activities of Middle Paleolithic man—i.e., the successive stages of the Levalloisian and Levalloiso-Mousterian industries—to the pluvial and interpluvial periods of Egypt and of East Africa and to the glacial and interglacial periods of alpine Europe are summarized by Butzer, *Quaternary Stratigraphy*, pp. 64–71, 98, 102, Tables IV, VIII, and IX; and by Cole, *Prehistory of East Africa*, pp. 152 ff. (on the naming, characteristics, and dating of the Kanjeran and Gamblian Pluvials see pp. 29, 47–52). See also Alimen, *Prehistory of Africa*, pp. 88, 206–207, 216, 424–25.

Among the many articles on Neanderthal man which make up the *Neanderthal Centenary 1856–1956* volume (Wenner Gren Foundation, Kemink en Zoon. Utrecht, 1956) is one by C. B. M. McBurney (pp. 253–64) on "Evidence for the Distribution in Space and Time of Neanderthaloids and Allied Strains in Northern Africa." Here and in his *Stone Age of Northern Africa* (pp. 168, 171, 187) McBurney discusses the association of the Levalloiso-Mousterian industries of Cyrenaica and Palestine with the Neanderthaloid remains of Haua Fteah and Mount Carmel, and speaks of "biological intercourse across now formidable deserts, particularly those separating the Nile Delta on the east from the hills of Judea," arriving at the conclusion that: "In a word, everything points to a close community between the human populations of the Gebel Akhdar and western Asia at this time" (*Neanderthal Centenary*, pp. 260–61. Cf. Arkell, *History of the Sudan*, p. 9). Dr. Wiercinski's preliminary announcement of the three Neanderthaloid skulls from Maadi is reported by Edward Wente in "Newsletter Number Twenty-nine" of the American Research Center in Egypt (May, 1958, p. 2). A search through the bibliographical lists of the *Anthropologischer Anzeiger* for 1958–1961 has failed to disclose any additional publication of these skulls by Dr. Wiercinski. Besides the works of McBurney, just referred to, the Neanderthaloids of Africa are described and discussed by Alimen, *Prehistory of Africa*, pp. 333–37; by Cole, *Prehistory of East Africa*, pp. 74–76, 82, 89–94; and by Leakey, *Stone Age Africa*, pp. 169–70, 194, 195. See also P. Oakley, "The Dating of Broken Hill (Rhodesian Man)," *Neanderthal Centenary*, pp. 265–66. In this article Oakley concludes that the Broken Hill remains are of Upper Pleistocene, post-Acheulian date. The quotation regarding the Steinheim and Ehringsdorf Neanderthaloids is from Cole, *op. cit.*, p. 156; and that concerning the dating of the Haua Fteah mandible from McBurney, *Stone Age of Northern Africa*, p. 168.

Cole's remarks on Upper Pleistocene

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man's tendency toward specialization in the forms of his implements is from her *Prehistory of East Africa*, p. 151. The physical characteristics of Neanderthal man and his relationship to *Homo sapiens* are discussed by H. L. Shapiro in *Man, Culture, and Society* (New York, 1956), pp. 14–15, and by C. S. Coon in *The Races of Europe* (New York, 1939), pp. 14, 17, 23, 25–28. The material on his cultural level, living habits, and hunting prowess is drawn from G. Clark, *From Savagery to Civilization*, pp. 39–43; C. S. Coon, *The History of Man* (London, 1955), pp. 60 ff.; *The Story of Man* (New York, 1958), pp. 57–69; "There are Neanderthals among Us," *New York Times Magazine*, March 12, 1961, pp. 32, 84, 86; V. G. Childe, *Man Makes Himself* (2d impression [London, 1937]), pp. 56–60; Braidwood, *Prehistoric Men* (2d ed. [Chicago, 1951]), pp. 25, 26, 32–36; Turner, *The Great Cultural Traditions*, I, 26–29; K. P. Oakley, *Man the Toolmaker*, pp. 49–56; and from other publications, including the *Neanderthal Centenary* volume cited above. The equine and bovine teeth discovered in Upper Acheulian and Levalloisian contexts at Kharga are reported by Caton-Thompson in *Kharga Oasis in Prehistory*, pp. 72, 79, 146, n. 1.

According to Oakley ("Use of Fire by Neanderthal Man and his Precursors," *Neanderthal Centenary*, pp. 267–69) Paleolithic man used fire as a weapon of defense against dangerous carnivores, for driving game into pitfalls or corrals, for fire-hardening wooden spear tips, and in Middle Paleolithic times probably for cooking his food (*contra* Coon, *History of Man*, p. 62). On the same subject see also Oakley, "Fire as a Palaeolithic Tool and Weapon," *Proc. Prehist. Soc.*, N.S., XXI (1955), 36–48; and L. C. Eiseley, "Man the Fire-Maker," *Scientific American*, CXCI, 52–57.

The words of McBurney cited in the last paragraph of this section will be found on p. 129 of his *Stone Age of Northern Africa*. With this statement may be compared those of Caton-Thompson in the opening paragraphs of her "The Levalloisian Industries of Egypt" (*Proc. Prehist. Soc.*, XII, 57–58).

4. The Cultures of Late Paleolithic Times

The last nineteen pages of G. Caton-Thompson's much-cited article in the *Proceedings of the Prehistoric Society for 1946* (Vol. XII, No. 4, pp. 57–120. See pp. 100–118) are devoted to a detailed discussion of "The Epi-Levalloisian Industries of Upper and Lower Egypt." Earlier in the same article (p. 59) she refers to the Epi-Levalloisian as "those varied regional industries of Levalloisian technique and descent which anachronistically occupy the Upper Palaeolithic period, and are physiographically linked with the silt régime in the Nile Valley which succeeded the gravel régime." C. B. M. McBurney's brief, but interestingly critical, treatment of the same industries occupies pp. 139–49 and 155 ff. of his *Stone Age of Northern Africa*; and S. A. Huzayyin's thoughtful assessment of them, pp. 251–63 of his *Place of Egypt in Prehistory* (Pls. X–XII). The great wealth of material collected in Egypt and Nubia by Sandford and Arkell and classified by them as "Late Paleolithic" (the term adopted here) or, less accurately, as "Sebilian" (without due regard for regional differentiation) is published in their *Prehistoric Survey*, I, 52, 54–56, 58–66, 71, 72, figs. 22–25; II, 38–52, 79–80, 86–87, Plates XL–XLII; III, 81–96, 116–20, 124–26, Plates XXXVIII, XXXIX; IV, 70, 72–74, 89, 97, 98. Useful descriptions of Egypt's Late Paleolithic cultures, which, however, must to some extent be emended in the light of the studies cited above, are provided by É. Massoulard, *Préhistoire et protohistoire d'Égypte*, pp. 16–23, 26–27; R. Cottevieille-Giraudet, "L'Égypte avant l'histoire" (*BIFAO*, XXXIII [1933], 1–168), pp. 19–46; J. Vandier, *Manuel d'archéologie égyptienne*, I, 43–61; A. Scharff, *Grundzüge der aegyptischen Vorgeschichte* (*Morgenland*, Heft 12 [Leipzig, 1927]), pp. 12–15; *Die Altertümer der Vor- und Frühzeit Ägyptens* (*Staatliche Museen zu Berlin. Mitteilungen aus der ägyptischen Sammlung*, Band IV [Berlin, 1931]), pp. 4–7; H. Obermaier, "Ägypten. A. Paläolithikum, § 2" (in M. Ebert [ed.] *Reallexikon der Vorgeschichte*, I

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[Berlin, 1924]), 49–50. Also to be consulted are Movius, "Old World Prehistory: Paleolithic" (in *Anthropology Today*), 175–76; "The Old Stone Age" (in *Man, Culture, and Society*), pp. 86–87; Leakey, *Stone Age Africa*, pp. 114, 119, 177–78, 193; Butzer, "Naturlandschaft," pp. 57, 58, 62–65.

Our dating of the Late Paleolithic period is derived from Butzer, *Quaternary Stratigraphy* (1958), pp. 15, 17, 41, 64–71, 75, 98–101, 103, 127, 128, 142; *Geografiska Annaler*, XXXIX (1957), 49; *Erdkunde*, XI (1957), 25; "Naturlandschaft," (1959), pp. 57, 60, 62, 63; Caton-Thompson, *Proc. Prehist. Soc.*, XII, 117, 118; McBurney, "Radiocarbon Readings and the Spread of the Upper Palaeolithic in Europe and the Mediterranean Basin," *Pro. I. N. Qu. A.* (Madrid), 1957; *Neanderthal Centenary*, p. 263; *Stone Age of Northern Africa*, pp. 42 n. 1, 51, 52, 203, 204; McBurney and Hey (R. W.), *Prehistory and Pleistocene Geology in Cyrenaican Libya* (Cambridge, 1955), pp. 218, n. 1; 234, 235. Cf. Zeuner, *Dating the Past*[4], pp. 229–48, 286–87, 291–97, 421–23; and see the references to radiocarbon dates cited above in the notes of Chapter I ("Chronology").

On the Sebilian cultures of the Kom Ombo basin the source publications are É. Vignard, "Une nouvelle industrie lithique: le 'Sébilien,'" *BIFAO*, XXII (1923), 1–76, Cartes Nos. 1, 2, Plates I–XXIV; "Une nouvelle industrie lithique: le 'Sébilien,'" *Bulletin de la Société préhistorique française*, XXV (1928), 200–220, Plates I–XX; "Le Paléolithique en Égypte," *MIFAO*, LXVI (1935–1938 = *Mélanges Maspero*, I), pp. 165–75 (see pp. 170–75); "Les microburins Tardenoisiens du Sébilien: fabrication; emplois; origine du microburin," Extrait du *Congrès préhistorique de France*, X[e] session (1934), pp. 66–106. The presence of Middle Sebilian implements in wadi deposits near the village of Qurna in western Thebes was reported by Butzer in 1959 (*Erdkunde*, XIII, 55 f.; "Naturlandschaft," p. 63); and the "Sebilian" surface stations of the region of Laqeita, some twenty-five miles east of the modern village of Qus, are discussed by F. Debono, "Expédition archéologique royale au désert oriental . . .," *ASAE*, LI (1951), 59–91 (see pp. 61–64, 87–88, fig. 1). In 1956 Vignard published his discovery in the plain northeast of Kom Ombo of flaking sites of a post-Levalloisian ("Upper Paleolithic") industry made up to a great extent of "large blades" (É. Vignard, "Les stations de taille de la plaine nord-est de Kom Ombo [Haute Égypte]," *Bull. Soc. Préh. franç.*, LIII [1956], 588–98). So far as is known, the position of this industry in the Late Paleolithic prehistory of Upper Egypt—if that, indeed, is where it belongs—has not been established.

On the Late Paleolithic industries and sites of northern Egypt there are, besides the important general works cited in the first paragraph of these notes, a number of reports on and discussions of individual localities and groups of implements. See especially S. A. Huzayyin, "New Light on the Upper Palaeolithic of Egypt," *Proceedings of the Pan-African Congress on Prehistory*, 1947 (Oxford, 1952), pp. 202–204; "Recent Studies on the Technological Evolution of the Upper Palaeolithic of Egypt," *Congrès International des Sciences Préhistoriques et Protohistoriques, Actes de la III[e] Session*, Zürich 1950 (Zürich, 1953), pp. 174–76; R. Vaufrey, "Variétés. Section II. Paléolithique et Mésolithique," *L'Anthropologie*, LV (1951), 288–90 (see p. 290); Alimen, *Prehistory*, p. 95; A. M. Montet, "Les industries levalloisiennes d'Heliopolis et d'Abu Suwair (Égypte)," *Bulletin de la Société Préhistorique française*, LIV (1957), 329–39. The microliths collected by H. Junker at Abu Ghalib are published by him in *Bericht über die von der Akademie der Wissenschaften in Wien nach dem Westdelta entsendete Expedition* (20. Dezember 1927 bis 25. Februar 1928), (Vienna and Leipzig, 1928), pp. 5–14, Pls. I, II, XI–XIII; and their dating is discussed by Caton-Thompson, *Proc. Preh. Soc.*, XII (1946), 116–17; H. Larsen, "Vorbericht über die schwedischen Grabungen in Abu Ghâlib 1932–1934," *MDIK*, VI (1935), 41–87 (see pp. 44–50).

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The Late Paleolithic cultures of Kharga Oasis, including the Aterian, are discussed and illustrated by G. Caton-Thompson in her *Kharga Oasis in Prehistory* (London, 1952), pp. 11, 29–32, 106–107, 116–39, Pls. 73–93. Of basic importance is the same author's lecture on "The Aterian Industry: Its Place and Significance in the Palaeolithic World (The Huxley Memorial Lecture for 1946)," published in *The Journal of the Royal Anthropological Institute of Great Britain and Ireland*, LXXVI (1946), 87–130. Valuable and often divergent assessments of the same material are provided by C. B. M. McBurney in *The Stone Age of Northern Africa* (Harmondsworth, 1960), pp. 155–61, 177–89, 223. Some points of evolved Aterian type found in the vicinity of Laqeita in the Eastern Desert are illustrated by F. Debono, *ASAE*, LI (1951), 64–65, 88, Pls. IIb and IIIb. Miss Caton-Thompson (*Kharga Oasis*, pp. 32–36, 159–64, Pls. 94–100) favors a pre-Neolithic date for the Bedouin Microlithic, which, however, must be one of the cultures assigned by McBurney (*op. cit.*, p. 161) to a time not "earlier than the third or fourth millennia B.C., during a widely attested period of slight recovery of the rainfall."

Excellent and, for our purpose, wholly adequate accounts of the Upper Paleolithic blade-industries of Europe, Africa, and Western Asia are provided by Movius ("The Old Stone Age," pp. 64–74, 86 ff.), Balout, *Préhistoire de l'Afrique du Nord*, pp. 339–448; McBurney (*Stone Age of Northern Africa*, pp. 34–44, 48–52, 56–60, 190–228. The words quoted in our text are from p. 226), Cole (*Prehistory of East Africa*, pp. 182 ff.), Alimen (*Prehistory of Africa*, pp. 50–64, 157–60, 188–91, 214–16, 301 ff.), and Huzayyin (*Place of Egypt*, pp. 243–51, 263–68). The techniques of blade-tool production are described in some detail by Bordaz, *Natural History Magazine* for January 1959, pp. 46–51.

On the so-called "Upper Aurignacian" of the Champ de Bagasse (E. Vignard, "Une station aurignacienne à Nag-Hamadi [Haute Égypte]: Station du Champ de Bagasse," *BIFAO*, XVIII [1921], 1–20; "Station aurignacienne de Champ de Bagasse à Nag-Hamadi [Haute Égypte]," *Bull. Soc. Préhist. franç.*, XXVI [1929], 199–306; J. Vandier, *Manuel d'archéologie égyptienne*, I, 54–57, 59 ff.) see especially Huzayyin, *Place of Egypt*, pp. 236–37; Alimen, *Prehistory of Africa*, p. 101; and Massoulard, *Préhistoire et protohistoire d'Égypte*, pp. 16–17.

The application of the term "Capsian" (from a site near Gafsa, Roman Capsa, in southern Tunisia) to one or more of the Late Paleolithic industries of Egypt is, unfortunately, fairly widespread in books and articles on Egyptian prehistory (e.g., Scharff, *Grundzüge der aegyptischen Vorgeschichte*, pp. 14–15; *Die Altertümer der Vor- und Frühzeit Ägyptens*, pp. 4–7; Cottevieille-Giraudet, *BIFAO*, XXXIII, 19–38; Junker, *Westdelta*, pp. 8–14; Vandier, *Manuel*, I, 53–61). According, however, to Huzayyin ("Recent Studies," p. 174; *Place of Egypt*, pp. 247, 259, 267) ". . . the Upper Palaeolithic of Egypt has no affinities with the Aurgnacian or the Capsian . . ."; ". . . it is certain that the Capsian *sensu stricto* has not so far been recorded in N. Libya or Egypt (or Palestine)"; the small narrow blades which occur at Abu Suwair "are different from the blades of either the Aurignacian or the Capsian, . . ."; and the Capsian does not "seem to have spread, to any appreciable extent, along the Mediterranean Belt in the direction of N.E. Africa or Palestine, The Up. and Final Palaeolithic cultures of these latter regions (especially N.E. Africa) had a different technique." McBurney (*Stone Age of Northern Africa*, pp. 223–28 *passim*) notes that the small-scale backed-blade-industries of the Fayum and Kharga are "totally lacking in the evolved geometrical forms of the Typical Capsian and Upper Capsian . . ."; that the Sirtican microlithic culture "provides the most easterly versions" of the Upper Capsian trapeze "among hunting peoples north of the Sahara"; that while a very late (Mesolithic) hunting culture near Khartoum "does offer some of the forms of the Latest Capsian and its Neolithic derivatives" and the Capsian may possibly have

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passed "undetected" along the Delta coast en route from the Levant to the Gebel Akhdar "no trace of such an event has yet been detected in the desert near Cairo, further south, or in the region between the Delta and Suez"; and that "during the final hunting period the cleavage lies, in essence, between the predominantly Upper Capsian province in the west" and "the Cyrenaican traditions dominated by burins, end-scrapers, and non-geometric microliths most clearly pointing to the Levant." On the so-called Capsian sites near Aswan and Luxor, the Gebel Uweinat, and the oases of Baharia and Farafra (Vandier, *Manuel*, I, 57–58) Alimen (*Prehistory of Africa*, p. 101 [for "Aterian" read "Capsian" (see *Préhistoire de l'Afrique*, p. 127)]) has this to say: "The industries from these sites are characterized by backed blades and microburins and by a general tendency towards microlithism which, perhaps, do not constitute a real Capsian." It may also be noted, in passing, that according to D. A. E. Garrod and D. M. A. Bate (*The Stone Age of Mount Carmel* [Oxford, 1937], p. 119) there is no true Capsian in Palestine.

The conclusions of Movius and Caton-Thompson on the Late Paleolithic industries of Egypt are taken, respectively, from the former's "Old World Prehistory: Palaeolithic" (*Anthropology Today*), p. 176, and from the latter's "Levalloisian Industries" (*Proc. Preh. Soc.*, XII), pp. 57, 100, and *Kharga Oasis*, p. 30. Huzayyin's important reassessment of the Late Paleolithic industries of northern Egypt is contained in his already cited "Recent Studies on . . . the Upper Palaeolithic of Egypt" (*Congr. Internat. Sciences Préh. et Protohist., Actes de la III^e Session Zurich 1950*, pp. 174–76). The same author (*Place of Egypt*, p. 260, n. 3) speaks of "an unknown gap in technological evolution between the late Diminutive Levallois" and the "industry of Hilwan," and A. J. Arkell (*Archaeological News Letter*, II, No. 8, p. 124) of the "gap between the end of the Palaeolithic and the rise of Civilisation"; but to some prehistorians this hiatus is not discernible. Alimen (*Prehistory of Africa*, p. 425), for example, says: "The Palaeolithic-Mesolithic gap, so marked in western Europe, does not exist in Africa. In varying ways, but, all the same, almost everywhere, there is an insensible transition to microlithism, whether it be from Capsian, Levalloiso-Khargan, Sebilian, Magosian, Smithfield or Lupemban." Butzer (*Quaternary Stratigraphy*, p. 99), referring to the "Diminutive Levalloisian" of Egypt, says: "This graded into a microlithic stage that can be observed until the onset of the Neolithic." Caton-Thompson (*Proc. Preh. Soc.*, XII, 117, 118) speaks of the "earlier microlithic industries of Egypt which directly succeed Epi-Levalloisian II," and notes that the Sebilian industry develops "through the medium of steep marginal retouch, into one of a backed-blade, microlithic character," adding that this "probably happened elsewhere too," the "regional microlithic groups" resulting from the "needs for new tools common throughout Egypt."

The appearance and earliest examples of *Homo sapiens* in North and East Africa are discussed, with references, by McBurney, *Stone Age of Northern Africa*, pp. 35–37, 46, 48, 186–87; Cole, *Prehistory of East Africa*, pp. 74, 80–82, 101, 157; and Alimen, *Prehistory of Africa*, pp. 337–40, 348. The human remains from Kom Ombo in Upper Egypt and Qau in Middle Egypt were examined by Dr. Douglas E. Derry of Cairo, Sir Arthur Keith of the Royal College of Surgeons, London, and Sir Elliot Smith. They have not been adequately published, but are referred to in varying degrees of detail by K. S. Sandford, *Prehistoric Survey*, III, 85, 86; "The Fossil Bones found at Qau . . .," *The Quarterly Journal of the Geological Society of London*, LXXXV (1929), 536; F. Petrie, "Early Man in Egypt," *Man*, XXV (1925), 130; S. A. Huzayyin, *Place of Egypt*, pp. 272, 273; and Massoulard, *Préhistoire et protohistoire d'Égypte*, pp. 391–92, 417.

On the associated fauna our principal references are: C. Gaillard, "Contribution à l'étude de la faune préhistorique del l'Égypte," *Archives du Muséum d'Histoire*

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Naturelle de Lyon, XIV (1934), Mémoire III, pp. 13–56; L. Joleaud, "Progrès récents de nos connaissances sur la géologie du Quaternaire et sur la Préhistoire de l'Égypte," *Revue générale des Sciences pures et appliquées*, XLIV (1933), 601–608 (see pp. 602–606); K. S. Sandford, "The Pliocene and Pleistocene Deposits of Wadi Qena and of the Nile Valley between Luxor and Assiut (Qau). VIII. The Fossil Bones found at Qau, and Beds proved in Borings," *The Quarterly Journal of the Geological Society of London*, LXXXV (1929), 536–41; *Prehistoric Survey*, III, 84–88, 125; K. S. Sandford and W. J. Arkell, *Prehistoric Survey*, II, 38 (n. 5), 46, 52; Huzayyin, *Place of Egypt*, pp. 81–82; Vignard, *BIFAO*, XXII (1923), 12, 27, 64–65; *Bull. Soc. Préhist. franç.*, XXV (1928), 203, 207, 216; Butzer, "Naturlandschaft," pp. 63–64. On the secondary deposits of animal bones at Qau see also G. Brunton, *Qau and Badari III* (*British School of Archaeology in Egypt*, 1926), p. 20; Massoulard, *Préhistoire . . .*, pp. 391–92.

The probability of a western Asiatic origin for the *Homo sapiens* population of northeastern Africa is discussed by McBurney, *Neanderthal Centenary*, p. 263; *Stone Age of Northern Africa*, pp. 46, 48. See also Oakley, *Man the Tool-maker*, pp. 56–57, 74.

The pre- or proto-Bushman skull found at Singa has been published by A. S. Woodward, "A Fossil Skull of an Ancestral Bushman," *Antiquity*, XII (1938), 190–95; and has been discussed by A. J. Arkell, *The Old Stone Age in the Anglo-Egyptian Sudan*, pp. 45, 47; Cole, *Prehistory of East Africa*, pp. 95–96; Alimen, *Prehistory of Africa*, pp. 342–43. The remarks on this skull cited in our text are those of McBurney (*Neanderthal Centenary*, p. 262).

H. Breuil ("Les gravures rupestres du Djebel Ouenat," *Revue Scientifique*, LXVI [1928], 106) would attribute some early rock drawings of giraffes and ostriches found by Hassanein Bey at Uweinat to Upper Paleolithic hunters, and Sandford and Arkell (*Prehistoric Survey*, II, 70–71) favor an Upper Sebilian date for similar drawings at Wadi el Arab in Nubia. Alimen (*Prehistory of Africa*, p. 372), however, has this to say on the subject: "Various authorities (such as G. B. M. Flamand and H. Kühn) have assigned the most ancient engravings to the late Paleolithic. However, the tendency, nowadays, is to follow the lead of the late H. Obermaier and of R. Vaufrey and to consider the earliest of the rock-engravings as Neolithic." See also McBurney, *Stone Age of Northern Africa*, pp. 258–74 (especially pp. 272–74); Huzayyin (1939), *Bull. Soc. Roy. Géog. d'Égypte*, XX, 213–15.

The term "(higher) savagery" and "(Neolithic) barbarism" to describe, respectively, the Upper Paleolithic and Neolithic levels of human existence are used by, among others, G. Clark, *From Savagery to Civilization* (London, 1946), pp. 43 ff., 69 ff.; and G. Childe, *What Happened in History* (Harmondsworth, 1952), pp. 36 ff., 48 ff.

On the practice of cannibalism among Upper Paleolithic peoples see, for example, Clark, *op. cit.*, pp. 60–61.

The quotations in the final paragraph of our text are from G. Caton-Thompson, *Proc. Preh. Soc.*, XII (1946), 59; Alimen, *Prehistory of Africa*, p. 103; and Clark, *op. cit.*, p. 44.

5. The Final Paleolithic, or Mesolithic, Stage

Approximate absolute dates for the Mesolithic phase of human prehistory in the Near East are supplied by K. W. Butzer, *Quaternary Stratigraphy* (1958), pp. 99–103 (see also pp. 17, 128). These agree well with the more recent findings of H. L. Movius, *Current Anthropology*, I (1960), 374 (1 and m), though, as the latter points out, Carbon-14 dates are still lacking for the early Mesolithic.

Movius in his "Old Stone Age" (pp. 75 ff.) gives a brief but clear picture of the Mesolithic stage in general, which may be amplified by referring to such works as Bordaz, *Natural History Magazine*, Feb. 1959, pp. 93 ff.; Coon, *The Races of Europe*, pp. 56–77; Clark, *From Savagery to Civilization*, pp. 62 ff.; Burkitt, *The Old Stone Age*, pp. 240–42, 246; Oakley, *Man the Tool-maker*,

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pp. 68, 84; MacCurdy, *Human Origins*, II, 3–20; Turner, *The Great Cultural Traditions*, I, 51 ff., 58; and Cole, *Prehistory of East Africa*, pp. 195–214.

A good bibliography on the much explored and much published Mesolithic stations at Helwan is provided by Massoulard in his *Préhistoire et protohistoire d'Égypte*, pp. 29–30, 52, nn. 3 ff. To the references given there may now be added Huzayyin, *BSRGE*, XX (1939), 210, 211, 224–26; *Place of Egypt*, pp. 260, 263, 289–90, 294; Alimen, *Prehistory of Africa*, pp. 101–103; Cottevieille-Giraudet, *BIFAO*, XXXIII (1933), 38–40; Vandier, *Manuel d'archéologie égyptienne*, I, 57 ff.; and Movius, "Old World Prehistory: Paleolithic," p. 176. In 1936 the site was re-explored by Fernand Debono and the interesting results of his investigations are incorporated in his report, "Le Paléolithique final et le Mésolithique à Hélouan," *ASAE*, XLVIII (1948), 629–37. The possibility of the Helwan industry's having been an importation from Palestine is discussed by J. de Morgan, *La préhistoire orientale*, II (1926), 69; D. A. E. Garrod, "A New Mesolithic Industry, the Natufian of Palestine," *JRAI*, LXXII (1932), 268; D. A. E. Garrod and D. M. A. Bate, *The Stone Age of Mount Carmel* (1937), pp. 30–37; Massoulard, *Préhistoire et protohistoire d'Égypte*, p. 30; McBurney, *Stone Age of Northern Africa*, p. 226; and Debono, *ASAE*, XLVIII, 636. Huzayyin's somewhat divergent views on the subject are expressed in *BSRGE*, XX, 224–26; and *Place of Egypt*, pp. 260, 263, 289–90, 294. On the Egyptian Mesolithic in general see also Butzer, *BSGE*, XXXII (1959), 49–50, 79–82.

To Debono we owe a report on the Upper Paleolithic and Mesolithic of the Laqeita area in the Eastern Desert in *ASAE*, LI (1951), 64–66 ("Expédition archéologique royale au Désert Oriental [Keft-Kosseir] . . . 3. Paléolithique supérieur et Mésolithique"); and to P. Bovier-Lapierre similar reports on the microlithic industries and associated finds at Aswan and Ain Dalla in *BIE*, XVI (1934), 128 ("Industries préhistoriques dans l'île d'Élephantine et aux environs d'Assouan"), and in *BIE*, XII (1930), 126 ("Récentes explorations de S. A. S. le Prince Kemal el-Din Hussein dans le Désert Libyque"). See also Vandier, *Manuel d'archéologie égyptienne*, I, 57, 58.

The microlithic industry of the site now generally known as el-Omari, a mile and three-quarters to the north of Helwan, at the mouth of the Wadi el-Hof, is referred to by Bovier-Lapierre in the *Compte rendu* of the *Congrès International de Géographie, Le Caire, Avril, 1925*, Vol. IV (Cairo, 1926), p. 306; "L'Égypte préhistorique" (in *Précis de l'histoire d'Égypte*, I), 34; by Cottevieille-Giraudet, *BIFAO*, XXXIII (1933), 40; and by Butzer, *BSGE*, XXXII (1959), 49. On the naming of the site see Bovier-Lapierre, *Compte rendu . . .*, pp. 268–270. The industry of the Wadi Angabiya has not been published *in extenso*, but is briefly described and illustrated by Huzayyin in *BSRGE*, XX (1939), 210, 211, Pl. II, Nos. 25–32 ("Some New Light on the Beginnings of Egyptian Civilisation . . ."); and in *The Place of Egypt*, pp. 257 n. 2, 260, 297, 430, Pl. XII, Nos. 33–37. See also Caton-Thompson, *Proc. Preh. Soc.*, XII (1946), 116. The Fayum microliths are published by G. Caton-Thompson and E. W. Gardner, *The Desert Fayum*, pp. 30, 55, 58, 59, 67, 68, Pls. XLVIII, XLIX; and are discussed by Caton-Thompson, *Proc. Preh. Soc.*, XII (1946), 117–18; Sandford and Arkell, *Prehistoric Survey*, I, 60–61, 66; Huzayyin, *BSRGE*, XX, 210, 226, 232–34; *Place of Egypt*, pp. 290, 296–98; and McBurney, *Stone Age of Northern Africa*, p. 223. Though apparently contemporaneous with the "Fayum A" and "Fayum B" cultures of late Neolithic and post-Neolithic times they are described by Huzayyin (*Place of Egypt*, p. 290) as "of definite Final Palaeolithic descent." On the surface finds of microliths at Siwa see especially Huzayyin, *BSRGE*, XX, 234; *Place of Egypt*, p. 298; McBurney, *Stone Age of Northern Africa*, pp. 224–25; McBurney, *Prehistory and Pleistocene Geology in Cyrenaican Libya* (Cambridge, 1955), pp. 251–62.

The Mesolithic culture of Khartoum is published by A. J. Arkell, *Early Khartoum*.

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An Account of the Excavation of an Early Occupation Site carried out by the Sudan Government Antiquities Service in 1944–5 (Oxford, 1949); and is discussed in varying degrees of detail by C. B. M. McBurney, *Proc. Preh. Soc.*, XV (1949), 197–99; *Stone Age of Northern Africa*, pp. 59 n. 1, 242–44; Cole, *Prehistory of East Africa*, pp. 104, 211–14; R. Vaufrey, *L'Anthropologie*, LIV (1950), 478–81; and others (see J. M. A. Janssen, *Annual Egyptological Bibliography, Indexes 1947–1956* [Leiden, 1960], p. 20). See also Myers, *Kush*, VIII (1960); Cesnola, *Kush*, VIII (1960); Säve-Söderbergh, *Kush*, X (1962).

Because of the continuity which exists between the Late and Final Paleolithic (sub-microlithic and microlithic) industries of Sebil and Kharga the latter have been discussed and documented in the text and notes of our preceding section. The intensification of regional differences in Final Paleolithic times is referred to by Huzayyin, *Place of Egypt*, pp. 263, 269–70; "Recent Studies . . .," p. 211; and by Caton-Thompson, *Proc. Preh. Soc.*, XII (1946), 117. In the first reference Huzayyin remarks that the cultural isolation of the various sections of Egypt maintained itself although "the Nile continued to facilitate migrations." At Sebil the derivation of Sebilian III from Sebilian II is noted by Caton-Thompson, *Proc. Preh. Soc.*, XII (1946), 117; and Huzayyin, *Place of Egypt*, p. 253. Huzayyin (*op. cit.*, p. 260) suggests that "it was perhaps from" the "Diminutive Levalloisian" of northern Egypt "that the microlithic (partly Final Palaeolithic? and certainly later) facies discovered on the surface (and so of rather uncertain date) at Hilwan and Wadi ʿAngabiya (Pl. XII, 33–45) was evolved (though only indirectly)." See also Butzer, *Quaternary Stratigraphy*, p. 99. The quotation at the end of our antepenultimate paragraph is from McBurney (*Stone Age of Northern Africa*, p. 226), who says: "A final wave of hunters from the Levant brought the Natufian culture as far as the eastern Delta, but did not apparently penetrate further west."

K. W. Butzer studies the "Postpluvial"—i.e., Final Paleolithic to Neolithic—climatic stages and developments in the Near East in some detail in his *Quaternary Stratigraphy*, pp. 101, 127–28; and it is he who suggests a population of 1000 for the Nile Valley and Delta about 5000 B.C. (*BSGE*, XXXII [1959], 50). Butzer's assertion that "die einladenden Ufer des Fayumsees waren anscheinend um 5000 v. Chr. zuerst noch unbesiedelt" ("Naturlandschaft," p. 65) is derived from Caton-Thompson and Gardner, *The Desert Fayum* (see especially pp. 1 and 88). The phrase "gap between the end of the Palaeolithic and the rise of civilisation" is used by A. J. Arkell in *Archaeological News Letter*, vol. II, No. 8, p. 124. The coexistence of Mesolithic and Neolithic cultures in Egypt is discussed by Huzayyin, *BSRGE*, XX (1939), 211, 212, 216, 218, 219, 226, 232–35, 258; "Recent Studies . . .," pp. 175–76; Caton-Thompson and Gardner, *The Desert Fayum*, p. 30. The relationship of the Mesolithic in general to the preceding Paleolithic and the succeeding Neolithic is clearly defined by Movius, "The Old Stone Age" (in Shapiro, *Man, Culture, and Society*), p. 75. Butzer's cited comment on the effect of the contact between the Final Paleolithic and early Neolithic peoples of Egypt will be found in *BSGE*, XXXII (1959), 44.

On the recurrence of microlithic industries in Egypt in later prehistoric and historic times see especially Huzayyin, *Place of Egypt*, pp. 270–71; Caton-Thompson, *Proc. Preh. Soc.*, XII, 116–17; and Larsen, *MDIK*, VI (1935), 44–50; and on the use of tiny blades and barbs of quartz and flint on hunting arrows of the Eighteenth Dynasty see, for example, H. Bonnet, *Die Waffen der Völker des alten Orients* (Leipzig, 1926), p. 161; W. Wolf, *Die Bewaffnung des altägyptischen Heeres* (Leipzig, 1926), p. 85; G. Daressy, *Fouilles de la Vallée des Rois* (*CCG*, Nos. 24001–24990), Nos. 24083, 24085, Pl. XII; A. Lansing and W. C. Hayes, *BMMA*, XXXII (1937), January, Sect. II, p. 12, fig. 21.

The rock-engravings of the so-called Earliest Hunters are published by H. A. Winkler, *Rock Drawings of Southern Upper Egypt* (*Sir Robert Mond Desert Expedition.*

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2 vols. London, 1938, 1939), I, 28–29, 31–32, 49, Pls. XXVI–XXXII; II, 31–35, Pls. LI–LXI. See also Winkler, *Völker und Völkerbewegungen im vorgeschichtlichen Oberägypten im Lichte neuer Felsbilderfunde* (Stuttgart, 1937); J. H. Dunbar, *The Rock-Pictures of Lower Nubia* (Service des Antiquités de l'Égypte [Cairo, 1941]); Sandford and Arkell, *Prehistoric Survey*, II, 63–71; Caton-Thompson, *Kharga Oasis in Prehistory*, pp. vi–vii; Alimen, *Prehistory of Africa*, pp. 371–74; McBurney, *Stone Age of Northern Africa*, pp. 271–72. The association of these drawings with a "Mesolithic rather than a Neolithic culture" is discussed by Butzer, *BSGE*, XXXII (1959), 81–82. In his discussion Butzer points out that there is no evidence that these people "kept domestic animals" and draws attention to the "cultural impetus of rock drawings from Mesolithic Spain."

Groups of large flint implements from the Wadi el-Sheikh, in Middle Egypt, have been compared to those of the Mesolithic culture of Campigny in northern France (Seton-Karr, *JRAI*, XXVII [1898], 90 ff.; Scharff, *Altertümer der Vor- und Frühzeit Ägyptens*, pp. 7–8), but the resemblance seems to be superficial and without immediate cultural or chronological significance (Caton-Thompson, *Kharga Oasis in Prehistory*, pp. 187–96; Huzayyin, *Place of Egypt*, p. 307, n. 2. See also Vandier, *Manuel d'archéologie égyptienne*, I, 62–63). The implements in question apparently range in date from the Predynastic Period to the Middle Kingdom (Baumgärtel and Brotzen, *Präh. Zeitschrift*, XVIII, 100 ff.).

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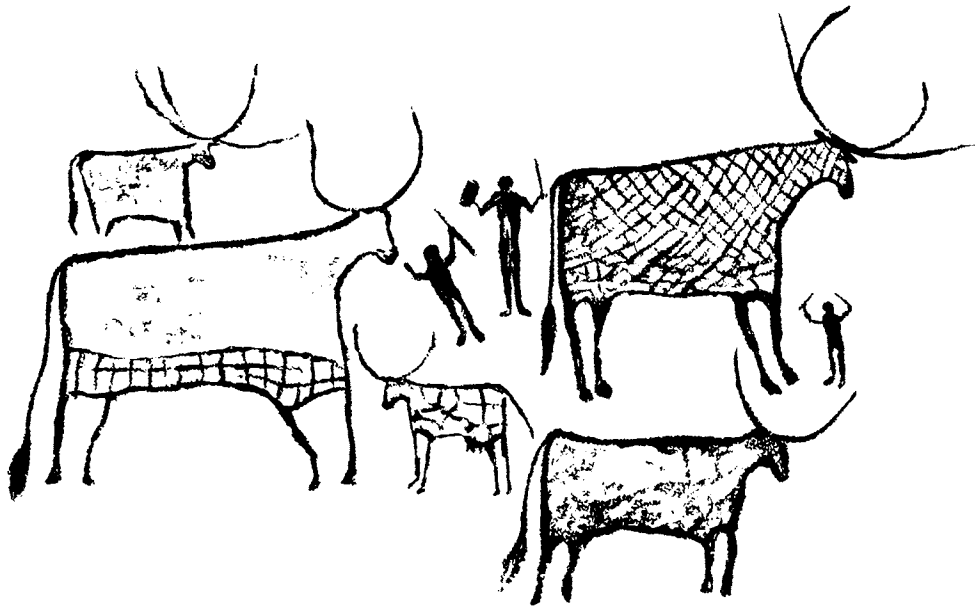

3

THE NEOLITHIC AND CHALCOLITHIC COMMUNITIES OF NORTHERN EGYPT

1. Near Eastern Origins

It will have become apparent that such terms as "Paleolithic" and "Mesolithic" do not imply "absolute periods of time," but are simply designations of broad and often overlapping stages of cultural development as observed at various times in various individual localities. This is true also, and to an equal degree, of the so-called Neolithic, or New Stone Age, a phase in man's cultural evolution which in the Near East extended roughly from 7500 to 3000 B.C., in Britain from 2500 to 1800 B.C., and in some of the world's more secluded backwaters down into modern times. The stage itself is characterized by the use of both flaking and grinding (or polishing) in the preparation of stone tools and weapons, by the inauguration of food production through stock breeding and agriculture, and by the adoption, thanks to this new economy, of an increasingly sedentary type of existence in more or less permanent dwellings grouped together to form settlements ranging in size from small farming villages to good-sized towns. It is also characterized, thanks in part to the security and the leisure provided by the new form of livelihood, by notable increases in the population and by marked developments in the fields of religion, politics, commerce, science, craftsmanship, and art—the components of what we are accustomed to call "civilization."

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In the Near East the earliest evidences of man's transition from the nomadic life of the hunter to the more settled existence of the farmer are found in southwestern Asia, in the long arc of grassy uplands which form the outer flanks of Breasted's "Fertile Crescent," curving around from the Iranian plateau, through northern Iraq and southern Armenia, and down into Syria and Palestine. Here the goat and the sheep, the first food animals to be domesticated by man, occur in profusion in a wild state, and at Qalat Jarmo in Iraq a form intermediate between the wild bezoar and the later domestic species of goat has been found in an early Neolithic context. Here also grow the wild ancestors of wheat and barley, the Neolithic farmer's basic crops, the cultivation of which probably originated in Palestine and is attested in Iraq by 6000 B.C., early forms of cultivated wheat and two-row barley having been found in the pre-pottery Neolithic village at Jarmo. Encampments partaking of the nature of villages, with sunken, plaster-lined shelters and storage bins, are already known in the Mesolithic (Natufian) of Jordan and in the contemporaneous Karim Shahir culture of Iraqi Kurdistan. At Tell el-Sultan (Jericho) in southern Palestine a fortified proto-Neolithic village of mud-brick houses has been dated by radiocarbon tests to before 6800 B.C., at Ras Shamra (Ugarit) in northern Syria similar houses solidly constructed on foundations of large stones are assigned to the seventh millennium B.C., and at Jarmo rectangular houses of packed mud or pisé construction range back in time into the latter part of the same millennium. On these sites the earlier settlement levels have produced no trace of pottery vessels and the cultures which they represent are accordingly designated as pre-pottery, or preceramic, Neolithic. In southern Anatolia and the mainland of Greece, on the other hand, well made pottery appears to have been present from the very beginning of Neolithic times.

Jericho lies a scant two hundred miles to the east of the Nile Delta, and it would seem inevitable that a Neolithic, food-producing, village culture of the type attested there before 7000 B.C. should have reached northern Egypt from this immediately adjacent southwest Asian area in the course of the seventh or, at the latest, the sixth millennium B.C. This assumption is supported by a radiocarbon date from the Haua Fteah cave in Cyrenaica which indicates that by 4850 B.C. immigrants from the east bringing with them a primitive Neolithic culture had already traversed the Delta and settled further to the west in the coastal region of Libya. The earliest settlement remains so far discovered in Egypt—on the northern fringe of the Fayum and at the west Delta site of Merimda Beni Salama—seem to date, however, from the fifth millennium B.C. and, though primitive in some respects, contain numerous pottery vessels and other elements of fairly well developed types. Butzer is inclined to push the Fayum "A" Neolithic back to about 5500 B.C., and Larsen has suggested a date of 5040 B.C. for the lowest level of the Merimda settlement, disregarding or emending the evidently somewhat low radiocarbon readings of 4440 and 4145 B.C. obtained for the former and 4130 B.C. for the latter. Dr. Baumgartel, on the other hand, repudiates the use of the term Neolithic in connection with either of these sites and would see in the Fayum and west Delta settlements retarded, marginal cultures of Chalcolithic times, contemporaneous, respectively, with the so-called Predynastic (Naqada I and II) cultures of Upper Egypt. With this it is difficult to agree, especially in view of the Carbon 14 results so far obtained, which tend to place

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the Predynastic finds five hundred to a thousand years later in absolute time than the metal-free and generally more primitive assemblages of the Fayum and Merimda.

2. The Fayum Settlements

It was apparently during the eighth millennium B.C. that the lower Nile, in response to the rise in sea level known as the Flandrian Transgression, began to aggrade its bed and send its waters once again through the Hawara Channel into the Fayum, reflooding the depression and creating a new, post-Paleolithic lake which in the course of time reached an elevation of 59 feet (18 meters) above present sea level. Two of the small Neolithic encampments strung out along the northern rim of the depression from Dimai to a point north of Kom Aushim may have been established on the shore of this high-level lake; but most of the settlements of the so-called Fayum "A" culture, to which these two camps ("M" and "Z1") also belong, date from a slightly later period when, owing to the silting up of the Hawara Channel, the lake had sunk to 33 feet (10 metres) above sea level, leaving along its margins expanses of rich lacustrine silt, suitable for hoe cultivation of the primitive type practiced by the first Neolithic settlers in the region. The long period of equilibrium maintained by the lake at this level is undoubtedly to be associated with the increase in rainfall and general betterment of climatic conditions which, toward the end of the sixth millennium B.C., ushered in the so-called Neolithic Sub-pluvial, or Moist Interval, facilitated agriculture and stock farming, and led to "the resumption of widespread cultural contacts and intercommunications" throughout the Near East.

For their settlements the Fayum-A people selected sites in the lee of the low sandrock "buttes" which ring the north shore of the lake, usually near an inlet or other indentation in the shoreline, where the fishing would have been good, and never very far from the level stretches of old lake bed upon which they grew their modest crops of wheat and barley. Of their flimsy huts or shelters, built probably against the protective masses of sandrock, nothing now remains; but the village sites are marked by sunken hearths, or fire-holes, ranging in number up to between two and three hundred for a single settlement (Kom W) and having occasionally coarse pottery cooking vessels, containing the bones of fish and animals, still in position in them. It is clear that fishing and hunting in and along the shores of the lake itself provided an important part of the settler's food supply, the wild game available locally including hippopotamus, elephant, crocodile, pig, Bubalis, and several carnivores. There is no evidence that domestic animals "played much, if any part in this lake-side economy"; and the scanty remains of sheep or goat found may belong to wild species, such as the Ammotragus, the same being true of the remains of cattle. Groups of grain storage pits, or silos, sunk in the high ground adjoining the settlements and often lined with coiled straw matting, indicate, however, not only that food production by agriculture was well advanced, but that, locally at least, it was organized on a community basis; and the fact that grains of emmer wheat (*Triticum dicoccum*) and six-row barley (*Hordeum hexastichum*) found in the silos are practically identical with those grown in Egypt today suggests that a very long time had already elapsed since the cultivation of the wild ancestors of these grains was first undertaken—in short, that agriculture had been practiced in the Near East for millenniums before its introduction into the Fayum. Well made

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grass-coil baskets found in the granaries were probably used for sowing grain, several silos yielded what look like threshers' flails, and two contained sickles composed of straight, tapered shafts of tamarisk wood, in one case with three serrated flint blades imbedded in resin in a groove in its cutting edge. For milling grain there were saddle querns of limestone with gritstone grinders, which, however, could also have been used for grinding red ochre used as a pigment.

Chipping, pressure-flaking, and grinding, or polishing, with an abrasive were employed singly or conjointly in the production of the Fayum-A people's extensive repertory of stone implements and weapons, nearly all of which were worked bifacially in accordance with a tradition now believed to have been revived in northern Egypt—perhaps with some stimulus from the Aterian—in Final Paleolithic and pre-Neolithic times. Most characteristic are the axes of chert, limestone, dolerite, and volcanic ash which comprise over forty percent of all the tools found. They are for the most part pounded or flaked to an elongated triangular, conoid, or trapezoidal form with a narrow butt and a straight cutting edge, the latter sharpened by grinding following the initial flaking, but not apparently re-flaked after grinding except to repair a damage or in a later re-use of the axe. Next in frequency are the sickle blades, thirty-one of which were recovered from the settlement of Kom W alone. They are serrated on one edge only and are usually pointed at one end, only three of the examples found being square at both ends. In nearly every case the edge of the blade has acquired a "silica-polish," or gloss, from cutting the stalks of wheat or barley.

Easily the most striking of the Neolithic Fayumis' hunting weapons are the superbly worked hollow-based arrowheads with long wings sweeping back on either side of the point of attachment of the shaft. These the lake-dwellers apparently used against even such formidable beasts as the African elephant and the hippopotamus, two such arrowheads having been actually found in the carcasses of an elephant and a hippo. This type of arrowhead, known also from the Badarian sites of Middle and Upper Egypt, is thought by some to have evolved locally from the Late Paleolithic core-point and the triangular arrowhead, by others to be a development of the Aterian tanged arrowhead borrowed by the Nilotic peoples from their Saharan neighbors.

Kom W, the largest of the A-group settlement sites, also produced adzes of flint and banded volcanic ash, a few triangular arrowheads, ground points of translucent chert and leaf-shaped points used as daggers, javelins, and spears, knives of tabular chert worked by pressure-flaking, a small number of pebble-butted and pebble-backed tools, a twisted bifacial blade, and an elaborate halberd-like point, perhaps a forerunner of the Predynastic "fish-tail." In the same area, but not *in situ* and probably belonging to the later B-group, were found chipped axes, planes, and gouges, leaf-shaped arrowheads, and a curious type of concavo-convex flake-tool detached from its core by a blow delivered on the side of the latter. The presence in Kom W of a small number of blade-tools, including plain blades and microlithic backed blades and cores, suggests a partial intrusion by one of the surviving North African or Palestinian blade cultures of Final Paleolithic antecedents. Hammerstones of flint, quartz, fossil wood, grit, and limestone were found in large quantities as were also smooth waterworn pebbles of flint and volcanic ash used as burnishers, and pebbles apparently collected by the settlers because of their odd forms.

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A pierced discoid object of limestone and another of diorite have been identified, perhaps correctly, as maceheads, though the possibility that they are weights for loaded digging sticks of the kind used by primitive agriculturists today should not be overlooked.

Similar objects, but smaller and more spherical in shape, made of limestone and, in one case, of dolerite, are almost certainly spindle whorls, employed in the spinning of thread, which we know from a piece of coarse linen cloth found near one of the A-group silos the Neolithic Fayumis were not only able to produce, but were also able to weave into fabrics on simple looms of, presumably, the primitive horizontal type. The fibre used in the manufacture of this cloth is quite definitely flax, though not necessarily *Linum usitatissima*, seeds of the latter having been found, however, in two adjoining silos. The weave of the cloth is fairly even, the thread "lightly spun," and the fibre evidently retted, beaten, scraped, and combed before spinning. Other spindle whorls recovered from the settlements are simply perforated disks of pottery of the type common in Predynastic times.

For catching fish in the clear, shallow waters of the lake the Fayum people seem not to have used fish-hooks but to have relied chiefly on fish-spears and harpoons tipped with heads of fish-bone (*Lates niloticus*) which are beveled at their butts to fit into the wood or reed shafts and are either barbed or grooved to receive small barbed points, now missing. Being, as we have seen, expert basket makers, they probably also fashioned fish-traps of basketwork and may have used knotted cord fish-nets weighted with grooved limestone sinkers of which a considerable number have been found.

The settlement of Kom W yielded bone pins and awls and a tubular length of bone which may have served as a paint-container, a needle-case, or the foreshaft of a beveled bone point or harpoon. Fresh-water mussels were gathered from the lake as food and their shells, especially those of *Spatha cailliaudi*, were used as scoops, or ladles, being frequently found stacked together, either in pottery vessels or in hearthside rubbish with sherds, fish bones, and splintered animal bones. Similar shells with nicked or serrated rims may have been employed for scaling or skinning fish.

Ochre, presumably destined for use as a pigment or cosmetic, was ground on oval or irregularly rounded palettes of banded limestone and Nubian diorite with bevelled edges and plano-convex or concavo-convex cross sections, a smooth pebble being used as the grinder. Among the strikingly few items of personal adornment recovered from the settlements are marine shells acquired, apparently through trade, from the Mediterranean and Red Sea coasts and usually pierced for suspension or stringing, the varieties of shell so employed including Pectunculus, *Cardium edule*, two species of cowries, Nerita, Conus, Turritella, and Columbella, as well as *Osinitus turbinatus* and *Helix desertorum*, the last obtained locally. A shell bracelet, evidently made to be worn by an infant, measures only 1.7 inches in its inside diameter. A few primitive stone beads and pendants of banded volcanic ash, limestone, and microcline felspar, or green amazonite—the last material probably imported from the Eastern Desert or from the Libyan massifs north of Tibesti—range in form from rough perforated pebbles to discoid and barrel-shaped beads and drop-shaped pendants. Despite their crudity, the shaping and drilling of these minute stone ornaments reflect the notable advances in technical ability achieved by the Neolithic craftsmen of northern Egypt. Turquoise nuggets, presumably for use as beads, may

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have been brought from the western massifs or possibly from as far away as Sinai, the locale of the principal turquoise mines of the dynastic Egyptians. Beads of a type peculiar to the Fayum settlements consist of discs of ostrich eggshell, half an inch in diameter, pierced with a hole through the center. Miniature axes of volcanic ash and fossil shark teeth were worn as amuletic pendants and show in several cases incomplete perforations for stringing. Garments, bags, vessels, and the like were apparently made of dressed animal skins, a "dark glutinous substance" found in one of the granaries having been identified as the remains of a piece of hide or leather.

The numerous pottery vessels found in the Fayum-A settlements are for the most part of simple forms, without handles, necks, mouldings, or projecting rims, and are made in the majority of cases of a coarse, ill-fired clay containing a binder of chopped straw. They are entirely hand-made and are often asymmetrical in shape. Among the larger cooking and storage pots deep round-bottomed bowls and wide-mouthed bulbous jars of rough-faced brown ware predominate. A few flat-bottomed pedestaled cups and one small cup resting on three knobbed feet are surprisingly sophisticated forms. Particularly characteristic of the Fayum Neolithic A culture are rectangular basins of polished red ware with the rims pressed up at the corners to form pronounced peaks. The surfaces of these platters, which do not occur again in Egypt until much later Pan-grave times, preserve "patches of a thin ferruginous slip of purply-red colour applied in horizontal smears below the rim." Vessels of polished black ware are exceedingly rare, and in several of the examples found the black is probably accidental, the result of improper firing of what were to have been red-polished vessels. In the case of one pot and a number of sherds of brown ware a smooth but not polished surface was achieved by the application of a slip or by wet hand-smoothing, or "creaming," of the damp clay. The fragments of nine pots show small holes drilled from the outside of the vessels and intended either for their suspension or repair. "No traces of incised, combed or painted pottery was found," the only decorated pieces being a solitary sherd with a row of studs below the rim and another with a single large boss on its surface. The primitive character and poor development of the Fayum-A pottery may be attributed in part to its relatively early date and in part to the "high perfection" attained by the contemporaneous basketwork.

Stone vessels appear not to have been manufactured in any quantity, the only examples recovered being an oval, boat-shaped mortar of nummilitic limestone and a fragment of diorite which may have been part of a bowl.

The complete lack of any articles carved of ivory is not only striking, but puzzling, since both the elephant and the hippopotamus were common in the area and were hunted by the Fayum people, as attested, among other indications, by a number of decayed hippo tusks found in a pot and in one of the middens of Kom W. Except for a few lumps of red ochre no trace of metal or any metalliferous ore has been found in an A-group context, even malachite, so common in prehistoric and later times as a pigment and cosmetic being entirely lacking.

Whatever artistic tendencies the Neolithic Fayumis may have possessed seem to have been confined to their superbly fashioned and often beautiful stone tools and weapons. Decoration of any sort is exceedingly rare on any of the other classes of objects found, being confined to

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the two boss-studded potsherds referred to above, an engraved line on a diorite palette fragment, and groups of incised rings around some of the bone points.

The total absence of burials in the low-lying, lakeside settlements, though understandable, has deprived us of any information not only on the physical and ethnic character of the Neolithic inhabitants of the Fayum, but also on their funerary customs and beliefs. Unless they were otherwise disposed of, it is probable that the dead were buried in cemeteries in the higher ground some distance from the villages, but to date no graves have been found which can with confidence be assigned to this period.

Though the initial impetus toward a semi-agricultural village life of the type seen here is almost certainly to be sought for in southwestern Asia, there is no general agreement among modern authorities on the origin of the earliest Neolithic settlers in the Fayum or on the principal source of the cultural tradition reflected in their villages and granary areas. Huzayyin, as we have seen in Chapter II, would recognize the prototypes of the more characteristic tool-forms of the Fayum Neolithic (axes, tranchets, adzes, hollow-based arrowheads) in a local Upper Paleolithic industry, for which he has suggested the name "Fayyoumian," or "Qarounian," and which he describes as a unique development starting in the Levalloisian, but "specializing more in the core than in the flake and reviving the truly bifacial technique." Having in 1934 favored "the possibility of an autochthonous Delta origin" for the Fayum Neolithic, Miss Caton-Thompson in 1952 was "tempted to see the origins of the Egyptian Neolithic and early Predynastic bifaced tools" "in the Aterian foliates." Forde-Johnston also is inclined to derive the hollow-based arrowhead and the Neolithic bifacial technique of the Fayum and the Nile Valley in general from the Aterian; and Arkell feels that "the neolithic features of the Fayum Neolithic were brought to the Fayum" from "a dispersal area well to the west of the Nile Valley" ("perhaps Tibesti)." McBurney, on the other hand, draws attention to the near-identity of the Fayum A and Natufian sickle forms and to the marked similarity which exists between the burnished pottery of the Fayum and that of the coastal areas of the Levant, and thinks that "there is a very strong *prima facie* case for an ultimate Levantine derivation of the [Fayum A] culture"; while Childe, after discussing the possibilities of a western or southern origin, concludes by pointing out the many "northern or Asiatic elements in the neolithic cultures at least of Lower Egypt"; and Butzer, as we have seen, describes the Neolithic immigrants as "new cultural and ethnic groups originating from the area of the Fertile Crescent . . ."

The occurrence in the middens of the A-group people of a few small blade-tools and cores of Final Paleolithic or Mesolithic type (see above) would seem to indicate the survival in the area of bands of semi-nomadic hunters and fishermen at a far less advanced stage of economic and cultural development than the contemporaneous inhabitants of the recently established agricultural communities. As the Fayum lake continued its downward trend, first to 13 feet (four metres) above sea-level and then to seven feet (two metres) below sea-level, this somewhat backward element evidently became a more and more dominant factor in the local population, to the detriment of the once flourishing Neolithic settlements and their culture. Degenerate forms of some of the A-group stone implements, however, continued to be produced and are found, together with increasingly large numbers of microlithic

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blades and points, on the surfaces of the village middens and at a series of evidently temporary camp and chipping sites along the northern rim of the ancient lake basin, both above and below the level occupied by the Neolithic villagers. The resulting mixed and essentially retrogressive culture, now generally known as the Fayum "B" phase, is seen to have extended in time from the interval between the formation of the 33- and 13-foot lake beaches to the earliest stage of the −7-foot shoreline, that is, from the period of decline of the Fayum A-culture to the establishment in the Fayum area (notably near Qasr Qarun) of outposts of a developed Predynastic (chalcolithic) culture of Nile Valley origin. Since it seems locally to have been generally earlier than the latter culture and since it exhibits no trace of metal tools or metalliferous substances of any kind it is usually classed as "Later Neolithic," the term, however, being in this case a convenient rather than a wholly accurate description of the material involved.

In its earlier stage the Fayum B culture is characterized by a marked diminution in the types of A-group implements still produced and by the substitution of variant or new forms for those abandoned. The temporary encampments of the B-group people at the 13-foot lake level yielded pebble-butted and pebble-backed knives and scrapers of A-group types, five abnormally small bifacial sickle-flints, and the tip of a concavo-convex scraper, or "side-blow flake." Polished axes, so numerous in the A-group settlements and granaries, no longer occur, their place having been more or less taken by chipped celtiform tools, including ovate and hoe-shaped forms. Tanged and winged arrowheads of a type attested elsewhere in the Egyptian area have largely replaced the concave-base type, only one example of which has been recovered in an early B-group context. A flaked adze or plane of plano-convex cross section, evidently intended for woodworking, is of a form not found *in situ* in the A-group mounds, but is known in the Predynastic middens of the Nile Valley, in the oasis of Siwa, and in the so-called Peasant Neolithic of Kharga oasis. The microliths found either in association with these A-group survivals or in separate patches, or "swarms," constitute a "monotonous little repertory" of single-backed straight blades, double-backed blades, partially backed or shanked forms, trihedral rods, and small conical, rectangular, or amorphous cores. Having comprised only a minute percentage of the implements present in the earlier Neolithic village sites, they now form a majority of all the tools found, while the number of Fayum A implements has decreased to such a striking degree as to suggest "a drastic reduction in the neolithic population as between A and B group times."

The later phase of the Fayum B culture is associated with a well-defined beach at seven feet below modern sea-level, a height apparently maintained by the lake throughout the rest of Egyptian prehistory and down into the time of the Old Kingdom. Little change is apparent in the typology of the stone implements, but the degeneration of the Neolithic forms has progressed still further and the proportion of microliths to larger tools has increased. The now complete absence of sickle-flints, granaries, and millstones suggests that agriculture had been temporarily abandoned as a means of livelihood and that the inhabitants of the Fayum had reverted for the time being to an outmoded food-gathering economy; and the absence of pottery, cosmetic palettes, and beads bespeaks the poverty of the B-group encampments and the low level of the culture represented by them. A few

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beveled bone points were still being made and the majority of the grooved pebbles used as net-weights are probably to be assigned to this phase. At a late camp site called by its excavators Moeris I and at "Site H, some two miles west of Dimai," "Fayum neolithic" types and a large number of Fayum micro-blades and other wind-worn microliths were found together with larger, coarse unifacial blades which seem to be related both chronologically and typologically, as well as in the technique of their manufacture, to the fine unifacial blades of the Predynastic settlement near Qasr Qarun.

3. The Oases of Siwa and Kharga

Whereas the Neolithic settlements at Merimda Beni Salama, on the western fringe of the Delta, and at Shaheinab in the Sudan show marked parallelisms with the Fayum Neolithic A, in the Libyan Desert areas to the west of the Nile Valley the affinities are chiefly with the later, B culture. For this reason it seems desirable to discuss the Neolithic remains in these areas while the picture of the latter culture is still fresh in our minds, though much of the material involved is of relatively late date, being partly, if not wholly, contemporaneous with the Predynastic cultures of Upper Egypt.

The oasis of Siwa, a depression some fifty miles in length from east to west and twenty miles in width, lies approximately two hundred and seventy-five miles due west of the Fayum, near the modern boundary line between Egypt and Libya, and roughly one hundred and seventy miles south of the Mediterranean coast. Surface collections of stone implements from small farming(?) settlements on the slopes and terraces of the depression's northern escarpment and from hunting camps grouped around small pond-like basins on the desert plateau, nineteen miles to the north, show much the same mixture of microlithic and developed Neolithic forms which characterizes the Fayum B culture and include a number of the more distinctive types of tools and weapons associated with that culture. We find, for example, among the Siwa collections now in Cambridge and Alexandria the concavo-convex scraper, or side-blow flake, known elsewhere only in the Fayum and at Kharga, the plano-convex adze or "plane," small pressure-flaked tanged, leaf-shaped, and elongated arrowheads, all of which can be matched in Fayum B and at Kharga, trihedral rod-shaped "drills," miscellaneous pressure flaked tools including planes, small leaf-shaped knives, and points, the "general effect" of which is "closely similar" to pieces from the Fayum, oval or slightly pointed bifacial tools "not unknown in the Neolithic of the Fayum," "though less conspicuous" there than further west, straw-polished bifacial sickle-blades like those of the Fayum and other Egyptian sites, and spherical calcite maceheads or spindle whorls known also among the Fayum surface finds. As in the B culture single-backed, double-backed, and shanked blades predominate among the Siwa microliths. "Virtually all the characteristics of Stage 'B,'" says McBurney, "are represented, but none of those which are the exclusive property of 'A.'" The same writer also notes the absence of "specimens displaying traits peculiar to the later Pre-dynastic or early Dynastic flint working traditions."

Aside from its many links with the Fayum B-group the stone industry of Siwa exhibits one or two "western traits," such as the Sirtican round-based arrowhead with micro-burin finish and the oval biface which, though known in Egypt, is far more abundant in nearby Cyrenaica and, further to the west, in the Maghreb.

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Heavy stone querns were found at several of the chipping sites on the northern escarpment of the oasis. They range in size up to a foot in diameter and are provided with flat circular pebble rubbers or grinders. They could have been used, as in the Maghreb, for grinding ochre, but are more likely to have been mills for grain. Their presence together with that of the well-worn sickle blades suggests that catch-crops of wheat and barley may have been grown by the Neolithic Siwans on the terraces of the escarpment and their weight implies settlements of a somewhat more permanent nature than the hunting camps of the northern plateau surface. Pottery is represented by a fragment of a thick-walled hand-made vessel with bands of impressed ornamentation on the exterior and by a piece of a heavy round-based pot of somewhat indefinite, though probably prehistoric, date. A cobble of speckled green crystalline rock, from which a few flakes have been removed, must have been imported from some distance away, since the stone is not local to Siwa or its vicinity.

Following a reference to "the pastoral and primitive agricultural economy" which had been implanted in the eastern Libyan area at this time McBurney concludes by remarking that "as far as Siwa is concerned its close affinity with Kharga and the Fayum is probably sufficiently explained by the fairly uniform nature of the oasis and plateau environment which . . . forms a not ill-defined geographical unit whose westerly extremity lies at Jaghbub."

At Kharga, four hundred miles to the southeast of Siwa and only eighty to ninety miles from the Nile Valley in southern Upper Egypt, the microlithic and Neolithic elements are not mingled as in the Fayum B and Siwan assemblages, but form two separate industries, the products, respectively, of a nomadic hunting culture to which Miss Caton-Thompson has given the name Bedouin Microlithic and of a settled agricultural population whom she describes as Peasant Neolithic. The two groups have further been identified with the authors of the rock-drawings assigned by Winkler, respectively, to his so-called Earliest Hunters and to his Early Oasis Dwellers (see above, p. 73). Though widely divergent in their mode of life and cultural level they are found occasionally in the same localities and appear to have been, partially at least, contemporaneous with one another and with the earlier Predynastic (Naqada I) culture of Upper Egypt.

The Bedouin Microlithic folk are seen as a roving people still in an essentially "Mesolithic" stage of existence. Their small-scale stone industry is comprised entirely of narrow blades and backed bladelets suitable for composite mounting, small leather borers, and a multiplicity of arrow tips, including transverse, shanked-blade, lozenge, foliate, winged, and tanged forms. Burins, microburins, and trapezes are lacking and geometric forms of any type are exceedingly rare. Aside from their stone implements and weapons the halting places of these hunting tribes around some of the silty basins of the Kharga depression and the silt pans of the adjoining Libyan Plateau yielded only a few small discoid hand-mills of sandstone, intended perhaps for grinding colocynth seeds and light enough to be readily portable, and some bits of ostrich eggshell including pierced disks of shell apparently strung and worn as beads. A Cardium shell found on one of the Bedouin Microlithic camp sites may have come from the Fayum with which, according to McBurney, the culture in general offers "a remarkably consistent typological picture," showing, on the other hand, few points of contact with either the Typical or Upper Capsian or

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with the Sebil III culture of nearby southern Upper Egypt. Small groups of much the same hunting people were spread out over wide areas of what is now the Libyan Desert, occupying mud-bottomed depressions along the route from Kharga and Dakhla to Gilf Kebir, on the track between Uweinat and Selima, and, to the north, in an area to the west of Abu Mungar. Their crude but highly informative rock-drawings have been discussed in some detail at the end of Chapter II, above.

In contrast to these lightly equipped and wide-ranging nomads the Peasant Neolithic population of Kharga made their habitations on the floor of the depression in the immediate vicinity of the moribund Pleistocene mound-springs, some of which they re-opened by digging, and confined their activities to the areas around these springs and to a seam of tabular chert on the Eastern Scarp edge of the Libyan Plateau where they mined the material for their often massive stone implements. In both areas are found the remains of their big circular hearths or fire-pits, lined with heavy slabs of a bluish limestone brought from the scarp and once surrounded, to judge from the presence of tamarisk roots, by circles of scrubby vegetation. There are no traces of houses in the settlement areas, but the craters of already dried-up mound-springs were apparently used as shelters. Here, *in situ* in the sandrock cappings of the spring mounds or on the surface round about, are found flaked chert axes with transverse edging, axes of nummilitic limestone, and lugged scutiform axes of chert, chisels, planes, and scrapers, including the concavo-convex, or side-blow, type of scraper, massive bifacial and unifacial knives, serrated sickle-blades and other saw-toothed tools, light picks or punches, retouched bulbar flakes, a few burins, or gravers, and a variety of arrowheads, including a kind of concave-based point, not dissimilar from those of the Fayum A and Badarian cultures, but with angled instead of rounded or pointed extremities. Hand-mills of diorite and sandstone, fragments of undecorated reddish brown pottery vessels with plain rims, the imprint of a woven straw or grass platter, and a rough bead of green microcline felspar serve to round out our picture of the material culture and "home life" of the Neolithic Khargans, and the remains of hyenas, two kinds of gazelle, and the fish *Lates niloticus* tell us something of the fauna and climatic conditions amid which they lived.

At the chert workings on the high plateau between the Refuf and Abu Sighawal passes the same people have left us massive mauls, choppers, and hoes (or coarse adzes), gigantic oval or discoidal plaque scrapers, a few light picks or punches, and many of the distinctive concavo-convex side-blow flakes—for the most part unfinished. That some of these implements were stone-masons' or quarry-men's tools seems not unlikely, though there is little area of agreement between the Kharga series and the equally massive but generally later (Predynastic and Dynastic) implements from the well known flint mines of the Wadi el Sheikh in Middle Egypt.

In the Peasant Neolithic folk of Kharga we see, then, more or less sedentary communities of cultivators possessed of a highly developed "heavy industry" of stone tools and of sufficient imagination and initiative to attempt, by sinking shallow, funnel-shaped shafts into the nearly defunct mound-springs, to resurrect and control a failing water supply and in so doing to take what may well be one of the earliest recorded steps in "the age-long development of hydraulic engineering."

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If, as seems likely, the Peasant Neolithic cultivators of Kharga and the "Early Oasis Dwellers" of a group of rock drawings observed by Winkler and others in an ancient depression to the east of the oasis of Dakhla are one and the same people, we know something of their magico-religious beliefs and of their association with the more or less contemporaneous hunting tribes of the area. The drawings in question, carved in a primitive form of sunk relief on and around a series of small sandstone hills, portray almost without exception crude mud(?) statuettes of a pregnant female with exaggeratedly large hips and buttocks, thought by Winkler to have been a fertility goddess and bringer of rain. Unlike her naked devotees, the "goddess" is clad in a skirt adorned with woven patterns and occasionally wears patterned sandals, a necklace(?), and a high cap or radiate headdress above her long plaited hair, her costume reflecting a high degree of skill in the weaving of cloth and production of other garments among the prehistoric inhabitants of the oasis. In one scene cattle are being presented to the deity either as sacrifices or for her blessing; but are otherwise very rarely represented in these drawings and evidently played no important role in the economy of their authors. Other animals known and depicted by the Early Oasis Dwellers are the giraffe, the antelope, the ibex, the ostrich, and the dog. Hand-mills for grinding grain are found in the vicinity of the drawings, and the desert surface round about is strewn with Neolithic stone implements described by Winkler as "typical of the Faiyûm" and assumed by Miss Caton-Thompson to be Peasant Neolithic. The style of the drawings is a combination of that of the cattle-breeding "Autochthonous Mountain Dwellers of Uweinat" and that of the "Earliest Hunters" (= Bedouin Microlithic folk?), and the appearance of the Oasis Dwellers' pregnant "goddess" in the drawings of the latter indicates that the two peoples—the settled cultivators and the roving bands of hunters—lived amicably side by side and exchanged ideas one with the other. The distinctive zigzag treatment of the body of an elephant in a drawing of the Earliest Hunters points to the at least partial contemporaneity of both them and their associates, the Early Oasis Dwellers (= Peasant Neolithic people) with the "Amratian," or Naqada I, culture of the Nile Valley.

Associations of the Khargan Peasant Neolithic with the Fayum (B-culture), Siwa, and, above all, the Predynastic settlement at Armant in the Nile Valley immediately opposite "the Great Oasis," are readily apparent, the agreement of the stone implements in the last instance being sufficiently close to permit us to date the Khargan settlements to Early-Middle Predynastic times and to suggest a migration of the same groups of people either from the Nile Valley westward to the oasis or from the oasis to the riverine zone.

In marshaling the evidence for the existence of a Neolithic subpluvial, or relatively moist interval, extending from about 5000 to approximately 2350 B.C., Karl Butzer refers to the "innumerable Neolithic . . . sites . . . still preserved along the desert margins of the Valley from Merimde to Upper Nubia" and of "the wealth of New Stone Age artifacts seemingly scattered over the desert surfaces of the greater part of Egypt," which "do not only occur at oases such as the Gilf Kebir and Kharga but along the routes across the Libyan Desert." Among such surface concentrations of Neolithic implements may be mentioned the ones found by Georges Legrain in 1897 some forty to forty-nine hours by camel along

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the desert track leading from Rizeiqat in southern Upper Egypt to the Oasis of Kharga and the similar groups observed by Miss Caton-Thompson at three or four points along the light railway line connecting Abydos with the oasis. Stone-lined hearths, hand-mills of sandstone, and quantities of "very finely worked" implements strongly reminiscent of those of the Fayum were seen by the expedition of Prince Kemal el-Din Hussein on the plateau surface between Ain Dalla and Alam el-Ghard, to the northwest of the oases of Farafra and Baharia. In or near the Nile Valley surface finds of Neolithic flints have been recorded at Aswan, Qurna, and Medamud in southern Upper Egypt, at the flint mines of the Wadi el Sheikh, and near Maasara in the Eastern Desert ten miles south of Cairo.

Like the Fayum, Siwa, Kharga, and the other Libyan Desert sites now under consideration belong to the eastern of the two culture provinces into which McBurney divides the Neolithic of North Africa, a province wherein "a remarkably constant culture pattern of incipient food-producing type seems to have been established starting as early as the late fifth millennium B.C." This can be ascribed, the same author goes on to say, "to culture contact between the indigenous microlith using hunters, and intrusive food-producing groups ultimately deriving from South West Asia. The special character of this province, already noticeable in the later hunting cultures, seems to have been maintained locally well into historical times, to judge from the uniformity and consistency of the archaeological material."

4. The West Delta Settlement of Merimda Beni Salama

Reconstructions by Passarge and Butzer of the ancient landscape of the Nile Delta indicate that about 5000 B.C. large areas of relatively high ground in and around the southern half of the broad and fertile triangle were not only habitable but were in all probability dotted with village farming communities similar to those of the Fayum and of the adjoining areas of southwestern Asia. Most of these villages appear either to have been submerged in relatively recent times beneath the rising silts of the Nile's alluvial plain or to have remained unexplored. A notable exception is a great settlement at a site called Merimda ("Place of Ashes") on the southwestern fringe of the Delta one and a third miles south of the modern village of Beni Salama and an equal distance from the Rosetta arm of the Nile, which probably at one time flowed close beside the ancient town. The ground on which the latter was founded, now part of the so-called Low Desert, is composed of Middle Paleolithic silts rising some ten feet above the level of the modern alluvium and banked against bluffs of Lower Pleistocene (pre-Paleolithic?) sandy gravels. With an area of over 215,000 square yards, an average depth of seven feet of cultural debris, and a lifetime of some six centuries, the town, if fully occupied at any one time, would have supported a population of 16,000 and would, thus, have been one of the largest prehistoric settlements in Egypt, rivaled only by the big Predynastic town at Hierakonpolis. Three layers or stages in the settlement of the site have been distinguished, the lowest and earliest layer dated by radiocarbon tests to 4130 B.C., the uppermost layer to 3530 B.C. These dates, according to Hjalmar Larsen, who is followed in his conclusions by Hermann Junker, the excavator of the site, are much too low and are to be raised, by analogy with later, obviously low Carbon-14 readings from Egypt, to 5040

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(or 5290) B.C. and to 4350 (or 4570) B.C., respectively.

The firstcomers to the site of Merimda settled on a gentle sandy rise near the river's edge in the midst of what were then probably seasonal pasturelands and not far removed, we may be sure, from arable stretches of Nile silt. Their flimsily constructed and evidently sparsely scattered shelters and windbreaks have been engulfed or swept away by sandstorms and by sheetflooding during intervals of "appreciable rainfall," the latter having left a "thin but fairly continuous" spread of gravel over the whole of "the lowest settlement stratum." A few of their hearths, however, still survive, showing black in the midst of the yellowish soil, and, in the same habitation area, fifteen shallow oval graves filled with grey earth and containing in each case a human skeleton, usually that of a young child or a woman, lying on its side in more or less contracted position and normally not provided with any kind of personal adornment or food offering. There are as yet no traces of granaries, but one of the hearths yielded grains of cultivated emmer wheat (*Triticum dicoccum*) altogether similar to that found in the basketry silos of the layers above. The implements of the earliest settlers differ in no essential respect from those of their descendants, comprising, among other forms, bone awls and harpoons, flint knives, and cylindrical axeheads of flint and other hard stones. Their pottery, on the other hand, exhibits certain forms and wares which are either rare or lacking in the upper levels of the settlement. Particularly characteristic are bowls of fine hard polished red ware, having below the rim a mat band adorned with an incised horizontal herringbone pattern, usually without a midrib. Also present in the first stage of the Merimda settlement are such sophisticated forms as footed vases, carinated vases, pottery ring-stands for jars, and pottery ladles. In general, there is a predilection at this stage for hard red ware, sometimes with a slight admixture of chopped straw; but bowls of greyish yellow ware are also found, as well as the large, coarse basins or pans, which are common to all three layers. Noteworthy is the absence in the first level of the fine polished black ware and the decorative knobs or bosses characteristic of the pottery of the upper strata.

Rows of post-holes and fragments of the wooden posts themselves show that the villagers of Layer II lived in oval huts of wood-frame and wickerwork construction, perhaps covered with hides, and in horseshoe-shaped shelters of similar construction with the open end normally toward the southeast, away from the strong westerly winds which prevail in this region. In some instances the roof of the hut had been supported by a stout wooden column at the centre of the dwelling and in one case a partition, marked by a row of post-holes, had divided the house into two rooms of unequal size, reminiscent of the entranceway and main chamber of modern African huts. The hearths which are prominent features of these dwellings exhibit several different forms, including the simple round or oval fire-pit, smeared inside with mud, the fire-tray of Nile-mud clods with a smooth, flat surface for heating cakes, the grooved hearth with a hollow in the middle for a cookpot, and pairs of conical mud fire-dogs or "andirons," designed to raise the cooking vessel above the level of the mud or beaten earth floors. Smaller holes in the floors served as supports for the round-bottomed household vessels. Besides these some of the dwellings contained pottery water-jars sunk in the floors, heavy mud-lined mortars for crushing fruit or the like,

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and large circular or oval baskets woven of rush (*arundo donax*) or wheat straw and evidently used for storing grain. In the upper sub-strata of this layer are found for the first time traces of similar large baskets coated on the outside with clay and sunk into pits in the earth to form silos of much the same type as those already seen in the Fayum. At Merimda, however, the granaries are not normally segregated in groups off by themselves away from the village, but are scattered through it and are associated with the individual dwelling places. A number of them preserved portions of their woven matwork covers and, below and between these, a few blackened grains of *Triticum dicoccum*, or emmer, and of a globular grain which has been identified as a small-leafed fodder-vetch (*Vicia sativa augustifolia*). Larger but shallower circular cavities up to thirteen feet in diameter, their sides revetted with spiral matting, may have been threshing floors, especially since grain was found in them and in receptacles nearby. Also scattered among the houses and granaries of this level are contracted burials of the same simple type seen in Layer I and presently to be encountered in Layer III, normally unprovided with offerings except for a few wheat grains placed near the mouth or strewn over the body. Despite the improvements in house construction and grain storage achieved during the second stage of its history the town remained throughout this stage an open settlement of sparsely scattered dwelling-groups, or little "farmsteads," not yet sufficiently closely grouped to prevent the infiltration into every substratum of the settlement area of massive quantities of wind-blown sand. No very striking changes have taken place in the household, farming, and hunting implements of the people since the time of the original settlers; but among the pottery vessels the fine polished red ware bowls with herringbone patterns, so characteristic of Layer I, have all but disappeared and have been largely replaced by vessels of polished black pottery and of various coarse wares, not infrequently provided with knobs or bosses below the rim to serve as handles and elsewhere purely as decoration. High-footed vases and chalice-shaped vessels are among the new forms which begin to put in an appearance in the second phase of the settlement's evidently extended occupation.

The uppermost layer at Merimda is a dark grey mass of settlement debris far deeper and denser than the earlier strata. Here we are confronted by the remains of a large closed village of mud buildings, huts, and work places, which, though not apparently surrounded by a wall or embankment, was, like the Egyptian village of today, protected against the intrusion of wind-blown sand by the number and close juxtaposition of its houses. The latter, laid out in ragged rows on either side of what appear to have been winding streets, are for the most part oval chambers, five to ten and a half feet across, sunk a foot and a half into the ground and continued above ground by walls more than three feet high built up of superimposed rings of Nile mud or constructed of rough blocks or clods of the same material containing a binder of chopped straw and, like the interiors and floors of the houses, covered with a coating of mud plaster. There may have been upper walls and roofs of rush or reed matting; pairs of post-holes at the ends of some of the ovals suggest that the roof in these cases may have been double pitched. Access to the house was gained by means of a crude step consisting of the leg-bone (tibia) of a hippopotamus or a short wooden post set upright against the inside surface of the

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mud wall. A pottery jar embedded either in the floor or against the wall was evidently intended to hold a supply of drinking water rather than to serve as a drain, as was once thought. Such houses would have provided ample protection against the rain, cold, and winds of the northern Egyptian winter; and it is clear from the presence in them of hearths, ring-stands for platters, and bits of animal bones that meals were sometimes eaten in their interiors. Since the prehistoric Egyptian, like his more recent descendants, normally slept in curled-up, or contracted, position the larger houses at Merimda could have accommodated entire families. Their oval form is undoubtedly reflected in that of the contemporaneous and later prehistoric graves—shallow oval pits wherein the dead also lie on one side, in contracted position, as if in sleep. Though primitive in many respects, these houses are solidly and painstakingly built and were evidently designed to last a long time, suggesting in their construction and arrangement an urban community of a permanent nature rather than a desert-fringe encampment of semi-nomadic tribesmen. Their alignment in rows to form streets almost certainly reflects the existence of some form of local government, headed probably by a town or district chieftain.

Oval huts and horseshoe-shaped shelters of light construction still continued to be built for use by day and in warm weather as temporary residences, kitchens, workshops, and the like. A more or less complete fence made of long bunches of reeds bound together by cross-bundles of the same material resembles the present-day *būs*-fence, or *zeriba*, used as an enclosure for small cattle and grain. Besides the now numerous sunken basketry granaries, grain, fruit, and other commodities were stored in hemispherical, mud-lined storage bins let into the ground and resembling great bowls and in huge flat-bottomed cordiform pottery jars, or pithoi, over three feet high and two feet in diameter at the shoulder, also buried in the ground up to the level of their evidently narrow mouths. The earlier examples of these pithoi are ineptly made of a coarse red ware and tend to be irregular and asymmetrical in shape, suggesting that a mastery of the technique of their manufacture had not yet been attained; but those of the uppermost substrata of the layer, a reddish light brown in color, are thin-walled and regular in form. The other pottery of Layer III is characterized by the extensive use, for the finer pieces, of a soft black polished ware and by the complete disappearance of the fine red-ware vessels with incised herringbone ornament, found in the earliest levels. The decoration now consists of groups of simple incised lines, rows of small circular hollows, applied bosses, and small rib-like ornaments, as well as vertical, horizontal, and horseshoe-shaped rolls, the last serving as hand-grips for lifting the vessels.

In general, the pottery of Merimda, though comparable to that of the Fayum "A" settlements, differs from the latter in a number of significant details and seems, on the whole, to be more evolved. It tends, for example, less to the simple bag-like forms seen in the Fayum and more to flat-bottomed and concave-bottomed dishes, bowls, and jars, and comprises a number of quite elaborate footed and multi-legged forms, including bowls and jars standing on human feet modeled of clay, vessels with tapered tubular spouts or open spouts, carinated vases, double vases, conical beakers, chalices, oval and boat-shaped bowls, ring-stands for round-bottomed jars, and well developed if somewhat coarse terra cotta ladles, spoons, and scoops, the last occurring also on

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early Chalcolithic sites in Palestine. Besides the fragments of vessels with the horseshoe-shaped grips below the rim there are others with thumb-sockets, projecting knob-handles and conical handles and at least one example with a stirrup handle. Holes for suspension cords occur near the rims of a number of potsherds from Merimda, while others show similar holes used for lashing together the pieces of vessels which had been broken. Miniature jars and bowls found during the season of 1931–1932 have been thought to be children's toys ("doll's dishes"), but are more likely to have been containers for cosmetics or perhaps even votive vessels like the model vases found in tomb-chapels and foundation deposits of the dynastic period. Many of the larger narrow-mouthed jars were provided with lids composed of potsherds or, more rarely, thin slabs of stone trimmed to form flat disks and in one case grooved on the under side for a cord lifting device. At Merimda the wares, polished, hand-smoothed, and coarse, include red, black, red-black speckled, reddish and yellowish grey, and light or grey brown with a red slip, or wash. With the exception of the finest polished red and black wares most of the pottery contains a binder of chopped straw. There is, as has been suggested, a general similarity to the pottery of the Fayum, where, however, the black wares played a far less important role than here in the western Delta. The great quantity of pottery vessels produced by the Neolithic inhabitants of Merimda is attested by the recovery from a small portion of the site during the seasons of 1928 to 1932 of over 60,000 sherds and 41 complete vessels.

Exceptional interest attaches to a miscellany of objects, other than vessels, made of pottery, clay, and dried Nile mud. Small barrel-shaped rattles of red polished pottery flecked with black contain in their hollow interiors small pebbles. They were perhaps children's toys, though larger examples found in the same part of the settlement have been thought to be cult implements used in some form of religious ceremonial. The mid-section of a human figure modeled of Nile clay and lightly fired probably represents a woman or goddess, a pair of protuberances rather low on the figure being taken as breasts and a loop of incised dots above and between them as a bead necklace. The clay of which the figure is made contains a binder of chopped straw and tiny glittering particles, possibly mica. Like the ivory figures of Badari in Upper Egypt it would appear to have been an idol of some sort rather than a doll. A bull's head, also modeled of dried Nile mud, has also been identified as a cult object, rather than a toy, and has been compared with other prehistoric and Early Dynastic heads of animal divinities. On the other hand, a Nile mud model of a boat, pointed at both ends and having a low freeboard, since it was found, not in a grave, but loose in the settlement debris, some five feet below the surface, can hardly have had the funerary significance later attached to such models and may indeed have been a child's plaything. Its importance lies in the fact that it offers definite evidence that the Merimdians of this early period possessed serviceable boats and would therefore have been able with relative ease to cross marshes, Nile arms, and probably even larger bodies of water in any hypothetical journey from an eastern point of origin to the western fringe of the Delta. Finally, there are some curious fragments of Nile mud found in 1928 lying on the surface of the site and somewhat imaginatively interpreted as parts of headrests, an article of furniture which is not otherwise attested in Egypt before dynastic times. Since both the true nature

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of these rather amorphous bits of mud and their association, if any, with the settlement layers below are matters of the utmost uncertainty, it would seem hardly justifiable—as has been done—to regard them as indications of an Early Dynastic date for the uppermost level of the settlement, especially since the latter has been dated by radiocarbon tests to the early fourth (or late fifth) millennium B.C.

As in the Fayum A-group settlements the most characteristic and by far the most common type of stone implement made and used by the villagers of Merimda was the bifacial axehead, usually of flint but also produced in other fine hard stones such as quartzite, granite, chlomelanite, nephrite, basalt, red jasper, chalcedony(?), and quartzite schist and, in a very few instances, in limestone. The numerous examples in flint are usually chipped to shape from an appropriately formed nodule and their edges ground to an often knife-like sharpness, the rest of the tool being sometimes left untouched, with the cortex intact, when the nodule chosen already had the form desired. Those made of other stones are of two general forms: the elongated "cylindrical" axehead with more or less rounded cross-section and the smaller and more trapezoidal head with a wider edge in proportion to its length and usually with a fine overall polish. The latter, evidently for the most part "show pieces," include two superb examples of haematite, the polished surfaces of which have a lustrous metallic sheen.

At Merimda saw-toothed sickle flints, closely similar to those from the Fayum, occur in matched and close-fitting sets of three, a rectangular element flanked by two pointed ones to form a continuous, double-ended cutting edge. The serrated edges of these copiously represented implements are usually glossy from cutting the stalks of grain. A coarse-toothed saw of unusual type has a concave end, like an arrowhead, evidently for mounting on a handle of some sort. Besides the elongated triangular saws, retouched on both sides, there are also fine-toothed unifacial saws made from blades and having, as in later prehistoric and early historic times, smooth, unworked undersides.

The Merimdian hollow-based arrowhead often differs from those of the Fayum and the Upper Egyptian site of Badari in having straight sides and rounded or beveled—not pointed—wing tips. As in the Fayum "A" settlements it is the prevailing type, the triangular arrowhead being less common and the tanged arrowhead exceedingly sparse, but including several specimens with toothed or barbed edges and long tangs of a type known also in the Fayum, in North Africa, and in western Europe. Among the hollow-based heads is a show-piece, described by its finders as the "most beautiful known Neolithic arrowhead." Three and a half inches long and very thin, it was polished on both sides and then skillfully retouched along the edges. Several handsome polished lanceheads of elongated foliate or triangular form, in one case with lateral barbs near the point of attachment, range in length up to six and a quarter inches.

A thick, ground and retouched point of unusual nature is believed to have been mounted at right angles to its shaft and, if so, must have constituted a formidable weapon of the type called in German a "Dolchstab" or "Dolchbeil." The point in question "has two close relatives in the Fayum culture" which, according to Miss Caton-Thompson, "do more to strengthen the essential unity of the two groups than a host of minor differences due to local environment, independent development, or the caprices of discovery can do to weaken it."

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The knife blades of Merimda show a variety of forms, among the more common of which are broad, sharply curved with rounded or pointed tips, sometimes tanged and sometimes with a finely serrated cutting edge. A long dagger blade with slightly convex edges is waisted near the butt end for attachment to its haft; a curious tanged implement has a broad chisel-like cutting edge at right angles to its long axis; and a flat halberd-like blade is reminiscent of several found in the Fayum. Small stone awls and scrapers of various types, the latter often showing a steep secondary retouch, are fairly numerous in the settlement but are not among its more distinctive implement forms.

The stone-headed mace, a favored battle and hunting weapon of the prehistoric peoples of the eastern Mediterranean world, is well represented at Merimda, where the heads, like those of Palestine and Anatolia, are invariably pear-shaped or, less frequently, spheroid. This form is not found in Upper Egypt until Naqada II times and is somewhat doubtfully represented in the Fayum, two so-called maceheads found there having the discoid form popular in the earlier Predynastic culture of southern Egypt (Naqada I), while a number of rather small spheroid objects of limestone and dolerite would appear to have been spindle whorls rather than weapons. For attachment to their shafts the hard stone heads are drilled longitudinally from either end, the elongated conical holes meeting in centers of the heads. An unfinished specimen, only half drilled through, indicates that manufacture was carried out on the site of Merimda itself, though some of the materials used were certainly imported from considerable distances away. The latter include basalt, granite, volcanic rock, a grey-green stone, possibly serpentine or greywacke, and a black and white stone, probably some type of diorite.

Interesting is the identification of a large number of small roundish flints, ground to a conical point on one side, as sling-stones, since the sling, though popular in western Asia and, later, in Libya, was not a weapon much used by the Egyptians of any age.

Besides a number of true Paleolithic stone implements, derived mainly from gravel slopes to the west and southwest of the site, the settlement yielded a considerable quantity of implements of Paleolithic character and appearance, but of Neolithic or later origin, their presence reflecting a tendency noted elsewhere in the Egyptian Neolithic and post-Neolithic industries to reproduce certain primitive forms—hand-axes, coarse cleavers, crude boring tools, and flat scrapers—originated in or reminiscent of the Old Stone Age. The dating of these implements, believed by Junker and Menghin to have been contemporaneous with the settlement itself, presents something of a problem, the so-called "hand-axes of pronounced Chalossian type" being, in Caton-Thompson's opinion, identical with the "pebble hand-picks" of Old Kingdom age found in the gypsum quarries along the northern rim of the Fayum depression.

For shaping and polishing his stone implements and weapons the Neolithic Merimdian used hammerstones of flint, white quartzite, and other hard rocks in various shapes and sizes, including flat wheel-shaped specimens with indentations for the users' fingers and slender examples with small striking surfaces for more delicate work; slipstones and polishing stones, chiefly of petrified wood, also in a variety of sizes, most of them worn concave on both working surfaces; and pointed or edged stone retouching tools of

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many forms. The purpose for which a great quantity of smooth round white pebbles, all of about the same size, was collected and stored in a circular pit near one of the village's dwelling houses "is not evident."

Numerous oval and irregularly shaped hand-mills and grinding stones of sandstone, basalt, and granite were found strewn over the whole of the settlement area. They were evidently household objects, used both for milling the wheat and other cereal grains which are assumed to have supplied an important part of the villagers' diet and for grinding the ruddle, or red ochre, used to adorn their owners' bodies. Small, flat palettes of "alabaster" (i.e., calcite), granite, and a dark basaltic stone were perhaps designed for grinding the smaller amounts of pigment used as face and eye cosmetics. Characteristic of these cosmetic palettes is a complete example in black basalt found together with a small brown grinding pebble some five and a half feet below the surface of the site, not far from the burial of an adult of unrecorded sex. It is shield-shaped with a small notch in its straight top edge a short distance in from each corner. The type is unknown in either Upper Egypt or the Fayum, but is paralleled by an example in the museum in Jerusalem and by a slate palette of much later date from one of the sun-temples at Abusir. An ivory plaque from the lowermost level of the settlement is of the same form, but in view of its material, can hardly be regarded as a grinding surface. Possibly, however, it was for mixing cosmetic colors or other pigments.

A few very small, thick-walled stone vases, of basalt and mottled diorite, were produced by the inhabitants of the latest, or uppermost, level of the Merimda settlement, three examples having been found on the surface of the site and a fourth at a depth of less than twenty inches below the surface. Of the complete vessels a deep, flat-footed little bowl of diorite, now in Stockholm, measures only four inches in height and has borrowed its form from pottery bowls of the same uppermost level. A tiny beaker, two and three-quarters inches high, made of basalt, calls to mind the pottery beakers of Badari in Upper Egypt. The minute size, irregularity of profile, and heaviness of these vessels indicate clearly that, locally at least, the art of making them was still in its infancy.

Two or three hundred implements of bone, ivory, and horn were recovered from the ruins of the settlement at Merimda. Most of these, it would seem, were used in the dressing and stitching together of animal skins for the production of leather garments, bags and other containers, the coverings of shelters, and the like. The dominant types, in any case, are knife-like implements provided occasionally with holes for suspension, flat triangular or round-topped scrapers resembling modern leather dressers' fleshing-knives, punches, or coarse awls, fine awls, sewing needles, in some cases with eyes, larger, blunt-ended needles, used perhaps in the making of fish nets, and a variety of spatulae including an awl and spatula combined in a single tool. A rib-bone with a rounded end is believed to have served for smoothing either a seam in leather or the surface of an object of bone or wood. Flat, pointed instruments of bone were probably employed in the pressure flaking of small flints, such as arrowheads. The bone harpoons of Merimda have one or more barbs, like those of the Fayum; but the fish hook, of which, as we have seen, none was found in the Fayum, is without a barb and, though made of horn, resembles in this and in other respects the shell and ivory fish hooks of

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Tasa, Badari, and Shaheinab as well as the earliest copper fish hooks found in Egypt. Sections of hollow bone were made to serve as pipes, as tubular containers, and as handles for other implements, being in the last instances sometimes grooved or rebated at one end or provided with a series of incised parallel rings.

A miscellany of objects in various materials, though numerically unimpressive, throws considerable additional light on the industries and other activities of the townspeople of Merimda. Small egg-shaped weights of limestone are grooved longitudinally, almost certainly for attachment, as sinkers, to the edges of fishing nets. An oval spindle whorl of unfired clay has the form seen in the later hieroglyph for "spindle." Together with several discoid whorls made of potsherds it attests a local knowledge, as in the Fayum, of the spinning of linen thread and, presumably, the weaving of cloth. Spatha shells were used as scoops or ladles in the kitchens of the settlement and are occasionally serrated around the edges for use as fish scalers in much the same fashion as they were in the Fayum. A fragmentary sieve or strainer in an undesignated material is referred to by the excavators of the site as "the first and only example" of its kind.

Jewelry and other items of personal adornment, though not as rare as in the Fayum settlements, are still scarce, and it is clear that, with the exception of an occasional primitive pendant or a few roughly shaped beads, jewelry was not generally worn by the people of Merimda. Twenty bodies found buried in the settlement during the first season's excavations yielded, between them, only one ivory bead and one stone pendant. The pendants, evidently worn as amulets, include the miniature axehead of highly polished dark green or black stone, which occurs elsewhere in the eastern Mediterranean area, notably in the Fayum and in the earliest Neolithic level at Jericho, and the boar's tusk, an example of which was found in position on the breast of a skeleton and which may reflect the important role played by the pig in the economy, if not in the magico-religious beliefs, of the Merimdians (see below). A pear-shaped pendant is carved from the tusk of a hippopotamus, while others consist simply of small bivalve shells notched around the edges and pierced in each case with a hole for suspension. A more elaborate pendant amulet has the form of a small plano-convex cosmetic palette with a suspension hole near the center of its top edge and a semicircular notch in either of its sides near the top. Roughly tubular, spherical, lenticular, and disk-shaped beads occur in a variety of materials, including black and green stone, alabaster, ivory, bone, and clay fired black and polished, and small rings of bone and of alabaster seem to have formed links in chainlike necklaces. Other narrow sections of tubular bones have been identified as finger rings, but seem in most cases too small for the purpose, unless the wearers were infant children. Fragments of several plain, ring-shaped bangles of ivory were found, in one instance near a burial, as well as a wide bracelet of clay, fired black and engraved on the exterior with a series of parallel curved lines. A carved piece of bone has been identified, perhaps correctly, as the top of a hairpin. The curious absence of combs, which are so common in the prehistoric cemeteries of Upper Egypt, may be attributable to the extreme fragility of this class of object, to the ravages which the site has undergone at the hands of man and of nature, and to the fact that only a small percentage of its total area has yet been excavated.

The bones and horns of numerous

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domestic animals found in the hearths, potholes, storage areas, and general rubbish of the settlement show that stock farming played a far more important role in the life and economy of the Merimdians than it did with the lakeside population of the Fayum. Bones of pigs are particularly numerous, and it is clear that, like other prehistoric peoples of northern Egypt (and western Asia), the Neolithic villagers of Merimda were great pork eaters, an apparently regional or even racial characteristic, since traces of pig are relatively scarce in the settlements and cemeteries of Upper Egypt, Nubia, and the Sudan. The remains of longhorned cattle, sheep, and perhaps also goats occur in some quantity and the dog is attested at least three times in the village area. Of wild animals hunted for their meat the most important was the hippopotamus, the bones and tusks of which recur again an again throughout the village. The long bones and spinal vertebrae of this massive beast and also the articulated vertebrae of a smaller animal, perhaps a steer, are found sometimes bound with sinew and cloth and stuck upright in the ground like columns, evidently as offerings to some divinity or guiding spirit of the chase who seems to have been similarly propitiated in the later prehistoric settlement at Maadi. Other quarry successfully pursued by the hunters and fishermen of Merimda were the crocodile, the polecat, or fitchew, a kind of antelope, numerous turtles (*Testudo* sp.), and various species of Nile fish. Shell fish gathered from the river included *Spatha cailliaudi* and other types of large bivalve mussels.

At Merimda, as we have seen, it was apparently the custom to bury the dead amid the habitations of the living. The practice may have been confined to those persons—chiefly women and infant children—who died within the confines of the settlement, for the 125 graves found during the seven seasons of excavation can hardly represent the total mortality during the prolonged occupation of the huge site or even that which occurred within the relatively restricted areas explored. It has been suggested that the men of the town, the bodies of only a few of whom have been found at Merimda itself, more often than not died or were killed on campaigns, hunting trips, and other expeditions which took them away from home and were normally buried where they died, a perfectly understandable procedure for a primitive people possessed of very limited transport facilities and no artificial means of preserving a dead body. Undoubtedly, too, the mortality among newborn infants and women in childbirth was in Neolithic times very much higher than among any other segment of the population. We must consider, finally, the probability that the severe denudation of the site by wind and water has destroyed many of the graves which at one time existed within its limits. In any event, the existing evidence together with the absence of traces of anything resembling a cemetery or isolated burial ground in the vicinity of the ancient town strongly suggest that here, as in the Natufian and earlier Neolithic settlements of Palestine and on the Upper Capsian habitation sites of northern Africa the primitive custom of settlement-burial or house-burial prevailed. It is, on the other hand, difficult to agree with the proposition advanced by Junker that this type of burial in itself is an earmark of a settled community, while burial in cemeteries away from the habitations, as apparently in the Fayum and in Predynastic Upper Egypt, is a trait of a nomadic or semi-nomadic population.

The shallow oval graves of the Merimdians, occasionally lined with coarse

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matting, are scattered, either singly or in groups, throughout every level of the settlement, the method of burial having evidently remained unchanged from the earliest occupation of the site until its abandonment some five or six centuries later. Within the grave the body usually lies on its right side, with knees drawn up, in the position of sleep. More often than not the head is to the south and the face toward the northeast, the north, or the east. From this it might be supposed that the intent was to direct the gaze of the deceased either toward the Nile, the principal local source of life, or, as later in Egyptian history, toward the rising sun. There are, however, so many variations in the positions and orientation of the bodies that there is at least equal reason to believe that the focus of the dead person's gaze was in most cases not a distant point outside the settlement, but simply the hearth in the dwelling house in or near which he or she was buried. Here lay the center of the household of which the deceased had been and was evidently still regarded as a member and the principal source of the food conceived of as shared at mealtime by the living and the dead members of the family alike. Such a concept would obviate the need, so universal in the cemetery type of burial, of providing the grave with supplies of food, drink, and other equipment and would explain the bareness of the Merimda graves as compared with those of later prehistoric times in both Upper and Lower Egypt. Occasionally, to be sure, a body is adorned with a single crude pendant or bead, is accompanied by one or two flint implements, and holds to its mouth or has scattered over it a few grains of emmer, the last perhaps more the symbol of a hoped-for resurrection and immortality, like the germinating "Osiris beds" of later times, than an actual offering of food. It is possible that at mealtimes food was set aside for the dead or was even placed on the grave, such a practice foreshadowing the funerary banquets and periodic feasts held in the cemeteries and tomb-chapels of subsequent eras. The close and continuing contacts maintained at Merimda between the living and the dead shows, in any case, that even at this early period piety and devotion, rather than fear, characterized the former's attitude to the latter and governed the funerary service as a whole.

A slender, dolicocephalic people, small by modern standards, the Merimdians, nevertheless, are seen from their skeletal remains to have been distinctly taller, more sturdily built, and endowed with larger, better formed, and more capacious skulls than the Natufians of Palestine and the earliest Predynastic population of Upper and Middle Egypt. The differences are sufficient to suggest that they, together with other prehistoric and early historic peoples of northern Egypt, belonged to a different and generally less primitive race than the Upper Egyptians. The men of Merimda, to judge from the few skeletons recovered, averaged five feet five and one-half inches in height, the women, five feet two inches. The crania are higher in relation to their breadth than the skulls of the Naqada people of Upper Egypt and broader, with smoother and more evenly contoured cranial vault, than those found in the Badarian cemeteries of southern Middle Egypt. The teeth are small and often show abscess cavities at the roots, "due to exposure of the pulp cavity by excessive friction," a condition common in Egypt at all periods. "Certain Armenoid characteristics" shared by the Merimdians with the people of El-Omari have suggested the association of these early northern Egyptians (and of two or three of the so-called "Tasian" skulls from Upper Egypt)

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with a race which, fanning out from a hypothetical homeland in the region of Turkestan, has been credited with bringing Neolithic culture to Europe and to northeastern Africa.

However that may be, the cultural ties which exist between the settlement at Merimda and the Mesolithic, Neolithic, and early Chalcolothic sites of southwestern Asia—Eynan, Jericho, Tell el-Ghassul, Byblos, Ras Shamra, Hassuna, Eridu, Mersin, Hacilar, etc.—are substantial. They include, as we have seen, the practice of burying the dead, or, at least, certain classes of dead, in and among the houses of the living, the use of rounded, mud-plastered pits as granaries and at Eynan and Merimda as dwellings, the breeding and eating of pigs, the production of large numbers of flaked axes and adzes with ground edges and a predilection for the globular or pear-shaped macehead, the use of the sling, a typically Asiatic weapon rarely found in Egypt, the wearing of pierced animal teeth and miniature axeheads of hard green or black stone as amulets, the prevalence in the Pottery Neolithic B of Jericho and the earlier levels of Merimda of pottery vessels coated with a smooth red slip and adorned with bands of incised herringbone patterns, the occurrence of footed vases and long-handled clay ladles, and the modeling of small female and animal figures of clay, reflecting perhaps a magico-religious belief in the efficacy of such idols in stimulating the procreative powers and increasing the fertility of the people, their flocks, and their fields.

At the same time, we should expect and do in fact find in this west Delta culture elements which link it to the adjoining Saharo-Libyan area, to more remote African regions to the west and southwest, and, through these, to some aspects, at least, of the Neolithic of western Europe. The most obvious link lies in the fine Merimdian stone industry with its bifacially worked hollow-based, triangular, and tanged arrowheads of types unknown in western Asia, but without much doubt of Saharan origin and probably of Aterian ancestry. Arkell has suggested that the flaked axehead with only the edge ground "may have been invented in the Saharan Neolithic"; and Larsen would see in Merimda "a spur of a widely expanded Saharan culture." Menghin has pointed out that the cylindrical axes of Merimda are similar to those of northwestern Africa and western Europe, and believes that the Merimdian culture "is to be designated as proto-Libyan." Kaiser notes that the stone implements of both Merimda and the Fayum A settlements seem to be related to finds in the distant Hoggar, Air, and Tibesti region; and a number of prehistorians have drawn attention to the fact that burial of the dead within the habitation area is known from the Upper Capsian *rammadyat*, or shell-heaps, of the Maghreb. For Baumgartel the material "nearest" to that found at Merimda comes from the "A-Group," or Early Dynastic, cemeteries in Nubia, which, following Oric Bates, she proposes to identify as "Libyan." It has been repeatedly stated that the cultures of Merimda, the Fayum, and El-Omari are "African," derive from a common "African substratum," or have their roots in "the North African mother-soil." They have even been described as "African-Hamite," though the expression "Hamite" is normally reserved for associations of a linguistic nature, of which at this period, of course, we know nothing.

The agreement is not complete in the case of either southwestern Asia or northern Africa, typological and chronological discrepancies being in both instances too great to derive the Merimdian culture in its entirety from one of these areas

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alone. Rather, we must recognize in this large northern Egyptian settlement a composite culture which, like the Fayum A-group villages, owed its food-producing, semi-urban character, much of its material equipment and magico-religious beliefs, and perhaps the salient physical characteristics of its people to immigrants from the north and east, but which, at the same time, exchanged ideas, customs, and implement types with its Libyan and Saharan neighbors on the west and was by no means wholly out of place in its north African setting. Again, as in many another Neolithic community, we find here the merging of a settled village-farmer strain of ultimately western Asiatic origin with a warlike, semi-nomadic hunting element of local Paleolithic antecedents.

The culture and mode of existence which resulted from the fusion at Merimda of these ingredients seems, in any case, to have persisted during the entire occupation of the site, the differences noted between the earliest and latest habitation layers reflecting developments of and within the culture itself rather than the results of changes introduced by intrusive foreign elements. Throughout we find a settled, semi-urban population dependent for their livelihood to approximately equal degrees on agriculture, stock-breeding, hunting, and fishing. Though the community as a whole may have participated in a primitive form of land irrigation—this being known in some parts of the world to have antedated agriculture itself—the crops of emmer and other food-plants were evidently neither the products nor the property of the community, as was apparently the case in the Fayum, but were raised by the individual villagers and stored in private granaries adjoining their respective houses. The long occupation of the site suggests either that new plots of arable land were from time to time discovered or created in its vicinity or that some method of crop rotation or fallowing had been developed, for without such measures the fields adjacent to a Neolithic farming community were rapidly exhausted and the life of the community was necessarily brief. The fact that the houses of the uppermost level of the town appear to have been lined up along winding but nonetheless recognizable streets bespeaks an orderly community life and implies, as we have remarked, the presence of some sort of local governmental authority or administration, centered perhaps in a mayor or town council. The religious beliefs of the townspeople are reflected, on the one hand, in the hunters' offerings which they set up to some spirit or spirits of the chase and, on the other hand, in the crude clay figure of the farmers' characteristic fertility or "mother-earth" goddess, that bringer of rain, rich harvests, and increased herds revered also at Jericho and in other village-farming communities of western Asia. The head of a bull or aurochs (*Bos primigenius*) modeled of clay may indicate the existence in this early settlement of a fetishistic animal cult and is significant in view of the persistence and widespread popularity of bull-gods in the religion of the dynastic Egyptians, especially the northern Egyptians. The sistrums or rattles used extensively in the religious rites of historic Egypt may also have had their forerunners in the crude pottery rattles of the Merimdians. The concept of protective magic inherent in two of the amulets worn by the people of Merimda is direct and uncomplicated, the amulets in question having, quite simply, the forms of natural or artificial weapons of defense, in one case the boar's tusk, in another the miniature axehead. The notions behind the pear- and palette-shaped pendants were apparently more complex. Like

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other ancient peoples among whom the practice of settlement burial prevailed the Merimdians "lived in the closest association with their dead," shared their meals with them, and evidently regarded them as still maintaining their old ties with their homes and families. They clearly believed in a life after death and naively pictured that life as similar to man's earthly existence. Like the houses of the living the graves of the dead are oval cavities scooped out in the ground and like the living the dead were occasionally provided with trinkets to wear, implements to use, and with grains of wheat, the latter to serve either as food or as a symbolic means of inducing the deceased's resurrection. Within the settlement the potters and stone-knappers, the carvers of wood, bone, horn, and ivory, the jewelers and lapidaries, the leatherworkers and basket-makers, and the spinners and weavers of cloth, supported now by the excess of food and other commodities produced by the farmers, the hunters, and the fishermen, practiced their crafts with ever growing skill, some of the materials which they used—Red Sea shells and crystalline stones from the Eastern Desert and the Libyan massifs—having been acquired, probably through trade, from sometimes fairly remote regions. The relatively advanced stage of civilization attained by these west Delta villagers is further attested by their elaborate and systematic arrangements for the storage of their household provisions, which, according to their types and natures, were consigned, respectively, to baskets, subterranean granaries, mud-lined storage bins, and large pottery pithoi.

The many analogies already noted between the Merimdian and the Fayum A cultures leave little room for doubt that they are closely related one to another and are without much question descended from a common ancestor or combination of ancestors. Of the two the big settlement at Merimda seems the more advanced, its pottery more evolved, its dependence on agriculture and stock farming more pronounced, and its social organization of a higher order. The radiocarbon dates so far obtained for the two sites (pp. 92 and 102 suggest that it is also somewhat later in date than the Fayum A villages, with perhaps only its earliest stage reaching back into the period when these lakeside settlements were still flourishing. At the same time, it shows no relationship whatsoever with the later B-group culture of the Fayum and east Libyan areas. The important fact which emerges from a study of the Fayum A and Merimda settlements is that, despite the differences which exist between them, they are clearly parts of a single cultural complex characteristic of and local to northern Egypt and distinct from the earliest groups of post-Paleolithic cultures of Upper Egypt, the distinction extending apparently to the races and physical characteristics of the populations of the two parts of the country as well as to their material culture.

5. El-Omari: Its Settlements and Cemeteries

Two subsequent stages of the same general northern Egyptian cultural development belong a series of prehistoric villages and cemeteries clustered in and around the mouth of the Wadi Hof, some two miles north of Helwan and four and a half miles to the east of the Nile, opposite Abusir. The site, now part of the low desert at the foot of the Gebel Tura, on the eastern edge of the Nile Valley, is generally known as El-Omari, in memory of Amin el Omari, a young Egyptian mineralogist who in the spring of 1924 conducted investigations there with the aid and advice of the veteran prehistorian,

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Père Bovier-Lapierre. During the winter of 1925, following the death of his protégé, excavations were undertaken at El-Omari by Bovier-Lapierre himself on behalf of the Egyptian Service des Antiquités, and were resumed in 1943–1944, 1948, and 1952 under the direction of Fernand Debono. By and large, however, the prehistoric remains of El-Omari have not been as thoroughly explored nor as extensively published as those of the Fayum and Merimda, and there is much about the site which still remains obscure, especially as regards the dating and interrelationships of the various settlements.

What would appear to be the earliest of these—its beginnings perhaps contemporaneous with the final stage of the Merimdian culture—occupies a gravel terrace which slopes downward from the south to join the southwest corner of the estuary of the Wadi Hof near the rocky spur known as the Ras el-Hof. Here, over a "very large" area, are scattered the sunken bottoms of more than a hundred circular huts as well as the remains of numerous oval dwellings constructed of posts and wickerwork on the surface of the ground. The circular hut-bottoms not infrequently cut into one another, the shallower examples sometimes providing access to deeper ones. They are lined with thick, clay-covered matting reinforced on the inside with cords and occasionally plastered against the remains of the wooden posts which supported the superstructures of the huts. Similar, but smaller pits, also lined with matting or containing, as at Merimda and in the Fayum, clay-daubed baskets, were used as granaries or magazines for provisions. Some of these were cut not in the yellow pebbly surface of the terrace but in the adjoining rock. Larger spaces were inclosed with reed fences, like the present-day *zeribas*, and there are also the remains of little walls of dried earth. The hearths or fire holes, usually in the centres of the huts, are small rounded depressions blackened by fire and usually containing or surrounded by pottery vessels, potsherds, stone implements, mills, and grinders, broken and charred animal bones, eggshells, mollusk shells, and other household litter. A difference in the lower and upper fill of the dwelling and storage pits—the former a yellowish detritus, the latter a blackish fill—points to two successive periods of occupation, separated by an interval when the momentarily abandoned huts and silos were used as dumps before being recut and re-occupied. Since, however, no change is discernible in the stone implements of the two layers, they probably reflect some purely internal upheaval or development through which the settlement passed during its evidently long period of occupation.

The implements in question, made chiefly of flint, include many of the bifacially worked forms with which we have become familiar in the Fayum A and Merimda settlements—the flaked axehead with ground cutting edge, the fully polished axehead (including an example in serpentine), the serrated sickle flint, the concave-based and triangular arrowhead and lancehead, and a few examples of the rare tanged arrowhead. On the other hand, the production of flake and blade tools—knives of a new form with curved and blunted backs and well developed tangs, saws, unifacial sickle flints, piercers, scrapers, and retouched blades of miscellaneous types—is far more extensive than at Merimda and foreshadows the stone industry of the still later settlement at Maadi, a few miles to the north, where the blade element almost entirely replaced the old bifacial technique. The presence of cores, flakes,

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hammerstones, and polishers in the debris from the hut circles indicates that the manufacture of stone implements was carried out in the dwellings themselves. The principal stone-knappers' atelier seems, however, to have been located on the outskirts of the settlement, where Bovier-Lapierre found large quantities of globular, discoid, and elongated hammerstones of flint and fossil wood together with "innumerable" flint flakes and cores. The hand mills or saddle querns found in the settlement are mostly of quartzite (from the subsequently famous quarries at Gebel el-Ahmar?), the grinders which accompany them usually of petrified wood, which is abundant in this region of the old Oligocene delta of the Nile. "Nodule-picks" of Merimdian type, made of indurated limestone, were probably used for excavating the hut-bottoms, and longitudinally grooved ovoid weights of the same material and of a by now familiar form were evidently sinkers for fishing nets. In bone there are piercers, punches, awls, knife-like blades, and needles with eyes; and in shell and horn a number of finely made fishhooks.

The spinning and weaving of cloth is attested to not only by a number of stone spindle whorls, but also by the presence in the settlement of actual pieces of linen cloth up to a foot in length, of both coarse and fine weave. Finely worked baskets of a type and quality comparable to those of the pharaonic era were produced at El-Omari as were also cords and strings exceeding five feet in length and mats of various kinds, used for lining hut and silo walls and for wrapping the bodies of the dead. Evidence for leatherworking includes bits of animal skins found in the graves and a complete skin two and half feet long recovered from the bottom of a hut.

Dwellings and graves alike yielded pottery vessels of good quality and "evolved character" in monochrome red, brown, or black ware, both fine and coarse, with surface finishes ranging from coarse through smoothed and polished to lustrous. The red pottery seems to have been the preferred ware and the favorite forms were the straight-sided "flower-pot" with everted rim and the globular flask; but Debono records at least seventeen different types of vessels, including narrow-mouthed vases, ovoid vases, goblets, cylindrical containers, pans with flaring or concave sides, conical vases, bowls and vases supported on two or three feet, pots with lug handles, large pithoi or storage jars, and coarse vessels of a variety of shapes. As evidence for a relatively low dating Baumgartel has drawn attention to parallel striations which occur on the interiors of some of the pots and which suggest that they were turned, or rotated, in the process of manufacture, though not necessarily on a potter's wheel. Despite some rather marked differences the pottery of El-Omari bears a general resemblance in its wares and in some of its forms—notably, the coarse pithoi, the cook-pots with lug handles, and the footed vases and bowls—to that of Merimda and to that of the later prehistoric settlement at Maadi. On the other hand, it exhibits no relationship whatsoever with the pottery of Tasa, Badari, Naqada, and the other Predynastic sites of Upper Egypt, being clearly, and in spite of its somewhat disconcerting individuality, a product of the northern zone of Egyptian culture. Notable is the complete absence of decorated pottery.

Besides their pottery vessels the people of El-Omari used ostrich eggshells as containers and even as cook-pots, and mollusk shells, especially those of Unio and Spatha, as scoops and receptacles. Stone vessels are represented by the fragment of a single basalt vase, thought

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to have been imported from elsewhere, and a few fragments of calcite of uncertain date.

In contrast to the inhabitants of Merimda and the Fayum the Omarians were well provided with primitive jewelry and other items of personal adornment. Pendants and necklace elements were made of gastropod shells, imported from the Red Sea coast and pierced for stringing, of ostrich eggshell, animal bone, and the spines of fish, and of mother-of-pearl and various hard, ornamental stones, some of the last-named evidently brought from afar. Fossil nummulites were sometimes perforated and worn as pendants. Bits of ochre found in and among the huts had apparently been used for cosmetic purposes as well as for coloring the red and brown pottery vases.

Aside from their sickle flints, mills, and grinders the agricultural activities of the people of El-Omari and the important role played by cereal grains in their daily diet is reflected by the presence in the dwellings, granaries, and other areas of the settlement not only of copious amounts of grains and ears of wheat and barley, but also of a cake made of crushed wheat grains and bits of wheat and barley bread. The wheat here is emmer (*Triticum dicoccum*), as on most other Egyptian sites including Merimda and the Fayum, but Club wheat (*Triticum compactum* or one of its varieties), hitherto unrecorded in the Near East before the mid-second millennium B.C. and in Egypt before Greco-Roman times, also occurs. The common, lax-eared barley of El-Omari (*Hordeum vulgare* L.) is of a different and more evolved form than that found in the silos of the Fayum A settlements, which, as we have seen, is of the six-rowed type (*Hordeum hexastichum*). Grains of a fodder-vetch (*Vicia sativa* L.) similar to that known at Merimda occur at El-Omari. Fruits eaten by the inhabitants of the town included sycamore figs and dates (*Phoenix dactylifera* L.), and flowers placed in one of the graves have been identified by Vivi Täckholm and Elhamy Greiss as *Pulicaria undulata* Kostel. A pod of flax (*Linum usitatissimum* L.) suggests a positive identification of the fibres used locally in the spinning and weaving of cloth. Stalks of a type of wild sugar cane (*Saccharum spontaneum* L.) appear to be the earliest examples of this plant recorded in Egypt. The specimens of wood found are chiefly tamarisk (*Tamarix* sp.).

Among the animals hunted or kept by the inhabitants of El-Omari were the pig, hippopotamus, crocodile, snail, ostrich, duck(?), antelope, goat, and a type of bovide, the last two probably domesticated. Also recognized were the bones of a canide or dog-like animal. Fish bones are abundant and include those of the *claria* and the *synodont*, or lizard-fish.

Of the ties which exist between the earliest culture of El-Omari and that of Merimda none is more significant or more striking than the custom common to both—and to no other Egyptian group now known—of burying the dead within the confines of the settlement itself. At the Omarian village below the Ras el-Hof the burials were made in the huts or near them, in some instances in adjoining silos or magazines. Graves belonging to the earlier of the two successive periods of occupation were sometimes cut into by subsequently excavated provision cellars or pierced by the posts of huts built on the surface above. Most of the graves are simple rounded cavities in the ground, but one grave, discovered in 1948, had its walls revetted with rough blocks of stone. In burial, the body, wrapped in a mat, an animal's skin, or a coarse fabric or protected by a mat spread above it on tree branches, was regularly placed on its left

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side in contracted position with the head in almost every case to the south and the face directed to the west. This rule, which was not followed at Merimda, is, interestingly enough, generally adhered to in the Predynastic cemeteries of Upper Egypt and may reflect the intrusion at this time into northern Egypt of influences from the south. Almost every grave contained a single pottery jar of common household type placed before the deceased and in one case the bouquet of flowers referred to above had been laid on the breast of the dead person, while in another a small clay box had been placed behind the head of its late owner.

The skeleton of what has been thought to be a local ruler was found holding in its hand a well made wooden staff or scepter, some fourteen inches long, carved at both ends, one of the latter being pointed, the other flat. This so-called "baton of command" has been compared with the *ames*-staff carried by Egyptian kings and gods from early historic times and perhaps of prehistoric ancestry and has suggested to Childe the rather far-fetched notion that one of the line of Omarian chieftains may have become King of Lower Egypt.

On the evidence of their skeletons the people of El-Omari belonged to a relatively tall, sturdily built, mesocephalic race, related on the one hand to the Merimdians and on the other hand to the so-called Lower Egyptian, or "Giza," type of Dynastic times, of which, indeed, they, together with "other primeval inhabitants of the Delta," appear to have been the ancestors. One of their skulls, which could be accurately measured, has a length of 190 millimetres, a breadth of 145 millimetres, a height of 138.5 millimetres, and a cephalic index of 76.3, surpassing in its measurements most of the Giza skulls of the Fourth Dynasty and pointing, according to Dr. Douglas Derry, "to a brain capacity far above the average of the prehistoric Egyptian."

Although no trace of copper or other metallic substance has been found in the settlement near the Ras el-Hof there is every probability that this town was partly contemporaneous with and certainly not earlier than the Naqada I cemeteries and settlements of Upper Egypt, where, in addition to a highly developed stone-tool industry, small implements and ornaments of copper were being fashioned from hammered sheets of the native metal. Possibly because in the southern portions of the Eastern Desert deposits of native copper lay nearer to hand than in the north the material culture of Upper Egypt was, then, already in what is generally called the Chalcolithic or Copper-and-Stone Age; and it is to this period that the earliest culture of El-Omari must be assigned, even though the village itself might still reasonably be classed as Neolithic. A radiocarbon date of 3305 ± 230 B.C., derived from a sample of charcoal found on a hut floor in the Ras el-Hof settlement, would appear, from the comparative archeological evidence available, to be several centuries too low.

On the northern side of the entrance of the Wadi el-Hof, more than three hundred feet up, on one of the highest terraces of the Gebel Hof, lie the remains of a second early Omarian village, evidently roughly contemporaneous with the larger settlement to the south and quite clearly forming part of the same cultural ensemble. Here also, even on this lofty plateau, the dead are buried in the village itself, their bones being frequently found washed out of the soil by mountain torrents. As in the first settlement the stone industry exhibits not only such bifacially worked forms as the polished axehead, the hollow-based and triangular arrowhead, the larger lance or javelin head, and the toothed sickle-

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flint or saw, but also blade-tools (knives, unifacial sickle blades, saws, and narrow blades) and implements fashioned out of irregularly shaped flakes. Cores and hammerstones abound in the atelier areas, and millstones with grinders as well as samples of the cereal grains milled on them occur among the rubbish in the dwellings. Pottery of at least two of the types known in the larger settlement are found, and *Nerita* shells from the Red Sea, perforated for stringing in necklaces, bracelets, or, as at Shaheinab in the Sudan, in girdles. Despite its strange location the existence in the Gebel Hof village of what appear to have been graves suggests a fairly long period of habitation, facilitated, presumably, by the presence in the immediate vicinity of two natural cisterns, or rain-catching basins, one to the west, in the Wadi Rayan, the other on the east, in the Wadi Rahana. Thanks to occasional winter rains, which must have been more frequent in prehistoric times, the latter still contains water throughout the greater part of the year.

Distinct from and apparently later in date than the two settlements just described are a small village and one or more adjoining, but separate, cemeteries discovered by Bovier-Lapierre in a branch of the estuary of the Wadi el-Hof. Of the village little now remains except traces of huts in the form of small round post- or pot-holes and some larger cavities taken to be magazines for provisions, filled in both cases with a blackish deposit containing flint flakes, a few potsherds, bits of cords or mats, and carbonated grains of wheat and barley. The stone industry here is comprised exclusively of small blade-tools—knives, flat and rounded scrapers, and chisel-shaped arrowheads—which differ markedly not only from those of the earlier Omarian settlements, but also from those of the later prehistoric complex at Maadi. The pottery, on the other hand, seems related to and is perhaps descended from that of the Ras el-Hof and Gebel Hof settlements.

The cemeteries associated with this village lie to the west and south of the settlement proper. They are characterized by graves surmounted by roughly circular tumuli of stones under which the dead lie buried in shallow pits in crouched position with the hands before the face but without, apparently, any standard orientation as regards the points of the compass. The bodies, which include those of both adults and children (sometimes buried together in the same graves) seem to have been wrapped in cloth or in plaited straw mats and are at times accompanied by a pottery jar and, more rarely, by snail or mussel shells, small flint blades, necklace beads of agate, and bits of charcoal and a "brown organic matter." The skulls of the people buried in one cemetery have been described as dolicocephalic, while those in another "seemed brachycephalic"; but since none was in a condition to permit of accurate measurement, such observations are of relatively little value. Hearths and small circles of stones ("miniature cromlechs") scattered among the grave tumuli were undoubtedly associated with meals or offerings shared by the living with the dead and with ceremonies performed in the latter's behalf.

Thus, during the late Neolithic and Chalcolithic phases of Egyptian prehistory we find the gravel terraces in and around the mouth of the Wadi Hof occupied by two distinct and probably successive groups of settlers, both of whom raised wheat and barley, lived in circular huts of light construction, and continued to make their tools and weapons exclusively of stone, wood, bone, and shell, ignoring apparently the contemporaneous production

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in Upper Egypt of implements of beaten copper. Though both groups display markedly individual, local characteristics, what appears to have been the earlier of the two shows also certain clear relationships with the West Delta culture of Merimda, the most cogent of which is the practice, common in Egypt to these two sites alone, of burying the dead in or among the dwellings of the living. By contrast, the people of the second Omarian group, or what is sometimes called the Omari (or Helwan) B culture, follow the custom, current already in the Fayum and throughout Upper Egypt, of burial in cemeteries separated by some distance from the areas of habitation. The period during which this people flourished is a matter of extreme uncertainty; but if, as seems likely, they did indeed supersede the Omari A settlers, their occupation of the site would date, at the earliest, from the end of the Naqada I or the beginning of the Naqada II phase in Upper Egypt (*ca.* 3600 B.C.). The many points of difference between their culture and that of the late prehistoric and protohistoric settlement at Maadi, only a few miles to the northwest, suggests a *terminus ad quem* for them well before the rise of the first historic dynasty (3100 B.C.).

Though, with Kaiser and others, we may recognize the cultures of El-Omari, together with those of Merimda and the Fayum, as basically "African" in origin and character, the position of the site on the edge of the Eastern Desert not two hundred miles from the Palestinian border is a factor not entirely to be overlooked. The predilection for blade-tools, the burial of the dead among the dwellings of the living, and perhaps also the presence of grains of Club wheat, otherwise first known in the Near East in Anatolia, Syria, and Palestine, suggest, in any case, that influences from the north and east played a not inconsiderable role in the life of this most easterly of all the prehistoric sites of northern Egypt.

6. Maadi, Wadi Digla, Heliopolis, and Qasr Qarun

Four miles northwest of El-Omari, six miles south of Cairo, and a few hundred yards east of the modern suburban community of Maadi lies a low desert ridge, about a mile in length from west to east and one hundred and thirty yards in width from north to south, which extends eastward into the mouth of the Wadi el-Tih and separates the latter from its smaller southern subsidiary, the Wadi Tura. Here have been found the remains of a sprawling town of oval huts, rectangular houses, and subterranean shelters and magazines, which appears to have been founded in late Predynastic (Naqada II–III) times but which evidently continued to flourish well into the protohistoric, or Early Dynastic, period. The position of the town, at the mouth of the principal wadi leading eastward to the rich copper deposits of Gebel Ataqa and Sinai and the large amounts of worked and unworked copper found within its confines has suggested to Dr. Baumgartel that "a budding copper industry caused by the first exploitation of the Sinai mines could well have been the reason for Maʿādi's existence." Be that as it may, it is clear that the population of this great settlement included farmers and stockbreeders as well as metal workers and that the cultivation of wheat and barley and the raising of pigs, beef-cattle, sheep, and goats were among its essential activities. Hunting and fishing seem, on the other hand, to have been relatively unimportant and to have contributed less to the livelihood of the ancient Maadians than was the case with Egypt's earlier prehistoric peoples. Arrowheads, fishhooks, and net-weights are extremely

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rare, and the scanty remains of wild game recovered in the area of the town are confined to the ibex and to such purely riverain species as the hippopotamus, the beaver(?), turtles, fish, and freshwater mollusks.

The houses and shelters of Maadi are concentrated chiefly in the central section of the 45-acre site, with the silos, provision cellars, and huge, buried store-jars distributed for the most part around its periphery, the arrangement calling to mind the segregated granary areas associated with the Fayum A-group settlements (§2). Of the dwellings the most prevalent type is the oval hut or horseshoe-shaped windbreak constructed of stout tamarisk posts driven deep into the virgin soil and supporting walls made of interwoven tree branches plastered over with Nile clay. The bottoms of the posts had been neatly pointed, evidently with a metal axe or adze, but most of them still retain their bark and the projecting stubs of untrimmed branches. The hearths, usually placed near the centers of the shelters or just inside their entranceways, are shallow circular or rectangular cavities in the ground, frequently surrounded by stones and sometimes lined with fired or unfired clay, one hearth, in fact, consisting of the bottom of a large pottery jar embedded in the earth. Big store-jars buried in the ground up to their mouths, small storage-pits, and clay-lined pot-holes and "mortars" were occasionally found inside or closely associated with the huts. The oval house or shelter evidently continued to be constructed during the entire long occupation of the site, the remains of several being found in the uppermost levels of the six-foot-deep town debris and one example having been built over the ruins of a rectangular structure—house or courtyard—of more advanced type. The latter, some seventeen feet in length from north to south and ten feet wide, was provided, near the south end of its long eastern side, with a doorway, protected from the prevailing northerly winds by a wind-screen. Its walls, springing from shallow, mud-filled trenches, appear to have been of reeds and straw supported on wooden posts. The structure contained no hearth but had a cruciform partition just inside the doorway, a circular pit two feet deep near the east wall, and a rectangular pit outside the entrance. Another rectangular building, of which little more than one corner was preserved, seems to have been built of logs, laid horizontally, and to have been partitioned on the interior. Several large cave-like subterranean chambers, dug in the compact sandy soil to depths of between six and eight feet, are roughly circular, oval, or rectangular in plan with their walls, either vertical or sloping inward toward a domed(?) roof, covered with matting or, in one case, revetted with boulders and large blocks of mud. They were entered by means of steps, cut in the soil and sometimes faced with flat stones, and contained fire-pits or hearths, and holes for the posts which in some cases supported the roofs. Such subterranean dwellings are unknown elsewhere in Egypt but are well attested in Palestine, notably at Bir Abu Matar, Bir el-Safadi, and other sites near Beersheba. Fragments of rectangular sun-dried mud bricks could not be associated with any of the structures described above. The remains of stout post fences, or palisades, and of long narrow ditches may have formed part of the town's primitive defenses against enemy attack—defenses which apparently proved futile, for layers of ashes, scattered human bones, and the scarcity on the site of copper tools and weapons and other articles of value suggest that the town was sacked and burned at least once in the course of its history.

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A very large circular fireplace has been identified by the excavators of the site as a pottery kiln and some long rectangular pits are supposed to have been provided for vertical looms, a device, however, which appears not to have been introduced into Egypt until the New Kingdom. Small holes with clay-lined walls and bottoms consolidated by pebbles and potsherds may well have been mortars for crushing fruit and other foodstuffs, while similar holes, not so reinforced, were evidently for supporting pots with rounded or pointed bottoms. The storage cellars, concentrated in the southern sector of the site, are circular pits, three to six feet deep, with sloping or vertical sides, sometimes lined with mud or showing traces of basketwork. Their bottoms are not infrequently provided with one or more pot-holes and their rims are occasionally rebated to take a lid or cover of some sort. Some of the cellars are connected with one another in series. Their contents included black soil, carbonized grain, animal and fish bones, flint implements, spindle whorls, potsherds, and groups of as many as six to twelve complete pottery jars. In one deep cellar-hole, sunk in the virgin soil and covered with a stone slab, were found seven well made basalt vases, an alabaster vase, a jar of grey limestone, and twenty-two beads of carnelian and "a whitish material." Another storage pit contained some twenty large lumps of asphalt, or bitumen, of a type known chiefly from Syria and Palestine.

A second storage area, in this case given over chiefly to rows of huge pottery store-jars or pithoi, buried up to their mouths in the sandy soil, occupied the northern fringe of the settlement. The jars, three to four feet in height and two to three feet in diameter, are usually cordiform with broad shoulders and bottoms tapering to rounded points. They are of coarse brick-red, reddish brown, grey, or black, or solid black ware, with surfaces carefully burnished or covered with a dull red or whitish wash, the larger examples being made up of superimposed cylinders of clay joined together. One such jar has a drawing of a crocodile scratched on its shoulder and a round hole in its bottom. On this rather slender evidence, it has been identified as an offering or libation vase used in the cult of a local crocodile god. A nearly cylindrical barrel-shaped pithos has a moulded rim and, around its shoulder below the rim, a row of rounded lug-handles pierced to receive a stout cord or rope. Coated with a shiny red slip, it is unique at Maadi, but finds a faint parallel in the Early Dynastic cemetery of nearby Tura. The contents of these great jars was generally similar to that of the cellar-holes, including, besides large quantities of grain (emmer and barley), the bones of animals and fish, shells, cooked mutton, masses of a brownish resinous substance, flint implements, spindle whorls, small vases, and jar-stoppers of Nile mud, pottery, and wood. Among the last-named are a pottery disk pierced with holes near its edges and a carefully made domical cover of wood, hollowed and rebated on its underside and provided with holes for lashing it in place.

Besides the big store-jars pottery vessels and potsherds were recovered in vast numbers from the cellars, huts, and general debris of the settlement at Maadi. As elsewhere in Lower Egypt at this early period the pottery is for the most part monochrome. Most characteristic are a smooth red ware, a polished black ware, and a mixed red-and-black pottery which resulted apparently from the uneven firing of the black ware. In the first of these wares there are slender ovoid jars with moulded rims and "ring-bases" of a type which survived at Tura and elsewhere

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into Early Dynastic times, ovate pots of various proportions with flat, rounded, pointed, and "knobbed" bases, deep and wide-mouthed bowls, and conical cups with moulded rims, thought at Tura to have been jarlids, but often containing, at Maadi, a cosmetic composed of pigment mixed with a fatty substance. Some of these forms occur also in the polished black pottery together with globular pots and bottles, broad ovate vases with pointed bottoms, cylindrical situlae, and conical bowls. We find, in addition, a highly polished fine red ware, the use of which was confined to little globular pots with bands of incised decoration at the base of the neck, middle-sized wide-mouthed bowls with narrow bases, small double vases, and high ring-stands. Vases of Syro-Palestinian types, including broad "wavy-handled" jars, known also in the Gerzean (Naqada II) of Upper Egypt, ledge- and lug-handled jars, loop-handled cups, barrel-shaped pots, and squat, flat-bottomed vases with imprinted decoration around the neck were imported into Maadi (as containers of oil, etc.) or produced there under western Asiatic influence in a distinctive white or pink clay, often with a whitish surface wash or slip. Among a number of special and relatively rare types may be mentioned wide basins of coarse pottery resting on high cylindrical feet, handled jars of yellowish pottery, spouted vases and bowls, squat carinated cosmetic pots containing powdered ochre, very small ovoid and conical vases which may have been toys or models, vases made in the form of birds with the wings and tail clearly indicated, not unlike those found in the Naqada II culture of the south, sherds of black-topped red and brown vessels which also suggest a contact with the predynastic culture of Upper Egypt, and sherds and complete vessels with a variety of incised ornament—gouges, slashes, dots, triangular imprints, cross-hatching, and branch and herringbone patterns. Painted decoration in light or dull brownish red on a pinkish yellow or whitish slip occurs on numerous sherds and one or two nearly complete vessels from Maadi. The designs, elementary in concept and crudely executed, consist largely of rough net or scale patterns, palm-leaf patterns, dots, crosses, curved strokes, straight lines, and parts of what have been thought—somewhat imaginatively—to be human figures. The frequently suggested association of this pottery with the so-called "decorated" ware of the Naqada II culture of Upper Egypt is, in fact, somewhat vague, though it may represent a late, debased, and much simplified form of that ware. Menghin and Vandier have compared it with the Thinite (Early Dynastic) vases called by Petrie Aegean and by Hall Syrian, Bonnet believes it to have been "made in Egypt by a foreign tribe," and Childe notes that the painted sherds from Maadi "are as like Early Palestinian wares as Gerzean Decorated vases."

For jar-lids the Maadians, like the Merimdians before them, used potsherds, trimmed to form rough disks, and sometimes the broken and inverted bases of small pots. Pottery disks with a central hole were probably spindle whorls and deeply scored ringbases of ovoid jars were apparently used as scrubbers or burnishers in the manufacture of limestone vases.

Crude sculpture in pottery is represented by the heads of animals in red-on-white painted ware, perhaps broken away from vases and variously identified as camels, donkeys, and birds, and by rough T-shaped figures of burnt clay which may have been intended as bulls' heads or possibly as female idols. Also found were a fragment of a boat model in red pottery and the head of a human statuette of the same

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material, described by its discoverer as "showing a racial type not uncommon, even in our own days, in the countries lying north east of the Delta."

Stone vessels are more numerous at Maadi than on the earlier northern Egyptian sites and it is probable that their number was at one time swelled by many other examples which, because of their durability and value, were either buried in the graves of their owners or were taken away by plunderers when the town was sacked. The surviving vessels are chiefly of basalt or limestone, with an occasional example or fragment in alabaster, granite, or diorite. They show considerable variation in their shapes, sizes, and workmanship. Finest are the polished basalt vessels, which are thought not to have been produced locally, but in the neighborhood of the Fayum where outcrops of the hard light grey to black stone are found. Slender cylindrical and ovoid vases with flat rims, small ear-like handles, and rounded, flat, or spreading conical bases, flat hemispherical bowls or goblets, also with splayed conical feet, conical vases with a broad flat rim, and small conical cups are among the more common forms. Childe and others have remarked that the slender footed vases and the squat chalices go back, in Upper Egypt, to Naqada I, or "Amratian," times; but Baumgartel, while conceding a fairly early origin for the vases, points out that they continued to be produced in Egypt during the early historic period and even down into the reign of King Menkaure (Mycerinus) of the Fourth Dynasty. The conical cup and the wide-brimmed conical vase, in both cases, according to Baumgartel, of protodynastic date, have been found, respectively at Badari in Middle Egypt and at Mersa Matruh, west of Alexandria; the squat chalice, or "egg-cup," occurring at Maadi in both basalt and limestone, but rare elsewhere in Egypt, is known at Arpakhiya in Assyria and at Erech in Sumer, where it has been assigned to the Late Uruk–Jemdet Nasr phase. A massive limestone goblet is less carefully finished on the outside than its basalt mates but is decorated on its exterior surface with an incised vertical zigzag pattern. It is solid except for a very shallow cavity in its top and was perhaps a ritual or cult vessel used for pouring libations. Other coarse limestone vessels, obviously manufactured at Maadi itself, include deep and shallow circular bowls and dishes, a few small cups, an oval dish, a boat-shaped vessel, and several heavy elliptical limestone bowls, blackened with soot on the interiors and clearly to be identified as lamps, the shape, according to Menghin, having been traditional since Upper Paleolithic times. Carinated cups, cylindrical cups, with or without projecting rims, and a number of very small conical vases are made of a fine, translucent "limestone" (or calcite?), their surfaces carefully smoothed but not usually polished. A vase of grey limestone has the form of a pottery jar and was even tinted red to enhance the illusion. Fragments of several large limestone mortars show that these massive vessels were smoothed on the interior but left rough on the outside. In a brief report on the fifth season of excavations at Maadi (1935) mention is made of a "marvelous" vessel of "Libyan" type made of gneiss with rose and dark green crystals. Several vases show in their interiors the marks left by a rotary boring tool, while the asymmetry and crudeness of others testify to the ineptitude of the early stoneworkers.

In contrast to the stone-tool industries of the earlier northern Egyptian settlements, where bifacially worked implements predominate, that of Maadi is primarily a flake and blade industry related to

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those of western Asia, the few bifacial tools found on the site—tanged arrowheads, "fishtail" and other lanceheads, saws, sickle flints, and one polished stone axehead—being perhaps imports from the south or west. Despite the Maadians' evident familiarity with the smelting and working of copper their flint implements number well up into the thousands, but show, as we should expect in so late a stone industry, relatively little variety in their types and techniques. Oval and fan-shaped scrapers made of thin slabs of tabular grey flint with the cortex left on and closely resembling those found at Teleilat Ghassul in Transjordania and Byblos (II) on the Syrian coast are among the more characteristic forms, which include also scrapers of other types (convex, keel-shaped, ribbed, double, etc.), knives with retouched edges, and fine and coarse awls and punches. A peculiarity of the Maadian flake tools is that the bulb of precussion—that is, the point from which the flake was struck off—is regularly at the thin, narrow end of the tool, making the achievement of a good point difficult. The characteristic sickle flint is a unifacial sharp-edged blade without teeth. True burins, microburins, trihedral "rods," and what Petrie has called "three-faced twisted blades" are also represented. Coarse wedges, choppers, scrapers, and borers bearing a superficial resemblance to the rough tools of Lower Paleolithic times occur in some quantity in the layers of the settlement debris and show the same patination as the other Maadian stone implements, with which they are clearly contemporaneous. Natural flint pebbles, much battered and evidently employed as hammerstones, and slender retouching tools of flint with round or polygonal cross-sections indicate that a certain amount of stone-knapping was done in the town itself; but the scarcity of cores suggests that the principal atelier was elsewhere. Aside from the pebbles of Nile-gravel flint and the slabs of mined tabular flint the materials used by the Maadian implement makers included, on rare occasions, quartzite and rock crystal. Stone axeheads, with the single exception noted above, are unknown at Maadi, this implement now being made almost exclusively of copper. Only two maceheads have been recovered from the site, one plano-convex in form and made of granite, the other a conical head of dolerite. Though the beautifully worked fish-tail lanceheads, the fine twisted blades, and some of the other forms which crop up occasionally at Maadi go back in Upper Egypt to early Naqada times the industry as a whole has a late and somewhat decadent character, its traditions, as Miss Caton-Thompson, Dr. Baumgartel, and others have pointed out, being more closely allied to those of the Early Dynastic, or Protodynastic, period than to those of the earlier Fayum and West Delta cultures.

The stone mills or querns of Maadi differ in no essential respect from those met with on the other prehistoric and early historic sites of northern Egypt and adjoining areas. They are heavy oval slabs of sandstone or quartzite with slightly concave, or hollowed-out, upper surfaces on which were ground the cereal grains which formed a staple item of the townspeople's diet. Some of the smaller examples were evidently used for pulverizing the ochre from which was produced the much-admired red pigments and cosmetics, the latter employed, as we have seen, for magical as well as decorative purposes. Cosmetic palettes of yellow limestone with beveled edges and burnished upper surfaces are usually square, rectangular, or irregular in outline. They carry traces not only of red, but also of green and black pigments and the surfaces of some

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are worn and hollowed from prolonged use. Thin ovoid slabs of grey flint with finely chipped edges have been classed by some modern writers as palettes but are probably large scrapers of the Maadian-Ghassulian type referred to in the preceding paragraph. The presence in the town ruins at Maadi of fragments of a number of elongated rectangular and rhomboidal cosmetic palettes of slate characteristic of the Naqada cultures (Amratian and Gerzean) of Upper Egypt forms, with the fish-tail lanceheads and the black-topped pottery fragments, yet another tie with the southern predynastic group. Spherical and hemispherical polishers of red and white quartzite and limestone were evidently used for burnishing the rounded and flat surfaces of vessels, boxes, and other manufactured articles, and grooved sandstone hones for sharpening and polishing bone implements. Small pierced discs and balls of limestone have been identified as spindle whorls or net-weights; and burnt, flat stones found in or near the hearths as pot-boilers or fire-dogs. Mention must also be made of a rather amorphous piece of gypsum or baryte which has been thought to be the leg of a roughly sculptured stone statuette.

Implements and other objects made of bone, wood, and horn are less numerous at Maadi than in the earlier settlements. Fine and coarse awls and punches, not unlike those found at Merimda, were still produced in some quantity from sections of split hollow bones, with the trochlea or rounded joint-end of the bone often left in place to serve as a handle. One bone awl is provided with a wooden handle, evidently shaped with a metal cutting tool and bound with strips of bast fibre. Another consists of a wide, flat piece of bone with a thin, needle-like point projecting from one of its ends. There are also fragments of large oval(?) bone palettes, made of the shoulder blades of oxen or other large animals, and smaller, tongue-shaped palettes used perhaps as pigment rubbers or spatulae. An elongated bone point of somewhat irregular form has been tentatively identified as an arrowhead, and a small conical object with a cylindrical base as a playing piece for a game. Sections of small tubular bones, either left cylindrical or cut to prismatic forms and carefully polished, were strung together and worn as beads.

In wood there are, besides a number of handles for bone and copper punches and the domical jar-cover mentioned above, a crude, short-handled spoon or ladle, a fragmentary bent club or throwstick, a hardwood point thought to be an awl but identical in form with an Early Dynastic arrowhead from Abydos, part of a carefully carved or beaded staff, some wooden plates "of fine workmanship," wooden beads, and several short rods of an aromatic cedar-like wood, charred at one end and perhaps used as incense.

A single comb, carved of ox-horn, is unfortunately so badly preserved that the length of its teeth must remain uncertain. The shells of river mussels trimmed around the edges to serve as ladles or scoops are among the rare examples, aside from jewelry, of the use of this material in the Maadi settlement.

Though, for any number of reasons—pillage, evacuation, melting down for re-use, disintegration—tools and weapons of copper have not survived in large numbers at Maadi the site has yielded copious evidence that copper ore was imported and worked in some bulk and that locally a knowledge of smelting, casting, and other metallurgical processes had advanced sufficiently for the production of a variety of metal implements, some fairly large and complex in form. These included heavy rectangular and trapezoidal axeheads of copper with fine

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cutting edges, chisels with rectangular cross-sections, copper punches and awls (one of the latter provided with a bone handle), a copper fish-hook "of excellent workmanship," another type of hook, several needles and pins, and some sections of copper wire. Aside from the more or less well preserved tools and weapons patches of green oxide, the traces of copper objects long since disintegrated, occurred with some frequency in the settlement debris. A copper axehead spoiled in casting and a number of copper ingots and masses of copper ore found on the site indicate that the metal was processed and the tools manufactured in Maadi itself, and a piece of pyrolusite or natural ore of manganese, found with the copper ore, suggests that western Sinai or its vicinity was the source from which the ores were obtained. Here, then, as Baumgartel points out, we have in all probability "the earliest evidence of interest in the Sinai Peninsula and its copper and turquoise mines." In view, however, of the scale on which metal tools and weapons were now being produced and used and the relatively high degree of true metallurgical knowledge implicit in their production, a date for this particular Maadian activity not earlier than the end of the Naqada II phase of Upper Egypt and more probably in very late Predynastic and Early Dynastic times seems indicated. In this connection it is interesting to note, with Baumgartel, that the flint axehead, already replaced at Maadi by its copper successor, is known to have survived on other Egyptian sites well into the Dynastic Period.

Either through poverty or personal taste the people of Maadi seem to have concerned themselves little with jewelry or other forms of personal adornment. Like their predecessors at Merimda they wore as amuletic pendants the tusks of the male pig or boar, an animal apparently as important in their magico-religious beliefs as it was in their economy. Their dwelling areas have also yielded fossil sharks' teeth pierced for suspension and a few drop-shaped, wedge-shaped, and discoid pendants of limestone, translucent gypsum, and a dark stone, some of the examples being scarcely more than natural pebbles drilled for stringing. Disk-, ring-, barrel-, and ball-beads occur in various stones, including gypsum, banded calcite, limestone, azurite, baryte, quartz, rock crystal, black stone, and carnelian, and there are also beads of wood, tubular beads of bone and limestone, and small, pierced disks of ostrich eggshell. Among the river and sea shells perforated and worn as beads or pendants by the Maadians are the spiral *Conus*, the small scallop, *Pectunculus*, the spiny *Murex*, and several common mussel, conch, and snail shells, chiefly of local origin. During the third season of excavations were found fragments of two bracelets or armbands, one carved of mussel shell, the other of "red marble." The list sounds impressive, but, with the exception of twenty-one carnelian and white stone beads found together in a cache of valuable objects, the types are represented by only one or two examples each, found during twelve seasons of work widely scattered over an extensive area. Red ochre for use as a cosmetic occurs throughout the site in lumps, in the form of a crayon or pencil, as powder contained in a small pottery jar, as the pigment in a fatty cosmetic substance kept in little conical pottery cups, and as smears or traces on the surfaces of cosmetic palettes and grinders. The lump of manganese ore referred to above may have served as a black eye cosmetic.

That the people of Maadi were well acquainted with the spinning and weaving of textile fabrics is attested by the presence in the settlement debris of pieces of linen cloth as well as spindle whorls of several

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different types, including, besides the already mentioned spherical and discoid examples in limestone and pottery, thick, perforated disks of clay with rounded tops and slightly concave undersides. Strips of a bast fibre were used, as we have seen, to bind the handle of a bone awl and similar strips of fibre were found tied together in a knot. A section of stout cord or rope was made up of twisted strands of esparto or halfa grass (*Stipa tenacissima* or *Desmostachya*).

Animal and plant remains recovered from the dwelling and storage areas of the ancient town throw abundant light on its food supply and on the activities of its inhabitants as stock farmers and agriculturists. Numerous bones of domestic animals show that beef-cattle, sheep, goats, and, above all, swine were bred and eaten by the people of Maadi and that the donkey, Egypt's most ancient and most common beast of burden, was known to them. A mass of black organic matter found in a large pottery jar turned out, upon analysis, to be cooked animal flesh, probably mutton to judge from the nature of the fatty portion. Of the local wild fauna the hippopotamus seems to have been the Maadian hunters' favorite quarry, and, as at Merimda, the leg bones of this massive animal, evidently with the meat still on them, were set up in vertical position, braced by pairs of stones, at several places inside the town, where one can only suppose them to have been intended as trophies, fetishes, or offerings to some deity or spirit of the hunt. Also hunted, as we have had occasion to note, were the ibex and a large aquatic rodent, probably a beaver. Turtles and fish were caught in the Nile, the latter in great numbers, several storejars containing literally hundreds of fish bones, including the fin-bones of the sheat-fish. As in nearly every prehistoric Egyptian settlement fresh-water shellfish formed an important part of the townspeople's diet. The cereal grains stored in large quantities in the pithoi and provision cellars and scattered liberally throughout the settlement debris are without exception those of emmer wheat (*Triticum dicoccum*) and six-row barley (*Hordeum vulgare hexastichum*). Seeds of the castor-oil plant (*Ricinus communis*), known also to the Badarians of Upper Egypt, the remains of a seed- or fodder-vetch (*Vicia sativa* L.) similar to that found at Merimda and of a bird-vetch, or field weed (*Vicia cracca*), not previously known in Egypt but now found mixed with grains of emmer and barley, complete the floral specimens from Maadi which have so far been identified.

Though burial in the settlement itself was not a normal practice with the people of Maadi exceptions were made in the cases of premature and newly born infants, which, as in Central Africa, Nubia, and a few Egyptian villages of the present day, were buried under or near the dwellings of their parents, perhaps as a magical means of warding off future miscarriages and stillbirths. The younger foetuses, aged five to six months (intra-uterine), were buried in pottery jars averaging about a foot in height and usually of the familiar ovoid ring-base type made of smooth red ware. A cordiform jar containing the skeleton of a foetus is interesting in having near its inverted base a pair of eye-holes through which the deceased's gaze could be directed outwards—in this case toward the north, that being the direction toward which the jar was turned. There can be little doubt that these small circular openings form a true parallel to the so-called "soul-holes" in prehistoric burials and a predecessor of the pairs of great eyes painted or carved on the sides of Egyptian coffins and sarcophagi of the dynastic era. The more developed foetuses, eight to nine months old from the time of concep-

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tion, and the newborn babies, usually under a month old, were buried simply in small pits or hollows in the virgin soil below the town debris. By the third season of work (1933) nineteen foetus burials had been found within the habitation area at Maadi and this number was evidently added to during the succeeding years. In the course of the fifth season of excavations (1935), in the western sector of the settlement, the skeleton of a five-year-old child, apparently a girl, was discovered squeezed into a pottery jar, surrounded by smaller, provision jars and buried beneath the ruins of a rectangular structure, presumably a house.

An adult woman, perhaps the mother of one of the foetuses who died with it, was also buried among the habitations of the town. Her body was found lying in contracted position in a hollow in the ground and covered by a huge inverted pottery bowl. The head of the deceased lay to the south with the face to the west. The body was accompanied by two pots, a limestone cosmetic palette, and other grave furnishings. Described as larger, wider, "fuller," and more pentagonoid in form than those of the typical prehistoric inhabitants of Upper Egypt the woman's skull, like those of the child and two of the foetuses mentioned above, is said to mark her as belonging to the so-called "Delta-people," or "northern race."

The fragmentary skull bones—chiefly mandibles—of some ten other adults, found scattered in the settlement area, come possibly from graves in the area itself, but are more likely to have been dragged thither by jackals or other wild animals (one jaw-bone has been extensively mauled), collected and worn by the Maadians as amulets (a known custom), or may be simply the remains of persons killed in the fighting when the town was captured by an enemy.

Our knowledge of the ancient town at Maadi suffers from erratic and inadequate publication of the work conducted there, including a lack of even preliminary reports on the last six seasons of excavation. The same is true to an even greater degree of the associated cemeteries. There seem to have been three of these in the general vicinity of the settlement.

The first to be recorded was discovered in 1925 by the R. P. Paul Bovier-Lapierre on a low plateau in the mouth of the Wadi el Tih, some two miles to the northeast of the settlement, near the foot of the Gebel Moqattam. The graves here are shallow circular or oval pits containing skeletons in contracted position and occasionally a single pottery jar. Many are surmounted by rectangular or cubical structures of rough limestone slabs or blocks which have been described as "dolmens" and advanced as evidence of an early date for the cemetery, but which Dr. Baumgartel compares with the rough limestone-block superstructures of the Early Dynastic middle-class cemetery at Saqqara and the stone constructions found in the Early Dynastic tombs at Ezbet el-Walda, near Helwan. The larger, rectangular tomb superstructures at Wadi el-Tih are usually oriented east-west with the open end facing west, toward the Nile. One of them, perhaps marking the grave of a ruler or chieftain, was surrounded by a circle of the smaller, cubical superstructures. A number of more modest graves were marked simply by lines of stones laid flat on the ground. The cemetery, which—possibly owing to faulty recording—is said to be poor in grave equipment, has been dated by its explorers to Middle Predynastic (Naqada II, or Gerzean) times, but is probably, as Baumgartel has suggested, considerably later, perhaps of early historic date.

A second cemetery in the same general

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area ("Maadi North"), but apparently to the southwest of the town, "on the slope to the flood plain," is described as lying "at the foot of the same terrace" on which the settlement was founded. It was explored during the years 1942 and 1947 by members of the Egyptian University's expedition and is referred to briefly by Ibrahim Rizkana and Mustafa Amer in reports written, respectively, in 1952, and in 1947 and 1953, and by Childe in the fourth edition of his *New Light on the Most Ancient East*. Like those of the Wadi el-Tih necropolis its graves, including that of a dog, are reported to be "very poor" in furnishings, only a few containing as much as a single pottery jar for food and drink. Rizkana implies, though he does not actually state, that some of the pots were of the tall ovoid base-ring type, which, as we have seen, have been found in Early Dynastic contexts at Tura and elsewhere. The "Maadi-North" graves, too, have been dated by their finders to the Middle Predynastic period, but, again, there is doubt that they were really that early.

Another cemetery, often referred to as "Maadi South," lies on somewhat lower ground little more than half a mile to the southeast of the settlement, on "a little eminence" in the estuary of the Wadi Digla. It was discovered in October 1951, and was excavated for two seasons (1952 and 1953) by Amer and Rizkana on behalf of the Egyptian University. Here over an area of more than an acre were found four hundred and sixty-eight human graves and those of fourteen animals—thirteen gazelles and a dog. The typical grave is a circular or oval hollow scooped out in the virgin soil in which, in the case of the human burials, the dead, wrapped in a papyrus mat or an animal's skin, was placed in contracted or semi-contracted posture with the head more often than not to the south and the face to the east. Lines of limestone blocks mark the eastern boundary of the cemetery and rim the edges of some of the richer graves, and burnt hearth-stones, brought presumably from the settlement, were placed under the heads of the deceased to serve as headrests. The equipment buried with the dead in the Wadi Digla is far richer than in the Maadi-North cemeteries, comprising not only numerous pottery vessels of a variety of different types, but also an alabaster vase, limestone, basalt, and slate cosmetic palettes, flint tools and weapons, Nile shells (used for mixing pigments), combs, shell bracelets and necklaces, beads of carnelian, "coloured stone," and bone, and traces of malachite and manganese evidently employed as pigments. It is interesting and possibly significant that the cemetery yielded not a single object made of copper.

As in the settlement the pottery is monochrome—smooth red and polished black—the forms including the by-now familiar slender ovoid jars with ring-bases, squat and elongated ovate vases with rounded or flat bottoms, bottle-shaped vessels with very narrow necks, globular jars with ear-handles (rare), very small cosmetic(?) vases, and an ovoid jar with two lines of imprinted decoration around the neck and three knobs between the lines. A few of the vessels bear indecipherable pot-marks, all different, and some were stoppered with conical cups or with discoid lids of stone or pottery. Several pots found lying on the surface of the ground, outside of the graves, may have been brought thither as offerings by the families of the deceased on the occasions of periodical "funerary banquets."

The stone implements of Maadi South are without exception flakes and blades showing the same technique and many of the same forms seen in the settlement. Blades, knives, and scrapers of tabular

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flint predominate and there are also a few flakes with serrated edges. The slate cosmetic palettes are either trapezoidal with beveled edges or of the rhomboidal type which we associate with the Naqada cultures of Upper Egypt.

The skeletons of the men, women, and infant children buried in this cemetery are in many cases well preserved, but no anthropological report concerning them is as yet available. They are described in a brief resumé on the site as being taller, more heavily built, and more prognathous (more negroid?) than the people of Maadi North, sharing these characteristics with the occupants of a cemetery near Heliopolis, to which we shall presently turn our attention.

In the western sector of the Wadi Digla cemetery lie the more poorly equipped of the human burials and the fourteen animal burials referred to above. The latter were provided with graves of their own and half of them, including the dog and six of the gazelles, with food or drink contained in pottery jars. One at least of the gazelles, however, had had its throat cut prior to burial, and it is probable that we have to do here with household pets which the deceased wished to take with them into the afterlife rather than, as has been suggested, with sacred animals, in which dwelt the spirits of divinities. According to a zoölogist, Dr. Shawki Moustafa, the gazelles "belong to the Artiodactyl group of Gazellinae, Coues, as suggested by the nature of the horn cores and the flattened roof of the skull" and are probably of "the Asian and African Genus Gazella, Blainville." The remains of the dog have been identified by the same authority as "those of the domesticated dog Canis Familiaris, specimens of which were discovered . . . in the Predynastic cemetery of Maadi [North] in 1947, as well as in the Predynastic cemetery of Heliopolis in 1950."

The last-named cemetery, discovered in 1950 and excavated from March 20th onward of that year by Fernand Debono and others, lies near Cairo's well-known northeastern suburb, not far from the racetrack of the Heliopolis Racing Club, but at some distance from the site of the ancient city and cult center of On-Heliopolis (modern Matariya), with which, indeed, it may not have been associated. The fifty graves excavated here occur in three layers of gravel brought down by ancient freshets from the Gebel el-Ahmar, and it would appear from this fact that the cemetery covered a considerable period of time. In almost every respect—types of graves and burials, physical characteristics of the people buried, pottery wares and shapes, stone vessels, animal burials (four gazelles, five dogs)—it is so similar to the cemetery of Maadi South (Wadi Digla) that a detailed description of the graves and their contents would be little more than a repetition of the contents of the immediately preceding paragraphs. We may note, however, the presence of a number of new pottery types—ovoid, globular, and drop-shaped jars with low or high cylindrical necks— of an exceptionally fine basalt vase with two small handles, of a shell bracelet found in position on the wrist of a skeleton, and of a Nile mollusk shell placed over the mouth of one of the deceased. It may be remarked also that, whereas the dog burials were unaccompanied by offerings of any sort, the graves of the gazelles were "filled with vases" and the animals themselves were oriented in death in the same manner as their human companions, facing east with their heads to the south. This orientation, in the direction of the rising sun, has been thought to reflect the existence at Heliopolis, in Late Predynastic times, of the solar religion of which the town was shortly to emerge as one of the great

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centers. It must, however, again be pointed out that the distance of the cemetery from the site of the ancient city makes their association with one another at least dubious and that the same orientation of the bodies of the deceased is found in the graves of the Wadi Digla, south of Maadi.

There seems to be little reason to doubt that the cemeteries of Wadi Digla and Heliopolis were contemporaneous with one another and, in part at least, with the settlement at Maadi, and that the former was one of the necropolises used by the townspeople of the settlement. The curious absence of copper in both cemeteries, in contrast to the frequency with which it occurs in the town, is perhaps to be attributed to a natural hesitancy to bury useful objects in so valuable and so perishable a material with the dead. The belief, shared by several students of the period, that the cursively recorded and practically unpublished cemeteries of Maadi North are earlier in date than those of Wadi Digla and Heliopolis appears to have no basis in fact, the poverty of the burials being inconclusive in this respect and the type of tomb superstructure in the Wadi el-Tih pointing, if anything, to a slightly later period. Together the five sites—the settlement and the four cemeteries—seem to represent the known remains of a northeastern Egyptian sub-culture of late prehistoric and early historic times, to which, for want of a better name, we may tentatively apply the designation "Maadian."

Though classed on the basis of its flint implements as Predynastic, a small settlement four miles southeast of Qasr Qarun, at the western end of the Fayum, shows sufficiently strong affinities with the Maadian group to warrant its inclusion in the present survey. The remains of the settlement, "situated on a spur of middle palaeolithic gravels" close to the shoreline of the Neolithic lake, "covered an area of 120 by 100 ft." and consisted of a shallow deposit "of black powdery *sabakh*," devoid of any structural elements, but containing a few potsherds, some fifty flint implements, a small pierced discoidal object (spindle whorl?) of limestone, a limestone saddle-quern, a few fragments of ostrich eggshell, a Spatha shell, and the burnt bones of beef cattle, sheep, and fish. The pottery, of rough brown ware, includes two of the slender ovate jars with flat bases and everted rims so familiar to us at Maadi itself and the related sites but scarcely known in this ware in Upper Egypt. Miss Caton-Thompson describes the stone implements, which are chiefly unifacial but include a few bifacial tools and weapons, as "a typical middle-predynastic series." She goes on to say, however, that "comparison of the Fayum settlement flints with those of Maadi shows the similar tradition of both." Among the implements occurring at both Maadi and Qasr Qarun are the discoidal scraper of tabular flint, the upper surface of which still retains its cortex, the unifacial sickle flint, the "three-faced twisted blade," the narrow, pointed knife, and the forked or fish-tail lancehead. Scrapers of other types, narrow blades, trimmed flakes, sickle-shaped and handled knives of bifacial workmanship, and a single tanged arrowhead complete the Qasr Qarun series, which is interesting if for no other reason than that it establishes a bridge between the stone industry of the Maadian sites and that of the middle and late Predynastic of Upper Egypt.

7. Character of the Northern Egyptian Communities

Despite a relatively late date and a pronounced individual character the people and the culture of Maadi and the associated cemeteries exhibit certain traits which we

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recognize as characteristic of the prehistoric inhabitants and civilization of northern Egypt as a whole—traits which from Neolithic to protohistoric times tend to give the population of this region a degree of racial and cultural homogeneity and to set it apart from those of neighboring areas in general and from the more or less contemporaneous Predynastic people and civilization of Upper Egypt in particular.

The early northern Egyptian, wherever we encounter him—Merimda, El-Omari, Maadi North, Maadi South, and Heliopolis—appears to have been somewhat taller and more sturdily built than his Upper Egyptian contemporary and to have been endowed with a broader and better formed skull and a generally greater cranial capacity. The prognathism observed in the skulls from Maadi South and Heliopolis may or may not indicate the infiltration of a negroid strain into the northern region and, on the other hand, a few broad, square-jawed skulls found in a cemetery near Deir Tasa may point to the existence of an outpost of the "Northern Race" in Middle Egypt. Generally speaking, however, the prehistoric northerner seems to represent a type distinct in race and physique as well as in culture from the people of the south. In him, rather than in some intrusive group of outlanders, we may perhaps recognize, with Junker, the ancestor of the so-called Dynastic Race, or Giza type, of Early Dynastic and Old Kingdom times.

To judge from his surviving settlements on the fringes of the eastern and western deserts, the northern Egyptian lived in towns of far greater size and of more developed urban character than those presently known to us in Upper Egypt, where even the relatively late Predynastic settlement at Hierakonpolis, the most extensive yet recorded in this region, covered an area and had an estimated population less than one-third the size of those of either Merimda or Maadi. This may be attributable, in part at least, to a closer association with western Asia, where the urban tradition and the city state appear to have originated and were at this time strongly developed. It would not, in any case, seem to be, in itself, sufficient reason for assuming the existence of a generally more advanced and "exalted culture" in the North than in the South nor of a more typically "Egyptian" civilization, since, as we shall see, the truly urban community did not bulk large in the life of dynastic Egypt.

Indeed in some fields—notably in the arts—the northern Egyptian showed little or none of the flair exhibited by his southern contemporaries. His pottery, though frequently well made and carefully finished, is almost uniformly monochrome (red, black, or brown), its plainness only occasionally relieved by a few primitive decorative motifs incised into or applied in relief to the surfaces of the vessels. Only in the relatively late settlement at Maadi do we encounter pottery with painted decoration and even here the examples are few in number, crude in concept and execution, and quite possibly imported (from Palestine?) rather than produced locally. "Sculpture" is represented by an occasional female figure ("fertility goddess"?) or animal head modeled in pottery or Nile clay but usually so crude as to be scarcely recognizable, and, at Maadi, by bird-shaped vases, probably of Gerzean origin or inspiration. Applied decoration on objects other than pottery is confined to one or more incised lines on the surface of a palette or around the neck of a bone point. The same austerity or lack of imagination extended also to personal adornment. Jewelry is extremely scarce on all the northern sites, with the exception

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of El Omari, and when present at all comprises only a few sea or river shells pierced for stringing, an occasional boar's tusk or shark's tooth worn as a pendant, and a few isolated pendants and beads of stone.

Distinctive practices and customs found among the prehistoric inhabitants of northern Egypt, which are attested on two or more of the sites explored and which, so far as can be determined, are not prevalent south of the Fayum, include the large-scale breeding of pigs and a belief in the amuletic powers of a boar's tusk when worn on the person, the ceremonial setting-up of the leg of a hippopotamus or other animal to serve either as a fetish or as an offering to some divine or semidivine spirit of the chase, the burial of premature and infant children and, at Merimda and Ras el Hof (El-Omari), of adult women and, occasionally, men in and among the dwellings of the living, and the use in the settlements of clay-lined bins for storage and of trimmed potsherds as jar-covers.

From the earliest post-Paleolithic times relations between northern Egypt and western Asia, including perhaps occasional migrations of groups of people, are readily demonstrable. The initial impulse toward the domestication of food-animals and the cultivation of food-plants, such as wheat and barley, and toward the settled mode of existence which goes hand in hand with food production apparently came to Egypt, as we have already remarked, from the region of the Fertile Crescent. Since that moment Egypt's northern settlements seem to have maintained more or less continuous contacts, through trade and other activities, with similar but more advanced urban centers in Palestine and Syria, the effects of these contacts being discernible not only in their material culture, but also, it would appear, in their religious beliefs and burial customs and perhaps also in the physical and racial characteristics of their inhabitants.

Of equal importance to an understanding of the early settlements and cemeteries in the north of Egypt are the ties which quite evidently existed between them and other African groups and communities, particularly those generally described as Saharo-Libyan and including the peoples and cultures of the western oases, of the Gilf Kebir and Uweinat hills, of the more remote Hoggar-Air-Tibesti region, and of those stretches of the Nile Valley in Nubia and the northern Sudan which came most strongly under "Libyan" influence from the west. These ties are most readily discernible in the bifacially worked stone implements of the earlier settlements which derive their forms and techniques in part from local Paleolithic antecedents and in part from traditions brought from the west by the Aterians and other nomadic groups. They are apparent again, in late Neolithic times, in the striking coincidences which exist between the implement types of the settlements of the Fayum B-culture and those of the Libyan oases of Siwa and Kharga. Settlement burial and the cult of a fertility goddess, both attested in northern Egypt and western Asia, occur also in the Libyan area and further to the west, the former, as we have seen, in the Upper Capsian middens of the Maghreb, the latter among the Early Oasis Dwellers, or Peasant Neolithic folk, of the Kharga-Dakhla region. Arkell has noted significant parallels between a Neolithic settlement near Khartoum in the Sudan and the Fayum Neolithic "A" culture, and Baumgartel reports that some material from a protohistoric, or "A-group," cemetery in Nubia "is the nearest" she has "seen so far to Merimda." That at least desultory trade relations existed between the northern Egyptian settlements and the Predynastic

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people of Upper Egypt is indicated by the presence at Merimda and Maadi of such typical Naqada-culture products as black-topped pottery, forked lanceheads, and rhomboidal cosmetic palettes of slate.

Despite the facts that they almost certainly overlapped each other in time, were not widely separated geographically, and belonged to a recognizably "northern Egyptian" culture circle, the settlements of the Fayum, Merimda, El-Omari, and Maadi display in every case pronounced individual characteristics which distinguish them sharply from one another and lead inevitably to the conclusion that each was politically, economically, and to a great extent culturally and religiously independent of its neighbors. There is, in other words, archeological evidence that Lower Egypt consisted at this time of a series of independent townships, each comprising the town or village proper surrounded by the fields, pasture-lands, and other rural areas on which it depended for its support and each possessing its own local government, customs, and religious beliefs and cults. The existence of local governments, probably centered in each case around a town or district ruler, is suggested at Merimda by the laying-out of the settlement in streets, at El-Omari by the finding in a grave of a body holding in its hand a sceptre or staff of authority, and at Maadi North by a circle of relatively modest graves surrounding an obviously much more important grave with a massive dolmen-like superstructure. The contrasting richness and poverty of the graves in the eastern and western sectors of the cemetery of the Wadi Digla indicate, too, that different social or, at least, economic classes existed within a single settlement.

We shall find, in a subsequent chapter,[1] that the image of the political, social, economic, and religious development of prehistoric northern Egypt reflected in the archeological material is confirmed and clarified by traditions and records of events preserved to us in the writings and other documents of the historic, or dynastic, period. Before turning to these, however, it is of the greatest interest and importance to acquaint ourselves with the more or less contemporaneous developments in Middle and Upper Egypt, that is, in the long stretch of river valley extending southward from the Fayum to the great bend of the Nile at Qena and thence upriver through the Thebaid and past the First Cataract into Nubia.

[1] This topic, planned by the author for Chap. V, was unfortunately never developed into publishable form.—*The Editor.*

NOTES

CHAPTER III

1. Near Eastern Origins

Of the general works cited in the fourth paragraph of the first section of the notes to Chapter II, above, the following contain more or less detailed surveys of the New Stone Age and its salient characteristics as observed in various parts of the Old World, including the Near East: MacCurday, *Human Origins*, II (1926), 21–132; Menghin, *Weltgeschichte* (1931), pp. 273–477; Childe, *Man Makes Himself* (2d impr.; London, 1937), pp. 59–86; *What Happened in History* (1942), pp. 48–68; Childe, "The New Stone Age", in *Man, Culture, and Society*, ed. by Harry L. Shapiro (New York, 1956), pp. 94–110; Turner, *Great Cultural Traditions*, I (1941), 51–67, 68–122 *passim*; Clark, *From Savagery to Civilization* (1946), pp. 69–87 ("Primitive Barbarism"); Braidwood, *Prehistoric Men*, "Chicago Natural History Museum Popular Series, Anthropology," No. 37 (1957), pp. 90–104; Coon, *Races of Europe* (1939), pp. 78–130; *Story of Man* (1958), pp. 114–80; and Ebert, *Reallexikon* (1924–1932), under "Neolithikum" and other appropriate entries.

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To these may be added such—for the most part recent—general books, articles, and discussions as Cole, *The Neolithic Revolution* (British Museum [Natural History], London, 1961. Bibliography on pp. 57–58); Braidwood *The Near East and the Foundations for Civilization* (Eugene, Oregon, 1952); Childe, "Old World Prehistory: Neolithic" (1953); *New Light on the Most Ancient East* (1957), pp. 14–49, 102 ff.; Forde-Johnston, *Neolithic Cultures of North Africa* (1959); Balout, *Préhistoire de l'Afrique du Nord* (1955), see especially pp. 449–84; McBurney, *Stone Age of Northern Africa* (1960), pp. 229–74; Cole, *Prehistory of North Africa* (1954), see Index (p. 435) under "Neolithic"; Huzayyin, *Place of Egypt* (1941), pp. 275–304. A good general survey of the technology and typology of Neolithic tools and weapons, especially those made of stone, is provided by Bordaz, "First Tools of Mankind" (1959), pp. 92–106. See also De Morgan, "L'industrie néolithique et le proche Orient," *Syria*, IV (1923), 23–37.

Divergent opinions on the use and meaning of the term "Neolithic" are advanced by Arkell, *Kush*, VII (1959), 238: "Ground stone is the main criterion, and it occurs at Shaheinab, which is therefore 'neolithic,' while it has not yet appeared at Early Khartoum, which is therefore 'mesolithic'"; by Balout, *op. cit.*, pp. 450–51: "On pourra donc parler de Néolithique, même lorsque les pierres polies manquent dans un gisement; mais on se refusera à employer ce terme si aucun des aspects de la civilisation néolithique n'est attesté: *Polissage de haches et d'herminettes—Pointes de flèches de taille bifaciale—Céramique modelée, généralement ornée—Domestication et élevage—Agriculture*"; by Cole, *Prehistory of East Africa*, p. 215: "The change from a hunting economy to one of food production is the essential difference between Palaeolithic and Mesolithic stages and the Neolithic"; and by Braidwood, *Kush*, VII (1959), p. 236: "... the word 'Neolithic' has such a hopeless hodge-podge of meanings that we should quickly cast it into oblivion ... we might best name our archaeological materials in terms of the subsistence levels...."

On food production and the early food-producing communities of southwestern Asia we may consult Helbaek, *Science*, CXXX (1959) 365–72; *Archaeology*, XII (1959), 183–89; *Queen Ichetis's Wheat; A Contribution to the Study of Early Dynastic Emmer in Egypt* (Copenhagen, 1953); "Studying the diet of Ancient Man," *Archaeology*, XIV (1961) 95–101; Sauer, *Agricultural Origins and Dispersals* (1952); Wissler, *The Cereals and Civilization* (American Museum of Natural History [New York 1946]); Zeuner, *History of Technology*, I, 327–52; *ibid.*, pp. 353–75; Reed, "Animal Domestication in the Prehistoric Near East," *Science*, CXXX (1959), 1629–39; Isaac, "On the Domestication of Cattle," *Science*, CXXXVII (1962), 195–204; Braidwood and Reed, "The Achievement and Early Consequences of Food-production, A Consideration of the Archeological and Natural-historical Evidence" (1957); Braidwood, "Reflections on the Origin of the Village-farming Community," in Weinberg, *The Aegean and the Near East* (1956); Braidwood, *Science*, CXXVII (1958); Braidwood and Braidwood, "The Earliest Village Communities of Southwestern Asia," in *Cahiers d'histoire mondiale*, I, No. 2 (October 1953), 228–310; Frankfort, *Birth of Civilization in the Near East* (1951), pp. 35 ff.; Adams, "Agriculture and Urban Life in Early Southwestern Iran," *Science*, CXXXVI (1962), 109–22; Kraeling and Adams, *City Invincible* (1960); Cole, *The Neolithic Revolution* (London, 1961), pp. 5–28, 57–88; Kenyon, *Archaeology in the Holy Land* (London, 1960), pp. 20–57; *Digging up Jericho*, (1957), pp. 51–76; Schaeffer, *Syria*, XXXVIII (1961 [see pp. 8–13]); Mellaart, "The Beginning of Village and Urban Life," in Piggot, ed., *The Dawn of Civilization: The First World Survey of Human Cultures in Early Times* (New York, Toronto, London, 1961), pp. 41–64; Barnett, "The Growth of Society," in *The Epic of Man* (by the editors of *Life* magazine [New York, 1961]), Chap. 3, pp. 47–65; Garašinin, "The Neolithic in Anatolia and the Balkans," *Antiquity*, XXV (1961), 276–80; Mellink, *AJA*, LXVI (1962), 71–85; Junker, "Geisteshaltung der Aegypt-

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er," *Sitzungsb. der Österr. Akad. der Wissensch.*, 237, 1 (Wien, 1961), 58 ff., 70 ff. Arkell, *Kush*, V (1957), 9, points out that ". . . the domestication of plants and animals . . . are two very different things, and did not necessarily originate together, or even at the same time or in the same place." He agrees that wheat and barley were probably first cultivated in Asia; but remarks (p. 10) that "hungry wild animals must have sold themselves over and over again into slavery to man in return for a supply of food, and there must have been numberless places where the domestication of animals has so originated."

The radiocarbon and estimated dates cited in the last two paragraphs of Section 1 and the chronological picture of the Neolithic phase in the Near East reflected there were derived from Braidwood, *AOAW*, No. 19 (1958), Pittioni, *Forschungen und Fortschritte*, XXXI (1957); Junker, "Geisteshaltung," pp. 55–60; McBurney, "Radio Carbon Readings and the Spread of the Upper Palaeolithic in Europe and the Mediterranean Basin," (Madrid, 1957); Butzer, *Quaternary Stratigraphy* (Bonn, 1958), pp. 56, 90–104, 109–12, 128; Kenyon, *Archeology in the Holy Land*, pp. 35–44, 56, 59, 60; Schaeffer, *Syria*, XXXVIII (1961), 11; Alimen, *Prehistory of Africa* (1957), pp. 105, 426; Larsen, *Orientalia Suecana*, VII (1958), 48–51, 53; Arkell, *Shaheinab* (London, 1953), pp. 105–107; *Kush*, V (1957), 11–12; Cole, *The Neolithic Revolution*, pp. 2, 9, 11, 40, 47, 48, 55, 56; Mellaart, "Beginning of Village and Urban Life," pp. 53–60 *passim*; Kohler and Ralph, "C–14 Dates for Sites in the Mediterranean Area," *AJA*, LXV (1961), see especially pp. 359, 360.

Baumgartel (*Cultures of Prehistoric Egypt*, I [rev. ed.; London 1955], pp. 14 ff., 49, 120, 121; II [Oxford, 1960], 26 ff., objects to the use of the expression "Neolithic" in connection with any of the cultures discovered to date in Egypt. See also De Morgan, *La préhistoire orientale* (Paris, 1925–1927), II, 103 ff. Dr. Baumgartel's dating of the Fayum and Merimda settlements later in time than the Tasian-Badarian culture of Upper Egypt is followed by Forde-Johnston, *Neolithic Culture of North Africa* (1959), pp. 25, 72, 125. See, however, Arkell, *Bibliotheca Orientalis*, XIII (1956), especially pp. 125 ff. See also Massoulard, *Préhistoire et protohistoire d'Égypte* (Paris, 1949), pp. 30–54; Cottevieille-Giraudet, *BIFAO*, XXXIII (1933), 53–70; Vandier, *Manuel d'arch. égypt.*, I (Paris, 1952), 62–188, especially pp. 181 ff.; Huzayyin, *Place of Egypt* (1941), pp. 294–305; Alimen, *op. cit.*, pp. 103–110; Leakey, *Stone Age Africa* (1936), p. 120; McBurney, *Stone Age of Northern Africa*, pp. 233–47; McBurney and Hey, *Prehistory and Pleistocene Geology in Cyrenaican Libya* (Cambridge, 1955), pp. 247–51; Menghin, "The Stone Ages of North Africa with Special Reference to Egypt," *BSRGE*, XVIII (1932), 17–21; Bovier-Lapierre, "L'Égypte préhistorique," *Précis de l'histoire d'Égypte par divers historiens et archéologues*, I (Cairo, 1932), 40–43; Scharff, *Die Altertümer der Vor- und Frühzeit Ägyptens* (Berlin, 1929–1931), I, 8–16; Kaiser, "Stand und Probleme der ägyptischen Vorgeschichtsforschung," *ZÄS*, LXXXI (1956), especially pp. 98–100; and the vast majority of the works cited in the preceding paragraphs.

A convenient listing (with references) of the Carbon 14 dates for the Merimda, Fayum, Naqada I, and Naqada II cultures, respectively, is given by Junker, "Geisteshaltung," pp. 56, 57.

2. The Fayum Settlements

On the Neolithic and early post-Neolithic cultures of the Fayum lake basin the basic work is Caton-Thompson and Gardner, *The Desert Fayum* (London, 1934). A series of preliminary reports by the same authors include Caton-Thompson, *Man*, XXV (1925); *Man*, XXVIII (1928); *Ancient Egypt* (September 1928); and Caton-Thompson and Gardner, *Royal Anthropological Institute Journal*, LVI (1926); *Geological Magazine*, LXIV (1927). Also to be consulted is Caton-Thompson, Gardner, and Huzayyin, "Lake Moeris: Re-investigations and Some Comments," *BIE*, XIX (1937), in which they reaffirm their belief in a falling Neolithic and

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post-Neolithic Fayum lake, with an initial level of 59 feet (18 meters) above sea-level and storm beaches piled up to a maximum height of 72–79 feet (22–24 meters)—this last contribution being in part a reply to Little, "Recent Geological Work in the Faiyûm and in the Adjoining Portion of the Nile Valley," *BIE*, XVIII (1936).

The association of the post-Paleolithic reflooding of the Fayum basin and the creation of the high-level early Neolithic lake with the so-called Flandrian Transgression of the Mediterranean Sea is proposed by Pfannenstiel, "Entstehung der ägyptischen Oasendepressionen," (1953), p. 406, and by Butzer, *Quaternary Stratigraphy*, p. 109. On the Neolithic Moist Interval, or Subpluvial II Phase, and its effects in Egypt see especially Butzer, *Erdkunde*, XI (1957), 27; *AAWL Mainz* (1958), p. 39; "Naturlandschaft Ägyptens," *AAWL Mainz* (1959), No. 2, p. 86; *BSRGE*, XXXII (1959), 63 ff., and on the successive levels of the post-Paleolithic Fayum lake, Ball, *Contributions to the Geography of Egypt* (1939), pp. 197 ff.

More recent discussions of the Fayum Neolithic settlements and cultures, derived for the most part from the reports of the Misses Caton-Thompson and Gardner, but often incorporating new ideas and interpretations of the material, will be found in: Massoulard, *Préhistoire et protohistoire*, pp. 39–44; Cottevieille-Giraudet, *BIFAO*, XXXIII, 54–58; Vandier, *Manuel*, I, 62–94, 184–87; Huzayyin, *Place of Egypt*, pp. 294–98; Forde-Johnston, *Neolithic Cultures*, pp. 7, 17, 18, 69, 72 f., 108, 109; McBurney and Hey, *Prehistory and Pleistocene Geology in . . . Libya*, pp. 242–51; McBurney, *Stone Age of Northern Africa*, pp. 233–38; Childe, *New Light on the Most Ancient East*, pp. 35 ff.; Butzer, *Quaternary Stratigraphy*, pp. 111–12; Larsen, *Orientalia Suecana Uppsala*, VII (1958), 39–41; IX (1960), 49–51; Junker, *Anzeiger der Akad. der Wissensch. in Wien, Phil.-Hist. Klasse, 1929*, Nos. XVI–XVIII, pp. 180–84; "Geisteshaltung," pp. 56, 62; Scharff, *Altertümer der Vor- und Frühzeit Ägyptens*, IV, 13–14; Arkell, *Shaheinab*, pp. 1, 4, 28, 31, 40, 55, 57, 79, 102–105, 107; *Bibliotheca Orientalis*, XIII (1956), 125 ff.; Baumgartel, *Cultures of Prehistoric Egypt*, I (rev. ed.), 15–16; II, 27, 29, 32, 33.

The opinions cited regarding the origin of the Fayum Neolithic A-culture will be found in Huzayyin, "Recent Studies on the Technological Evolution of the Upper Palaeolithic of Egypt," *Congrés International des Sciences préhistoriques et protohistoriques, Actes de la III^e Session, Zurich, 1950* (Zurich, 1953), p. 175 (see above, Chap. II, Sec. 4, notes); Caton-Thompson and Gardner, *Desert Fayum*, p. 94; Caton-Thompson, *The Kharga Oasis in Prehistory* (1952), p. 31; Forde-Johnston, *Neolithic Cultures*, pp. 73, 77, cf. pp. 68, 70, 71; Arkell, *Shaheinab*, p. 105; see also *History of the Sudan from the Earliest Times to 1821* (London, 1955), pp. 345–46; *Kush*, V (1957), 8, 12; *Kush*, VII (1959), 15–26; McBurney, *Stone Age of Northern Africa*, p. 234 (see also p. 245); Childe, *New Light*, pp. 47–49; and Butzer, *BSRGE*, XXXII (1959), 44.

Earlier finds of Neolithic implements and other remains in the Fayum are described and illustrated by Schweinfurth, *Bulletin Institut Égyptien* (Cairo, 1886); Beadnell, *Geological Magazine* (London, 1903); Seton-Karr, *Annales du Service*, V (1904); VI (1905); Currelly, *Stone Implements* (Cairo, "Catalogue Générale" [1913]), pp. 68–203 (Nos. 63421–64426); De Morgan, *La préhistoire orientale*, II, 54–68.

On the animal and plant remains found in association with the Fayum A culture settlements see especially Caton-Thompson and Gardner, *Desert Fayum*, pp. 22, 34, 43, 46–49, 72, 84; Andrews, "Notes on an Expedition to the Fayûm, Egypt," *Geological Magazine*, X (1903); Butzer, "Naturlandschaft Ägyptens," p. 78.

3. The Oases of Siwa and Kharga

The largest and best-documented collections of stone implements from Siwa were assembled in 1918 by Dr. C. Willett-Cunningham from surface sites on the slopes and terraces of the northern escarpment of the oasis and on the high desert plateau to the

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north of the depression. They are now in the Museum of Archaeology and Ethnology in Cambridge (Reg. Nos. 24.1113 and 24.1114) and in the Alexandria Museum (Inv. No. 21664) together with a small series of implements collected in the region of Siwa by H. W. Seton-Karr (registered as "Seton-Karr"). The best discussion of the Siwan Neolithic and its relationships with the more or less contemporaneous cultures of the Fayum and other areas is provided by C. B. M. McBurney in McBurney and Hey, *Prehistory and Pleistocene Geology*, pp. 251–62, Figs. 35, 36. See also McBurney, *Stone Age of Northern Africa*, pp. 237–38; Huzayyin, *Place of Egypt*, pp. 282, n. 1, 298 and n. 2; Caton-Thompson and Gardner, *Desert Fayum* p. 94; Fakhry, *Siwa Oasis, its History and Antiquities* (Cairo, 1944), p. 22.

The so-called Peasant Neolithic of Kharga is described in detail and extensively illustrated in Caton-Thompson, *Kharga Oasis in Prehistory* (London, 1952), pp. vi–vii, 35–40, 165–96, Pls. 100–19. Further discussions of its nature, its relationships with the Fayum B culture and the Predynastic of Armant in Upper Egypt, and the probable identity of its people with the authors of the rock-drawings ascribed by H. A. Winkler to the so-called "Early Oasis Dwellers" will be found in Caton-Thompson and Gardner, *Journal of the Royal Anthropological Institute*, LVI (1926), 319; *Desert Fayum*, pp. 24, 26, 34, 55, 91, 94; Forde-Johnston, *Neolithic Cultures of North Africa*, pp. 23, 24, 70, 71; Huzayyin in Mond and Myers, *Cemeteries of Armant* (London, 1937), pp. 2, 196, 210, 215; Huzayyin, *Place of Egypt*, pp. 309, 317, 438; McBurney, *Stone Age of Northern Africa*, pp. 236–37; McBurney and Hey, *Prehistory and Pleistocene Geology*, pp. 256, 260–62, 272–73.

On the rock-drawings of the Early Oasis Dwellers our principal reference is Winkler, *Rock-drawings of Southern Upper Egypt* (London, 1939), pp. 27–30, 33–36, Pls. XXXIX–L. See also Caton-Thompson, *Kharga Oasis in Prehistory*, pp. vi–vii.

Surface finds of Neolithic stone implements in the Egyptian area are described, illustrated, and referred to by a number of writers, among whom may be cited Butzer, *BSRGE*, XXXII (1959), 81 (quoted in our text); De Morgan, *Récherches sur les origines de l'Égypte* (Paris, 1897), pp. 46 ff., figs. 29–45; Caton-Thompson, *Kharga Oasis*, p. ix, Pl. 126; Caton-Thompson and Gardner, *Geographical Journal*, LXXX (London, 1932), 371, 403, Map No. 1; Bovier-Lapierre, *Bulletin Institut d'Égypte*, XII (Cairo, 1930), 126–27; "Stations préhistoriques des environs du Caire," *Comp. rend., Congrés International de Géographie (Cairo, 1925)*, IV (1926), 306; Cottevieille-Giraudet, *BIFAO*, XXXIII (1933), 58, 63–64, figs. 42, 44; Massoulard, *Préhistoire et protohistoire d'Égypte*, p. 31, nn. 10–13; Vandier, *Manuel*, I, 64. See also Andrew and Delaney, "A Neolithic Site in the Sabalaka Gorge," *Sudan Notes and Records*, XXXIII (1952), 167; Säve-Söderbergh, *Kush*, X (1962), 76–105.

The remarks on the culture provinces of North Africa quoted in the last paragraph of our section are from McBurney and Hey, *Prehistory and Pleistocene Geology in Cyrenaican Libya*, pp. 272–73.

4. The West Delta Settlement of Merimda Beni Salama

The site of the Neolithic settlement at Merimda Beni Salama, lying six miles to the northwest of Merimda Abu Ghalib and thirty-seven miles northwest of Cairo, measures some 660 yards from east to west and 440 yards from north to south. It was explored and excavated during the years 1928 to 1939 by an expedition of the Akademie der Wissenschaften in Vienna under the direction of Professor Hermann Junker, assisted during the seasons of 1931–1932 and 1933 by members of the staff of the Medelhavsmuseet (then called the "Egyptiska Museet") in Stockholm. The first season's work was published by Junker, "Bericht über die von der Akadamie der Wissenschaften in Wien nach dem Westdelta entsendete Expedition (20. Dezember 1927 bis 25. Februar 1928)," *Denkschr. Akad. d. Wissensch. Wien, Phil.-hist. Klasse*, Band LXVIII, Abh. No. 3 (1928), pp. 14–24 (also

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pp. 25–33), Pls. II–VI and XIV–XXV. The results of the ensuing seven seasons (1929, 1930, 1931–1932, 1933, 1934, 1937, and 1939) were described and discussed by the same author and by Professor Oswald Menghin in a series of preliminary reports: Junker, *Anzeiger der Akad. der Wissensch. in Wien, Phil.-Hist. Klasse*, Nos. XVI–XVIII (1929), pp. 156–250; Nos. V–XIII (1930), pp. 21–83; Nos. I–IV (1932), pp. 36–97; Nos. XVI–XXVII (1933), pp. 54–97; No. X (1934), pp. 118–32; Nos. I–V (1940), pp. 3–25.

On the Neolithic landscape and population of the Delta see especially Butzer, "Die Naturlandschaft Ägyptens," pp. 71–78; *BSRGE*, XXXII, 50–52, 59 ff., and on the geological setting of the settlement at Merimda, Butzer, *Science*, CXXXII, No. 3440, pp. 1618–19, Fig. 3.

The stratification of the settlement site and the Carbon-14 dates obtained from it are discussed by Junker, *Anzeiger d. Akad. d. Wissensch. Wien*, Nos. I–V (1940), pp. 4–16; "Geisteshaltung der Ägypter," pp. 55, 56, and by Larsen, *Orientalia Suecana*, VII (1958), 48–51. See also Childe, *New Light* (1957), p. 38 and Säve-Söderbergh, *Egyptisk egenart* (1962), p. 18.

Detailed comparisons between the Merimda and Fayum A cultures are drawn by Caton-Thompson and Gardner, *Desert Fayum*, pp. 29, 32–34, 39, 45, 48, 70, 72, 87, 89–94, and by Junker, *Anzeiger . . . Wien* (1929), pp. 180–84.

Larsen, *Orientalia Suecana*, VI (1957), VII (1958), VIII (1959), IX (1960) has devoted four articles to the study, respectively, of the decorated pottery, the stone vases, and the bone implements from Merimda in the Medelhavsmuseet in Stockholm. Badawy, *History of Egyptian Architecture* (Cairo, 1954) has provided a section on the "Domestic Architecture" of Merimda; and Scharff, "Das Grab als Wohnhaus in der ägyptischen Frühzeit," *Sitzungsber. Bay. Akad. d. Wissensch., Phil.-hist. Klasse, Jahrgang 1944/46*, Heft 6, pp. 13 ff., discourses on the settlement-burials at Merimda and El Omari.

Preliminary reports on the human remains from Merimda, with special reference to the physical type and "northern" racial characteristics of the Merimda people, are contributed by Dr. Douglas E. Derry to Junker, *Anzeiger . . . Wien*, 1930, pp. 53–59, and *ibid.*, 1932, pp. 60–61. See also Junker, *ibid.*, LXXXVI (1949), No. 21, pp. 485–93, and Coon, *Races of Europe* (New York, 1939), pp. 93, 94, 99, 105.

Among the general works on Egyptian, North African, and Near Eastern prehistory in which the settlement at Merimda is discussed and evaluated may be cited: Massoulard, *Préhistoire et protohistoire d'Égypte*, pp. 33–39; Vandier, *Manuel*, I, 95–153, 181–88; Huzayyin, *Place of Egypt*, pp. 296–322 *passim*; Scharff, *Altertümer der Vor- und Frühzeit Ägyptens*, IV, 9–12 (see also pp. 13–14); Kaiser, *ZÄS*, LXXXI (1956), 87–109 (see also pp. 97–102, 105); McBurney, *Stone Age of Northern Africa*, p. 235; McBurney and Hey, *Prehistory and Pleistocene Geology*, pp. 244, 246, 249, 250; Forde-Johnston, *Neolithic Cultures of North Africa*, pp. 17, 18, 24, 72; Alimen, *Prehistory of Africa*, pp. 103 ff.; Childe, *New Light*, pp. 36–40; Menghin, *Weltgeschichte der Steinzeit* (Vienna, 1931), pp. 358 (Pl. XLI)–361; Menghin, "El origen del pueblo del antiguo Egipto," *Ampurias*, IV (1941), 25–41; Kantor, *JNES*, I (1942), 174–77, 199, 202–203.

For the vast majority of the prehistorians and other writers cited in the foregoing paragraphs the settlement at Merimda is a Neolithic town of considerable importance closely associated in its earlier stages with the Fayum A culture and, like it, generally more primitive in character and earlier in date than the Naqada I and II cultures of Upper Egypt. The principal dissenting opinion, as already noted, is that of Baumgartel, *Cultures of Prehistoric Egypt*, I (rev. ed., 1955) and II (1960)—see especially I, 14–18, 120 f., and other writings, who would see in the settlement a "rural community" "on the outskirts of Libya," representing "a belated civilization," its earliest phase (Layer I) contemporaneous with Naqada II, its "upper strata" with "Early Dynastic times." Though some of Dr. Baumgartel's points are well

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taken and her views in general must be given the most serious consideration, they have not—with only one or two exceptions (e.g., Forde-Johnston, *Neolithic Cultures of North Africa*, pp. 17, 18, 24, 72)—been accepted by subsequent writers on the settlement (among whom must be counted such competent prehistorians as Alimen, Arkell, Butzer, McBurney, Kaiser, Kantor, and Larsen) and have been convincingly criticized by Arkell, *Bibliotheca Orientalis*, XIII (1956), by Kantor, *AJA*, LIII (1949), 76–77, by Larsen, *Orientalia Suecana*, VII (1958), 42 ff., and by Vandier, *Manuel*, I, 81–88. The already-discussed radiocarbon dates obtained for the Merimdian and the Naqada I and II cultures also militate against Dr. Baumgartel's theories, which seem, to a great extent, to spring from the unwarranted assumption that in prehistoric times the Delta proper was uninhabitable and that, therefore, the home of the earliest Egyptian cultures must be sought for exclusively in the south.

The reference in the next-to-last paragraph of this section to the pre-agricultural use of artificial irrigation "by people who do not cultivate but collect wild-growing plants" is based on Frankfort, *Birth of Civilization in the Near East*, pp. 36–37, who, in turn, refers to Forde, *Habitat, Economy and Society* (London, 1934), p. 35. The quotation regarding the close association of the Merimdians with their dead is taken from Otto, *Ägypten der Weg des Pharaonenreiches* (Stuttgart, 1953), p. 21.

5. El Omari: Its Settlements and Cemeteries

In April 1925 Père Paul Bovier-Lapierre, "Une nouvelle station néolithique (El Omari) au nord d'Hélouan (Égypte)," (*Compte rendu, Congrès International de Géographie*, 1925, IV [Cairo, 1926])—see also "Stations préhistoriques des environs du Cairo," *ibid.*, pp. 298–308—reported the discovery, naming, and initial exploration of the prehistoric site (or sites) of El-Omari. Fernand Debono's three seasons of work on the site are described and discussed by him in *Chronique d'Égypte*, No. 41 (1946), pp. 50–54; *Annales du Service*, XLVIII (1948), 561–69; *BIE*, XXXVII (1956), 329–39. In 1949 Hermann Junker included the measurements and other characteristics of a skull from El-Omari in *Anzeiger . . . Wien*, LXXXVI (1949); and in 1955 a report was published by Elhamy A. M. Greiss, *BIE*, XXXVI (1955), on the "Anatomical Identifications of Plant Remains and Other Materials from (1) El-Omari. . . ." On the cereal grains from the site (and the false identification of the wheat as einkorn [*Triticum monococcum*]) see Helbaek, *Proceedings of the Prehistoric Society, Cambridge*, N. S., XXI (1955), 93–95.

El-Omari is briefly discussed in most of the general works on Egyptian and North African prehistory and in a number of articles and monographs devoted to special aspects of the subject. Some of these were written before the existence on the site of several distinct cultural groups and periods had been generally recognized (Debono, BIE, XXXVII [1956], 330), and present, therefore, a somewhat confusing over-all picture of the ensemble. Others tend to confine themselves solely to the early village near the Ras el-Hof. Nearly all, however, are of value for their independent and sometimes divergent interpretations of the evidence as a whole and of the typological and technological details which go to make up that evidence. The list of works is for the most part already familiar to the reader. Included are: Massoulard, *Préhistoire et protohistoire*, pp. 32–33; Vandier, *Manuel*, I, 154–66, 183, 188; Huzayyin, *Place of Egypt*, pp. 300–301; Baumgartel, *Cultures of Prehistoric Egypt*, I, 121; Cottevieille-Giraudet, *BIFAO*, XXXIII, 58–62; Scharff, *Altertümer*, IV, 13; "Das Grab als Wohnhaus," pp. 15–17; Junker, *Die Ägypter* (*Völker des antiken Orients*, III [Freiburg, 1933]), pp. 7, 9, 18; *Wien Anzeiger*, LXXXVI (1949), 486–87, 492; "Geisteshaltung," p. 65; Rizkana, *Bull. Inst. Desert*, II, 2 (1952), 119, 121, 130; Larsen, *Orientalia Suecana*, VII, 41–42, 52; *ibid.*, IX (1960), 51–52; Kaiser, *ZÄS*, LXXXI, 98–100, 105; *apud* Leclant, *Orientalia*, XXVIII (1959), 371; Otto, *Ägypten der Weg des Pharaonenreiches*.

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pp. 19, 21; Kees, *Ancient Egypt, A Geographical History of the Nile* (Chicago, 1961), pp. 23, 148, 149; Wolf, *Kulturgeschichte des alten Ägyptens* (Stuttgart, 1962), p. 26; Forde-Johnston, *Neolithic Cultures of North Africa*, p. 17; Alimen, *Prehistory of Africa*, p. 104; Childe, *New Light*, pp. 40, 41, 48, 73, 74, 93, 99; Badawy, *History of Egyptian Architecture*, p. 15.

A considerable range of dates has been ascribed to the Ras el-Hof settlement group or, as it is sometimes called, the "Omari A" or "Helwan (Neolithic) A" culture. Several writers, including Alimen, *Prehistory of Africa*, pp. 105, 128, and Rizkana, *Bull. Inst. Desert*, II, 2, p. 130, would make it earlier than Merimda and would assign to it a date in the neighborhood of 6000 B.C. Kaiser, *ZÄS*, LXXXI, 99, 100, sees it as contemporaneous with the late Merimdian and believes both of these cultures, as well as the Fayum A, to be earlier than Early Naqada in Upper Egypt. To Debono, *BIE*, XXXVII, 339, the settlement dates from the beginning of Naqada I and extends into the second part of that cultural phase. Baumgartel (*loc. cit.*) does not seem convinced that El-Omari is predynastic at all and would appear to favor a date in early historic times. The radiocarbon date of 3305 ± 230 B.C. (5256 ± 230 B.P. in 1951) for a sample of charcoal "from point 'A–15' of the house floors (*fonds de cabanes*)" of the Ras el-Hof settlement was first published by Arnold and Libby, *Science*, CXIII (1951), p. 111 (No. 463); and is discussed by Braidwood, *AOWAW* (1958), Nr. 19, p. 257, by Kantor, *Relative Chronologies in Old World Archeology* (Chicago, 1954), pp. 2–3, and by Alimen, *Prehistory of Africa*, p. 106. Junker, "Geisteshaltung der Ägypter," p. 57, points out that this date is not compatible with the archeological evidence as advanced by Debono, *loc. cit.*, and believes that "a substantially earlier period must be assumed."

On the identification by Hickmann, *Annales du Service*, XLIX (1949), 428–31, of the perforated *Nerita* shells from El-Omari as whistles see Arkell, *Annales du Service*, L (1950), 365–66.

6. Maadi, Wadi Digla, Heliopolis, and Qasr Qarun

Modern surface exploration of the ancient settlement site east of Maadi dates from 1925 when Mrs. F. W. Hume, the wife of the well-known geologist, and her associate, Mrs. Lamb, picked up a number of flint implements in the area. In the same year R. P. Paul Bovier-Lapierre explored both the settlement area and the cemetery some two miles to the northeast, in the mouth of the Wadi el Tih, and briefly reported his finds there of pottery, stone, and copper objects, animal and human bones (Bovier-Lapierre, *CRCIG 1925*, IV [Cairo, 1926], 306; see also *Chron. d'Égypte*, VII, [1932], 57–64). In 1929 the site was visited by Johannes Lukas, whose investigations are described in Lukas, *Mitteilungen Anthropologische Gesellschaft in Wien*, LXI (1931), 203–208.

Excavation of the settlement was inaugurated on December 14, 1930, under the auspices of the Faculty of Arts of the Egyptian University in Cairo and the direction of Oswald Menghin and Mustafa Amer, and was carried on thereafter for twelve seasons of one and a half to three months each. The results of the first three seasons (December 14, 1930, to January 31, 1931; February 15 to April 8, 1932; and February 1 to April 4, 1933) were reported on by Menghin, "Die Grabung der Universität Kairo bei Maadi," *MDIAK*, II (1931), 143–47; *MDIAK*, III (1932), 150–54; *MDIAK*, V (1934), 111–18; by Menghin and Amer, *Excavation of the Egyptian University in the Neolithic Site at Maadi. First Preliminary Report (Season of 1930–31)* (Cairo, 1932), *ibid.*, *Second Preliminary Report (Season of 1932)* Cairo, 1936); and by Amer, *Bulletin, Faculty of Arts, Egyptian University*, I (Cairo, 1933), 322–24; those of the fourth season (January 27 to April 16, 1934) by Amer, *ibid.*, II, Part II (Cairo, 1935), pp. 176–78; and those of the fifth season (February 1 to April 29, 1935) in *La Bourse Égyptienne* for August 8, 1935, and *Chron. d'Égypte*, XI, No. 21 (January 1936), pp. 54–57. See also Amer, *Cahiers d'histoire égyptienne, Héliopolis*, Série IV,

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Fasc. 5–6 (Cairo, 1952), p. 238, reprinted as Amer, *Chron. d'Égypte*, XXVIII, No. 56 (1953), p. 280. Amer and Huzayyin, "Some Physiographic Problems Related to the Pre-dynastic Site at Ma'adi," *Proceedings of the First Pan-African Congress on Prehistory, Nairobi, 1947* (Oxford, 1952), discuss the recent geology and stratigraphy of the site, including an alleged but probably non-existent succession of high aggradation and renewed degradation in Neolithic and early Chalcolithic times (cf. Butzer, "Naturlandschaft Ägyptens," pp. 26–27, 68, n. 1; *Geographical Journal*, CXXV [1959], 78, n. 6; *BSRGE*, XXXII [1959], 55–56).

Highly valuable—and often highly critical—discussions of the date and significance of the settlement at Maadi and of the associated cemeteries occur in such general works as Baumgartel, *Cultures of Prehistoric Egypt*, I (1955), 14, 29, n. 1, 42, 44–46, 51, 105, 109, 110, 121, 122; II (1960), 13, 23, 30, 131–33, 137–39, 154 (cited several times in the text of this section); Huzayyin, *Place of Egypt*, pp. 301–304, 306, 315; Massoulard, *Préhistoire et protohistoire*, pp. 259–68; Vandier, *Manuel*, I, 466–96, 508–18, 529–32; Alimen, *Prehistory of Africa*, pp. 111, 112, 123–26, 128; Childe, *New Light*, pp. 73–76, 99, 224, 229, 233, 237; Kees, *Ancient Egypt* (Chicago, 1961), pp. 40, 42, 148, 149, 189; Scharff, *Die Frühkulturen Ägyptens und Mesopotamiens*, ("Der Alte Orient," Band 41 [Leipzig, 1941]), pp. 12–15; Debono, *BIE*, XXXVII (1956), 339.

Two additional references, which should however be used with caution, are Leclercq, *Chron. d'Égypte*, VIII, No. 15 (1933), pp. 227–33, and Rizkana, *Bull. Inst. Desert*, II, 1 (1952), pp. 121 ff.

The shelters, huts, and magazines of Maadi are discussed and illustrated by Badawy, *History of Egyptian Architecture*, I, 17–19, 23, figs. 6–8; and some of the cultural contacts of the site with Palestine—especially as regards the flints and pottery—by Kantor, *JNES*, I (1942), 177, 180–85, 191, 192, 199; and Childe, *New Light*, pp. 224, 229, 237. On present-day foetus burials in Egyptian villages see Blackman, *The Fellāhin of Upper Egypt* (London, 1927), p. 67. The remarks of Petrie and Hall on the painted pottery of Abydos and of Bonnet and Childe on that of Maadi are cited with references by Vandier, *Manuel*, I, 481, nn. 1 and 2, 791, nn. 1 and 2.

The cemetery of the Wadi el-Tih, northeast of Maadi, is briefly described by Bovier-Lapierre, *CRCIG 1925*, IV, 306–308; and *Chron. d'Égypte*, VII, 60 and is commented on by Baumgartel, *Cultures*, I, 122, 131, Massoulard, *Préhistoire et protohistoire*, p. 261; and Alimen, *op. cit.*, p. 404.

That of Maadi North, as indicated in the text, is accorded only passing reference by Rizkana, *Bull. Inst. Desert*, II, 2, pp. 121, 122; Amer, *Cahiers d'histoire égyptienne, Héliopolis*, Serie IV, Fasc. 5–6 (Cairo, 1952), p. 238; Amer and Rizkana, *Bulletin of the Faculty of Arts, Cairo University*, XV (1953), 98, 203; Baumgartel, *Cultures*, I (1960), 122; and Childe, *New Light*, pp. 73, 75.

Short accounts of their two seasons of work in the cemetery of the Wadi Digla (Maadi South) were published by Amer and Rizkana, *BFAC*, XV (1953), 97–100, 201–205. See also Rizkana, *Bull. Inst. Desert*, II, I, pp. 121–23, Leclant, *Orientalia*, XXI, 2 (Rome, 1952), p. 244; XXII, 1, pp. 97–98; XXIII, 1, pp. 73–74.

On the early cemetery near Heliopolis there are brief reports by Debono, *Chron. d'Égypt*, XXV (1950), No. 50, pp. 625–52, Rizkana, *Bull. Inst. Desert*, II, 2, 121–23, Pls. III, IV–VII (B), VIII (A), and Leclant, *Orientalia*, XIX, 4 (1950), pp. 493–94, and comments by Baumgartel, *op. cit.*, I, 121–22, Childe, *New Light*, p. 75, and Vandier, *Manuel*, I, 496, n. 4. One of the dogs buried in this cemetery is the subject of an article by Moustafa, *Bull. Inst. Desert*, II (1952), 102–104, who reports that the animal's skeleton and teeth are very similar to those of a modern dog.

The Predynastic finds in the Fayum, including the settlement near Qasr Qarun and its relationship to Maadi, are described, discussed, and illustrated by Gertrude Caton-Thompson, in Caton-Thompson and Gardner, *Desert Fayum*, pp. 69–71, Pls. LII, LIII.

There can be little doubt that the immense

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settlement at Maadi and the associated cemeteries covered a long period of time, the former, as Huzayyin, *loc. cit.*, has suggested, exhibiting perhaps "some kind of 'later' or 'horizontal' stratification." Such items as the cylindrical vases of basalt, the black-topped potsherds, the rhomboidal slate palettes, the forked lanceheads, and some of the other stone implement types would seem to imply a contemporaneity or partial contemporaneity with the Middle Predynastic culture of Upper Egypt. On the other hand, the fan-shaped scrapers, many of the pottery forms, the absence of stone axeheads, the extensive use of copper for tools and weapons, and the presence of rough stone superstructures over some of the graves point certainly to very late Predynastic and Early Dynastic ("Early Bronze Age") times. That, however, neither the settlement nor the cemeteries survived very far into the historic period is indicated by the complete absence from them of true mud-brick construction, of any inscribed object whatsoever, and of most of the characteristic Early Dynastic types of pottery, stoneware, ivory carvings, and the like. An assumed lifetime for the so-called "Maadian Culture" ranging from somewhere around mid-Naqada II (*ca.* 3300 B.C.) to about the third or fourth decade of the First Dynasty (*ca.* 3070–3060 B.C.) would probably not be far wide of the mark.

7. Character of the Northern Egyptian Communities

The material for this summary was drawn in its entirety from the preceding sections of the present chapter and from the references—especially the more general works—cited in the notes accompanying these sections.

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4

THE PREDYNASTIC CULTURES OF UPPER AND MIDDLE EGYPT

1. Preliminary Survey

Surface finds of Neolithic stone implements at numerous points along the fringes of the Upper Egyptian Nile Valley and of habitation sites in the adjoining desert areas as well as in Nubia and the northern Sudan show clearly that this part of the land was not, as has been suggested, unoccupied by man between the Final Paleolithic and the Chalcolithic phases of Egyptian prehistory. To date, however, no Neolithic settlements or cemeteries comparable to those of northern Egypt have been identified in or near the river valley between the latitude of the Fayum and the First Cataract. Though this need not mean that Upper and Middle Egypt had at that time no settled population the fact remains that the earliest post-Paleolithic habitation and burial sites in this area belong to two partly contemporaneous and related cultures, the Badarian and the Naqadian, both of which from the outset produced small implements and ornaments of hammered copper and are therefore classed as Chalcolithic or, to use a more general and familiar designation, as "Predynastic."

In Egypt the "core area" of the Badarian centers around the type-site of Badari, on the east side of the Nile some twenty-two miles south of the city of Asyut, and includes the neighboring sites of Deir Tasa, Nazlet el Mostagedda, and Matmar on the north and El-Hemamieh and Qau el-Kebir on the south. Closely associated through their combed and burnished pottery with Nubia and the northern Sudan the settlements and cemeteries of the Badarians do not reach north of the area just described, but typical Badarian pottery and other products have been found at several places in southern Upper Egypt, notably at Armant and in the basin of the Wadi Hammamat. In all some one thousand Badarian graves have been cleared to date and to these may be added forty-odd burials of the so-called "Tasian culture," evidently an early phase of the Badarian found in the same general area, that is, in the vicinity of Deir Tasa and the adjoining sites. Small Badarian settlements are also known in sufficient quantity to be described by Werner Kaiser as "numerous." Unhappily, the only existing radiocarbon date derived from a Badarian sample (3150 ± 160 B.C.) is so obviously low as to be useless. Since, however, the Badarian appears to have been contemporaneous with the earliest phases of the Naqada culture (dated by the Carbon 14 method to 3790 ± 300 B.C.) it may be assigned with some assurance to the first century or two of the fourth millennium.

The kernel zone of the Naqada culture is the area inclosed by the great eastward

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loop of the Nile between Gebelein and Abydos. Here, where a number of desert tracks from the Red Sea on the east and from the Great Oases on the west converge on the Nile Valley, lay a region much frequented by ancient man from the Middle Paleolithic period onward and destined in the course of Egypt's dynastic and subsequent history to retain much of its old geo-political importance. In Predynastic times the focal point of the area lay to the north of the present village of Naqada, in the important prehistoric town of Nubt (later Ombos) and in the vast cemeteries of Naqada and Ballas which together have yielded more than three thousand graves. Settlements and cemeteries belonging to the earlier (and subsequent) stages of the culture abound in the same general area—at Hu and Abadiyeh ("Diospolis Parva"), El-Amrah, Abydos, El-Mahasna, Naga el-Deir, and Mesaeed, to the north of Naqada, and at Khozam, Armant, Gebelein, and Hierakonpolis to the south. With time the culture spread northward, first into the Badarian zone (Qau el-Kebir, Hemamieh, Badari, Mostagedda, and Matmar) and thence, during its later stages, into Middle Egypt (Deir Bisra, Sawada, Zawiyet el-Meitin) and the region of the Fayum (Harageh, Abusir el-Meleq, Gerzeh, Wadfa), reaching the Memphite area (Tarkhan, Giza) not long before the beginning of the historic period. Southward it spread beyond the bounds of Egypt proper into Nubia, where in its middle and final phases it has been found at many sites between the First and Second Cataracts (Bahan, Debod, Dehmit, Gerf Hussein, Dakka, Amada, Aniba, Abu Simbel, Faras, Gemnai, etc.). In the Eastern Desert it is represented by a settlement and graves in the vicinity of the oasis of Laqeita and by graves in the Wadi Hammamat and near the Red Sea coast, as well as by two series of rock drawings, those of Winkler's "Eastern Invaders" and those of his "Early Nile Dwellers." Traces of the Naqada culture in the oases and other areas of the Libyan Desert are slight, but an association of the Predynastic people of Armant and the Peasant Neolithic folk of Kharga is apparent, as has already been remarked (Chap. III, § 3), from the close agreement of their stone implements. All told it occurs at more than fifty sites, including ten with the remains of settlements, and its cemeteries number at least fifteen thousand graves.

As time progressed influences both from within and without brought about basic changes in the character of the culture and its products, the changes taking place in more or less recognizable stages to which modern investigators have applied a variety of designations. Having, in 1901, devised a system of relative dating, or "Sequence Dates," which is no longer regarded by prehistorians as reliable, Sir Flinders Petrie subsequently divided the Naqadian into three principal phases, named, with reference to the sites of El-Amrah, Gerzeh, and Semaineh, the "Amratian," the "Gerzean," and the "Semainean" and otherwise known as Naqada I, Naqada II, and Naqada III. In 1944 Helene Kantor challenged the existence of a Semainean or Naqada III stage and pointed out that the culture of the First Dynasty arose immediately out of the late Gerzean. In 1956–57 Werner Kaiser, chiefly on the basis of a detailed study of a well-recorded Predynastic cemetery at Armant, attempted a new chronological articulation of the Naqada culture, dividing it into three stages ("Stufe I," "II," and "III"), each subdivided into three to four sub-stages ("I a," "II c," etc.) which in turn were sometimes further subdivided ("II d I," "II d 2," "III a 1," etc.).[1]

[1] This fragment of Chap. IV concludes the completed portion of Mr. Hayes' proposed work.

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