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The Middle Palaeolithic of the Near East and the Problem of Mount Carmel Man

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The Middle Palaeolithic of the Near East and the Problem of Mount Carmel Man

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ONLY A LIMITED PART OF THE NEAR EAST IS, in fact, covered by this lecture, although neighbouring regions are touched on for the purpose of comparison. My subject is the Southern Levant, the long and narrow strip which lies between the Eastern Mediterranean and the North Arabian Desert, covering in a small space a contrast in altitude and climate, from the summit of Mount Lebanon to the surface of the Dead Sea, which is unequalled in the world. Politically it comprises Western Syria, the Lebanon, and the country for which I retain the name Palestine for the sake of convenience, but which is now divided between the states of Israel and Jordan. I have limited my main subject to this region for two reasons. It is here that the exploration of palaeolithic sites has been most actively carried on, and it is here that most of my own field-work has been done.

In 1939, after eight seasons in Palestine, with sorties into Southern Kurdistan and Anatolia, the prospect of further work in South-west Asia faded away, and after the war was replaced for me by more academic preoccupations. However, once caught by the Near East one is not so easily free of it. 'He is crazed with the spell of far Arabia,' wrote Walter de la Mare, 'they have stolen his wits away.' So it was without surprise that in 1958 I found myself digging in the Lebanon. And like Sir Mortimer Wheeler, I am still digging, though I intend that the season planned for the coming winter shall be the last. I cannot pretend, however, that some part of my wits will not still be directed to the problems of 'far Arabia', and the advances made by younger colleagues in the field which has occupied me for so long.

The work done in the inter-war period in Palestinian and Syrian caves had revealed a fairly complete succession through Middle to Upper Palaeolithic, but had left unsolved its relation in time to the European sequence. The specific purpose of my Lebanese project has been to explore caves and rock shelters along the coast in which one might hope to find occupation layers in direct contact with ancient beaches, and so through the general shore-line chronology of the Mediterranean to help in linking the Levantine industries with the glacial chronology of Europe. This is something which could not be done in Palestine. The broad coastal plain of Israel, under the double action of faulting in the Jordan Valley and sedimentation from the estuary of the Nile, was in subsidence during the Pleistocene, and no trace is left above ground of Quaternary high sea-levels. Along the relatively stable Lebanese coast, on the other hand, where the lower slopes of the mountain run down into the sea, or are separated from it by narrow plains, we have that situation, absolutely providential to the prehistorian, in

which clearly marked shore-lines, carrying their associated beach conglomerates, have been cut into a limestone rock which favours the development of caves and shelters.

It was to be expected that an investigation of this kind would involve more particularly the Middle Palaeolithic, and this has proved to be the case. The older shore-lines, here as elsewhere, ante-date most of the existing coastal caves, and, in the absence of the points of concentration which these afford, human artefacts are usually sparsely distributed in high-level beaches. Upper Palaeolithic industries, on the other hand, are well represented in caves and shelters, but since they belong to an advanced stage of the Würmian regression, all trace of habitations linked with contemporary oscillations of the sea are lost below its present level. It is chiefly for the relatively well preserved late Tyrrhenian shore-lines that the association of cave and beach can give significant results.

The dating of the Middle Palaeolithic in the Eastern Mediterranean has for long been the subject of a controversy in the course of which many bricks have been made with very little straw. The debate has been all the keener because it involves the age of that enigmatic human fossil, Mount Carmel man. I propose in this lecture to bring forward information now available from various sources, including, among others, my own recent excavations, and a group of radio-carbon dates. Without pretending that all problems have been solved, I think we can claim a very real advance.

CAVE EXCAVATION IN PALESTINE AND SYRIA 1925-35

It can be said that the systematic exploration of caves in Palestine was touched off by the finding of the Galilee skull in 1925. The following ten years were a time of continuous discovery, on the one hand by our own Joint Expedition of the British School in Jerusalem and the American School of Prehistoric Research on Mount Carmel (Garrod & Bate 1937), on the other by René Neuville, working for the Institut de Paléontologie Humaine, in the Judean Desert and at Jebel Qafseh near Nazareth (Neuville 1951; Neuville & Vaufray 1931). In those ten years the whole regional succession, from the close of the Lower Palaeolithic through to the mesolithic was revealed, and a new type of fossil man brought to light. 'Bliss was it in that dawn to be alive.' I venture to think that since the days of the pioneers in prehistory, few more stimulating experiences can have been known than was this one to those fortunate enough to have been involved in it.

The results of all this work, including that carried out in the 1930's by Alfred Rust at the Syrian site of Yabrud (Rust 1950), have been published, and I shall not do more than summarize that part which refers to the Middle Palaeolithic. The most important information comes from three sites having widely different geographical backgrounds; the Tabun cave of the Wady el-Mughara group, which overlooks the coastal plain from the western foot of Mount Carmel, the rock shelter Yabrud I, which faces east from the Anti-Lebanon towards the Syrian Desert, and Umm Qatafa, in the arid Wady Khareitun, on the way down to the Dead Sea.

The picture which emerges shows two distinct blocks of Middle Palaeolithic industries, differing markedly in technique and typology.

The oldest industry found in any cave in Palestine is a rather miserable affair of small, irregular flint flakes and chunks, with a few more neatly trimmed scrapers. In the absence of any very characteristic features, this has been labelled Tayacian. It is followed by an Upper Acheulean with well-made bifaces (Fig. 1), in whose closing stages new types

appear, in the shape of thick flakes with plain striking-platform, extensively retouched as angular, convex or transverse scrapers. These have certain affinities with the European Mousterian of so-called La Quina or Charentian type. In the succeeding stage (Figs. 2, 3) the proportion of these scrapers to bifaces increases greatly, and at Yabrud Rust distinguished certain horizons in which bifaces were absent. This was not the case at the Tabun, where they were present throughout this phase (Layer E), though in a proportion which never exceeded ten per cent in any horizon. Rust gave the name of Yabrudian to this industry, which I had meanwhile published as Final Acheulean or Micoquian. I have since recognized that the great preponderance of scrapers distinguishes it from the Acheulean proper, and have now no hesitation in adopting Rust's nomenclature. At the same time, I am persuaded by the evidence of Umm Qatafa and the Tabun that the Yabrudian has its roots in the Upper Acheulean which precedes it, and of which it must represent a development special to this region.

A very unexpected and original feature of the Yabrudian is the presence of blades and blade tools practically indistinguishable from those of the Upper Palaeolithic (Fig. 2). The majority are rather delicate, with fine nibbled retouch down one or both edges, but there are also typical end-scrapers and burins. At the Tabun these forms were never completely absent throughout the Yabrudian, but there were three horizons towards the top of Layer E where they were concentrated in greater numbers. At Yabrud the same blade tools appeared as a separate industry, Rust's pre-Aurignacian, which was interstratified with the last stages of the Yabrudian but not mixed with it.

After the Yabrudian there is a complete break in technique and typology. We now have a group of industries characterized by Levallois technique in which thin, flat flakes, broad or triangular, are retouched into scrapers or points of Mousterian type. The Levallois-Mousterian has proved to be much more widely distributed in the Middle East than is the Yabrudian, which is known from five sites only. It occurs in many caves and rock shelters, and in fossil dunes and other sub-aerial deposits.

At the Tabun the three Levallois-Mousterian horizons, B, C, and D, each several metres thick, showed variations from layer to layer, chiefly in the size of the material, and in the proportion of scrapers to points (Figs. 4, 5). At the time of excavation I thought that these had a chronological significance which might prove to be more than local, and a division was made into Upper and Lower Levallois-Mousterian in the expectation that this could be extended to other sites. To-day it seems more likely that there are considerable local variations—this is certainly the case as between the Tabun and Yabrud I—and that an industry found in isolation cannot be classified as Upper or Lower Levallois-Mousterian on typology alone.

The Levallois-Mousterian does not disappear abruptly with the arrival of the Upper Palaeolithic, but passes into a transitional industry, the Upper Paleolithic I of Neuville, or Emiran, in which its influence is still strong (Garrod 1952). This however, does not directly concern our subject.

Human skeletal remains from the Yabrudian are sparse, but it is almost certain that they include the Galilee skull. The material from the Mugharet ez-Zuttiyeh is made up of Yabrudian and Levallois-Mousterian implements in about equal numbers. At the time of excavation Turville-Petre (1927) thought that there had been a single Mousterian occupation, but when the independent status of the Yabrudian was established in other

sites, it became clear that there must have been some mixture at Zuttiyeh, possibly before excavation. The skull was found at the base of the archaeological layer, resting on sterile clay, and covered by two blocks of stone, possibly fallen from the roof. To my mind, everything suggests that it belongs to the earliest occupation of the cave and is therefore Yabrudian. This is borne out by its physical characters, more archaic than those of even the more primitive types of Carmel man.

Thanks to his custom of burying the dead in the homes of the living, the latter has left us his bones in generous measure, always associated with Levalloiso-Mousterian industries. At the Skhul rock-shelter in the Wady el-Mughara the terrace had been used as a cemetery, and contained the remains of twelve individuals, three skeletons being virtually complete. The Tabun was less productive—one skeleton and an isolated lower jaw in C, dispersed skull fragments and teeth in B. At Jebel Qafseh (Köppel 1935), five individuals were found, but only the skulls were recovered, one relatively complete, the others reduced to fragments of jaw and maxilla.

As is well known, although included up to the present under the general heading of Mount Carmel man, these people showed in varying degrees a mixture of Neanderthal and modern characters, the latter considerably more marked in the Skhul specimens than in those of the Tabun (McCown & Keith 1939). The Jebel Qafseh skulls, which have not yet been fully studied, are of Skhul type (Boule & Vallois 1952), although found at the base of a quite long Levalloiso-Mousterian sequence, in a level which Neuville considered to be older than Tabun D.

The first period of excavation and discovery ended just before the Second World War, and the essential results are contained in three books. The two volumes of *The Stone Age of Mount Carmel* came out in 1937 and 1939, but for Neuville and Rust publication was blocked by the war. In the end, *Die Höhlenfunde von Jabrud* appeared in 1950, and *Le Paléolithique et le Mésolithique du Désert de Judée* in 1951. This has led to a certain difference in perspective between the first book and the other two. Early publication has the advantage of being prepared when personal memory of field-work is still fresh, and from this I benefited. Neuville and Rust, on the other hand, had more time for reflection and interpretation, and were able to refer to my results, and to others which had become available meanwhile.

TWENTY YEARS OF CONTROVERSY

In 1937 regional geology could give very little help in dating the Wady el-Mughara succession. The one big river of Palestine, the Jordan, having no outlet to the sea, was unaffected by changes of sea-level. The pleistocene sedimentation of the depression did, indeed, point to three main pluvial phases, but their correlation with the European glaciations was uncertain. Although the first traces of palaeolithic man, in the shape of bifaces of Lower and Middle Acheulean type, had just come to light at Jisr Banat Yakub in the Upper Jordan Valley, nothing was yet known of their stratigraphical position. Their typology, and the fauna with which they were associated, made it certain, however, that they were older, probably much older, than anything found in the caves. Jisr Banat Yakub has since been dated as Middle Pleistocene (Hooijer 1959; Stekelis 1960). A still older stage, probably referable to the Lower Pleistocene, has now been discovered at Tell Ubeidya (Stekelis *et al.* 1960), just south of the Sea of Galilee.

An archaic pebble industry is associated with animal bones, and with a few small fragments of a human skull—the earliest trace of man so far found in the Middle East. The valley of the Jordan had therefore to be written off for our purpose in 1937.

The coastal deposits of the Lebanon held out hope for the future (Bergy 1932), but too little had yet been done to be serviceable. In the end, a study of climatic changes during the occupation of the Wady el-Mughara caves was made by Dorothea Bate on the basis of the fauna (Garrod & Bate 1937). The main result was expressed in the now well known Dama-Gazella graph, drawn up at the suggestion of Professor Zeuner, and based on the relative numbers of bones of Persian fallow deer and gazelle in each level of the Tabun and the neighbouring Mugharet el-Wad. It was presumed that a preponderance of *Dama* would point to moist, of *Gazella* to dry conditions. For the Tabun, the graph showed *Dama* peaks, that is wet climates, in the earlier Yabrudian and in the Upper Levalloiso-Mousterian, with a *Gazella* peak between, while a third *Dama* peak fell in the Upper Palaeolithic of the Mugharet el-Wad.

At Yabrud animal bones were very scanty, and at Umm Qatafa there were no significant faunal changes from layer to layer. Rust and Neuville therefore based their climatic deductions on a study of the sedimentation of their respective sites. When the results became available, in 1950 and 1951, it was found that they were in substantial disagreement with those of the Tabun. Yabrud and Umm Qatafa overlapped only in the early stages of the Yabrudian, for which Rust and Neuville both postulated a dry climate, corresponding with the Riss-Würm Inter-glacial. The Umm Qatafa sequence ends at this point, but at Yabrud Rust found evidence in the later Yabrudian for pluvial conditions, which he correlated with the early Würm, and which continued throughout the Mousterian (i.e. Levalloiso-Mousterian).

In these circumstances it is not surprising that on the question of the palaeolithic chronology of the Middle East there were eventually nearly as many opinions as there were prehistorians. For many years I myself inclined to the view that the whole of the Yabrudian and the Lower Levalloiso-Mousterian fell within the Last Inter-glacial (Garrod 1937), although in *The Stone Age of Mount Carmel* I had preferred to leave the question open, pending further evidence. Of the opinions expressed later, the extremes are represented by Zeuner and Bordes. Relying on the Dama-Gazella graph, Zeuner (1958) places the earlier Yabrudian in the Riss, the later, with the Lower Levalloiso-Mousterian in the Inter-glacial, and the Upper Levalloiso-Mousterian in the early Würm. Bordes (1955), unable to accept that a typical blade industry should appear earlier in the Middle East than in Europe, suggests that the pre-Aurignacian is contemporary with the Chatelperronian, and that the last stages of the Yabrudian and the whole of the Levalloiso-Mousterian correspond in time with the French Aurignacian-Perigordian complex. Intermediate between these two extremes, though inclining towards a late date, is the position of Vaufrey (1939), for whom the three Dama peaks of the graph represent Würman stadials, thus bringing the whole Palaeolithic of the Wady el-Mughara within the last glaciation.

MOUNT CARMEL MAN

The physical characters of Mount Carmel man have caused even more difficulty than the chronology of the cave succession. Was he a creature in the throes of evolutionary

change? Or was he a hybrid? Or did he represent a transitional stage, leading from a pre-Mousterian *Homo sapiens* to *Homo Neandertalensis*? All these questions have been asked at one time or another (McCown & Keith 1939; Ashley-Montagu 1951; Le Gros Clark 1955; Thoma 1957; 1958). The opinion most favoured at present is that the Tabun and Skhul types belong to two distinct races, one Neanderthal, the other *Homo Sapiens*, separated in time, perhaps by thousands of years (Howell 1957; Stewart 1960; Higgs 1961; Brothwell 1961).

The anthropological side of the problem of Mount Carmel man is outside my competence, but the new evidence which now allows us to date more closely the regional Middle Palaeolithic has a bearing on the relative dating of the men who were its makers, and is something which the anthropologists will have to take into account.

THE SHORE-LINE CHRONOLOGY OF THE LEBANON

While the debate was still in its early stages, Père Henri Fleisch, a distinguished philologist of the Université St Joseph at Beirut, had made use of an enforced war-time sojourn in France to take up a serious study of prehistory and Quaternary geology. Before returning to Beirut in 1945 he consulted Père Teilhard de Chardin as to the best approach to the palaeolithic chronology of the Lebanon. 'Travaillez avec la mer,' said Père Teilhard, 'work with the sea.'

The way had already been prepared during the war by Dubertret (1946a; 1946b), and Wetzel & Haller (1945), who had demonstrated the presence along the Lebanese coast of a series of ancient shore lines from 95 metres downwards. It is with the three most recent, at 45 metres, 15 metres and 6 metres that I am chiefly concerned. These can be accepted as corresponding to the Tyrrhenian stages I, II, and III of the Western Mediterranean. The shore-lines identified in the Lebanon can be traced northward across the frontier, but so far no comparable work has been done on the Syrian coast.

The age of the first two Tyrrhenian shore-lines is not in dispute. They are generally equated with the Mindel-Riss and Riss-Würm inter-glacials respectively. The position of the 6 metre shore-line, Tyrrhenian III (Zeuner's Late Monastirian) has been the subject of some discussion. It was originally thought to correspond with the second half of the Last Inter-glacial, and this position is still held by a number of Quaternary geologists, more especially in Northern Europe and Britain. Opinion, however, is coming round to the view that it should more probably be dated to the first Würmian Inter-stadial. Prehistorians, in particular, have difficulty in accepting an inter-glacial age, since this distorts the latter part of their sequence, leaving them with nothing to put into a long stretch of empty time. Neuville (1951) and Fleisch (1956) both accept an inter-stadial age for the 6 metre shore-line of the Eastern Mediterranean, and Caton-Thompson (1946a, b) had already taken position for it on the basis of evidence from the Nile Valley and the oases. My own recent work in the Lebanon brings further confirmation for this view, which I now accept.

In the Lebanon the 15 metre and 6 metre shore-lines (Tyrrhenian II and III) are particularly well marked. They are practically undisturbed by earth movement, maintaining a remarkably constant height throughout the 230 kilometres of the coast-line. The characteristic Tyrrhenian species *Strombus bubonius* has been found in the beach

deposits of both levels, but not, so far, further south than Batrun. The continuity of the two shore-lines from north to south cannot however be doubted.

Fossil dunes are well developed in connection with the 15 metre and 6 metre beaches, and these point to a fall of the sea to at least its present level between the two, followed by retreat to an unknown depth—the major Würmian regression—after the 6 metre transgression.

THE INDUSTRIES OF THE TYRRHENIAN BEACHES

The relation of palaeolithic industries to the Tyrrhenian shore-lines began to emerge in the work of Wetzel & Haller in the North Lebanon. It was given an immense impetus in the following years by Père Fleisch, whose major contribution has been to put the pre-historic chronology of Ras Beirut on the map—happily in time to beat the mushroom growth of the city, which disclosed a certain number of sites in the beginning, but has gone on to swallow up nearly all traces of the promontory's remote past into the foundations of a welter of sky-scrapers.

RAS BEIRUT

The results obtained by Père Fleisch can be summarized as follows (Fleisch 1956). At Ras Beirut two terraces of abrasion at 30 metres–50 metres and 15 metres–20 metres represent the high sea-levels of Tyrrhenian I and Tyrrhenian II. The 6 metre shore-line has left virtually no traces. A complex of deposits referable to the Tyrrhenian I shore-line was identified round and about +45 metres. The oldest industry, found in a slope breccia whose foot had been eroded by the sea, was a scanty, rather rough Acheulean, in which some flakes showed a rudimentary approach to the Levallois technique. A biface of archaic type, very heavily rolled and patinated, is considered by Fleisch to be derived from the deposits of a platform, now denuded, which rises behind the 45 metre level to a height of 70–78 metres. If this be so, it is the only artefact found on this coast which may possibly be related to a pre-Tyrrhenian shore-line.

Somewhat later than the slope breccia, and dating from the first stages of regression, a pebble beach, exposed over a length of 100 metres in a drainage trench, yielded an abundant Tayacian, considerably rolled, in which, as in the Acheulean, a minority of flakes show the beginning of a Levallois technique.

An industry described as 'old Levallois with bifaces' came from a sub-aerial clay resting on bedrock at the seaward edge of the terrace. This clay, which could not be related to the marine deposits, contained twenty-five per cent of blown sand, and is considered by Fleisch to date from a fairly advanced stage of the regression whose beginning is marked by the shingle beach; the industry shows a certain resemblance to the Acheulean of the slope breccia.

The first genuine Levalloisian came from the beach deposits of the 15 metre shore-line. The flints were abraded, and therefore contemporary with the beach. Discs, discoid cores, and well struck Levallois flakes give the material its distinctive character. The only feature in which it differs from the Levallois-Mousterian of the caves is the rarity of intentional edge-retouch.

More recent is a classic Levallois-Mousterian found in a depression filled with shelly sand, against the dead cliff of the 15 metre shore-line. The flints were totally

unabraded, but had penetrated into the beach to a depth of 70 centimetres. Père Fleisch suggests that this happened when a falling sea occasionally washed the sand, producing enough movement to bury, without rolling them, the flints which lay on its surface. If this interpretation is correct we have here the earliest recorded appearance of the Levalloiso-Mousterian, on the border-line between the Riss-Würm and the Würm.

In the absence of the 6 metre shore-line there is a gap in the record until we pick up the thread in the sands of Ras Beirut, the extensive stretch of dunes recent and fossil which lies to the south of the promontory. The fossil dune, which is firmly cemented, has long been exploited for building stone, and sections are well exposed in quarries, and in the sea cliffs where its base is seen to pass below the present level of the sea. It is certain that the greater part dates from the major regression following on the 6 metre shore-line. The sandstone is crossed by bands of red soil, of which the most important lies near the top, and contains flints of many ages from Levalloiso-Mousterian up to chalcolithic, unstratified, and washing out together at the surface when it is exposed to rain. It follows that the Levalloiso-Mousterian, in part at least, is later than Tyrrhenian III. This is the first link with the cave succession, and it is confirmed from the coastal plain of Israel (Avnimelech 1952), where ridges of calcareous sandstone—*kurkar*—represent the crests of fossil dunes whose base lies buried some 50 metres lower. The *kurkar* is crossed by bands of red soil—*hamra*—in which, as at Ras Beirut, Levalloiso-Mousterian flints have been found (Garrod & Gardner 1935; Avnimelech 1952).

THE NORTH LEBANON

The North Lebanon has so far been less productive than the south from the prehistoric point of view, but the succession, such as it is, tallies with that of Ras Beirut. A group of flakes from Bahsas, near Tripoli (Wetzel & Haller 1945), is probably Tayacian. It was contained in red soil underlying an alluvial conglomerate in conditions which suggest that it dates from well within the post-15 metre regression. It is therefore more recent than the Tayacian of Ras Beirut, though probably somewhat older than that of the caves. In the Bay of Chekka (Haller 1942), where a very fine series of shore-lines is exposed, a scanty and poor Levalloisian was found in the earliest regression deposits of the 15 metre stage. This cannot differ greatly in age from the Levalloisian of Ras Beirut. Although the 6 metre shore-line was present at Chekka, no industry was found in it, but at Faddaus, not far away to the south, Levallois flakes occurred in a consolidated dune overlying the beach of this stage (Wetzel & Haller 1945).

Although the work of Père Fleisch and of Wetzel & Haller had broken a deadlock in the study of Middle Palaeolithic chronology in the Levant, it still left unsolved problems, since the beaches and the caves seemed to tell different stories. The only direct point of contact between the two was the Levalloiso-Mousterian, which appeared as later than the 6 metre shore-line, though exactly how much later was not clear. The upholders of a short chronology would answer that the whole cave succession was later than Tyrrhenian III, but in this case we should have expected to find the earlier Middle Palaeolithic industries of the caves, the Yabrudian and Final Acheulean, in post-Tyrrhenian dunes and other sub-aerial deposits, just as we do the Levalloiso-Mousterian. In fact, this was not so; there was no more trace of them here than there was in the shore-line succession. On the other hand the Levalloisian of the 15 metre beaches of Ras Beirut and

Chekka, which was presumably ancestral to the Levallois-Mousterian, had not been found in any cave.

SOUNDINGS IN THE COASTAL CAVES

There was something here which clearly called for explanation, and by 1956 I was sufficiently interested to envisage the possibility of tying up the two successions by means of soundings in coastal caves.

The Director of Antiquities, Emir Maurice Chehab, approved this project, and in 1957 I was given permission to excavate as representative of the British School of Archaeology in Jerusalem. The work was carried out over the following years, with the collaboration of a group of English and French colleagues.

Two sites which I had already visited under the guidance of Père Fleisch stood out as especially promising. These were, a rock-shelter near Adlun, in the South Lebanon, in which Père Zumoffen (1900), the distinguished geologist of the Université St Joseph, had made a small sounding towards the end of the last century, and a cave at the mouth of the Nahr el-Kelb, also prospected by Zumoffen but never excavated, and partially destroyed by the construction of a coastal railway during the Second World War.

ADLUN

The excavation at Adlun was carried out in the early spring of 1958 (Garrod & Kirkbride 1961). The site lies in a fruit garden on the east side of the coastal road, half-way between Sidon and Tyre. The dead cliff of the 15 metre shore-line, although partially destroyed by quarrying, is still a prominent feature over a length of one kilometre, and from its foot the coastal plain, half a kilometre wide, runs out to the sea. The shelter to which I have given the name Abri Zumoffen opens towards the northern end of the cliff at 13.80 metres above sea-level. Sixty-six metres southward a much larger cave, Mugharet el-Bezez, lies at a higher level in the same cliff, and beyond it a Byzantine necropolis and an ancient quarry have certainly destroyed a number of caves and shelters, since patches of breccia containing flints and bones cover the rocky hillside to a distance of 200 metres to the south.

The connection of the cave and the shelter, as distinct from their contents, with the Tyrrhenian II shore-line was clear, and in the Bezez a notch at about +18 metres indicated the highest level reached by the sea. No trace of beach deposits had, however, been detected at any point, and in their absence, the presence of this or that industry remained irrelevant.

That the Bezez had been occupied by palaeolithic man was shown by the presence of patches of bone breccia with flints on the walls and at the threshold, but the earlier deposits must have been largely destroyed by the time the cave came to be used as a shrine of Astarte, relics of whose cult remain in a Phoenician inscription, in graffiti, and in modern folklore. As the recent deposits appear to go very deep, we decided to leave the Bezez for the time being, and concentrate on the shelter.

A wide platform, sloping slightly down in the direction of the sea, lay in front of the Abri Zumoffen, and over its surface flint tools could be seen weathering out from a reddish deposit. Père Zumoffen's sounding was made at the mouth of the shelter, and resulted in the discovery of an industry recognized to-day as Yabrudian. Père Fleisch (1956),

believing that all marine deposits had been removed by erosion before the shelter was occupied, concluded that Zumoffen's industry dated from the major Würmian regression, and went on, as Vauffrey had done, to place in this regression the whole succession of the Tabun and of Yabrud I.

The only way to get an answer was to dig as deep as possible, and this we proceeded to do, opening one long trench (A), and a shorter one (B) in front of the shelter. Trench C was placed 50 metres away in the direction of the Bezez, very slightly nearer the sea. As a full report has been published (Garrod & Kirkbride 1961), I give only the simplified outline of a rather complex stratigraphy.

When the red earth had been removed, we came to an intensely hard breccia, in which were two main archeological horizons, the upper being Yabrudian (Fig. 6), the lower containing a blade industry of the same type as the 'pre-Aurignacian' of the Tabun and Yabrud (Fig. 7). For reasons to be explained shortly, we gave to this the name Amudian. The whole sub-aerial complex, breccia and overlying red soil, had a maximum thickness of just over 1 metre. To our very great satisfaction we found that it rested directly on a conglomerate of beach sand and pebbles, whose surface rose from +12 metres to +13.20 metres in the mouth of the shelter. Not only had we found our beach, but we found also that the first occupants of the shelter had squatted on it while it was still uncovered, and before the surface had hardened, since their tools had penetrated to a depth of 30 centimetres. They were the makers of an industry in which the flint tools, chiefly nibbled blades, were the same as those found in the overlying Amudian layers, but which was given a special character by the use of a second material in the shape of the chert pebbles which were abundant on the beach, and which the knappers could pick up without moving a step from where they sat. From these they made not only rather large blades, nibbled or plain, but implements whose form, like that of pebble tools in all ages, is largely conditioned by the raw material. The choppers and chopping-tools from the Abri Zumoffen beach would not be out of place in some of the earliest industries of Africa or the Far East. After a careful study, we concluded that we had here a hitherto unknown coastal facies of the Amudian, likely to occur only where stretches of pebble or shingle beach had been exposed in the neighbourhood of a cave or shelter. It can be described as a beachcombers' industry.

The great hardness of the deposits had hampered digging at all stages below the red earth, but it reached its climax in the beach, which we could not penetrate to a depth greater than 50 centimetres. The rock platform, however, probably lies not far below, judging from the limited observations we were able to make in a small cave which opens in the back of the shelter. The owner of the site had closed this with a wall and door, and we were allowed by him to look inside, but not to dig in case we should find buried treasure. By the end of the season we were not even allowed to look inside. The Lebanese Government has now requisitioned the whole site, and the investigation of this cave is one of the tasks which still remain to complete our project.

The succession just described is from the two trenches, A and B, opened in front of the shelter. In Trench C, only littoral deposits were present. A breccia containing an Amudian industry, with animal bones and some sea shells and corals, passed down into a consolidated sandy beach, with its surface at +12 metres, into which flints had penetrated from above. At the bottom of the trench was an intensely hard pebble conglom-

merate at 11.50 metres above sea-level, which defeated all attempts at excavation. The important feature of this succession was the presence of a bed of red clay containing Beach Amudian implements sandwiched between the pebble beach and the sandy beach. This was presumed to be a former land surface, which would indicate that the Amudian occupants of the shelter were already there before the beginning of the regression, when the sea was still fluctuating about the 12 metre level.

To sum up, the earliest occupants of the Abri Zumoffen, the bearers of the Amudian blade industry, arrived when the sea was still near the 12 metre level, and stayed during the withdrawal represented by the lower half of the sub-aerial breccia. They were followed by the makers of the Yabrudian, but it should be noted that Amudian blades, retouched and plain, persisted in quite high proportions, though diminishing as time went on. There was here a kind of Yabrudian-Amudian symbiosis, which had already been noted in other sites (Tabun, Zuttiyeh) but whose meaning is not yet plain. The Yabrudian continued into the red earth which is a weathering product of the breccia, and may date from a fairly advanced stage of the regression.

The fauna of the Abri Zumoffen was not very informative. Most of the animal bones were found in the breccia, and were in poor shape. Dr D. A. Hooijer (Garrod & Kirkbride 1961) was obliged to make identifications on a very small amount of material, but concluded that here, as elsewhere, *Dama mesopotamica* dominated. Rhinoceros, *Bos*, Gazelle, and *Capra* were represented by a small number of teeth. The only interesting point was the presence of *Ursus spelaeus*, the cave-bear, reported for the first time from South-west Asia. Sea shells were neither abundant nor well-preserved. Lecoq reports that all are of species known in Tyrrhenian beaches, but which still live in the Mediterranean.

The presence of a true blade industry underlying the Yabrudian at Adlun fully supports Rust's claim of an independent status for the blade industry of Yabrud I. I have long felt that 'pre-Aurignacian' was an unsatisfactory label for this important stage, and this is why I propose the name Amudian, from the Wady el-Amud in Galilee, where Turville-Petre (1927) noted the presence of nibbled blades in the industry which accompanied the Galilee skull.

The position of the Zumoffen beach in the general shore-line sequence has been a subject for discussion. Professor Zeuner (1961), who visited the site at my request towards the end of the season, considers the marine conglomerates to be the remains of storm beaches, and places the contemporary sea-level at 'higher than 8 metres and lower than 11 metres'—too high for the 6 metre and too low for the 15 metre stage. He equates it nevertheless with the 6 metre shore-line, postulating a local uplift of the order of 2 metres. I discussed this question with a group of Quaternary geologists at the Wenner-Gren symposium on Mediterranean shore-lines in 1960, and found support for my own opinion that the Zumoffen 12 metre beach more probably represents an early stage of regression from the 15 metre level. This position has been strengthened by the results of the excavation at Ras el-Kelb, now to be described.²

RAS EL-KELB

The promontory of Ras el-Kelb dominates the left bank of the Nahr el-Kelb at its entrance to the sea. It is famous for the figures and inscriptions cut in the rock by the

armies which have passed this way from the time of Rameses II down to the Second World War. The cave with which I am concerned overlooked the mouth of the river from a height of approximately 6 metres. Zumoffen (1900), writing at the end of the nineteenth century, mentions a shelter at this point from which he collected flints, but its importance was revealed only in the Second World War, when engineers of the Australian Army, working on the construction of a coastal railway, cut a slice off the foot of the promontory, and so destroyed the outer half of what has proved to be a sizeable cave. This operation left the remainder of the cave, filled with deposits up to the roof, exposed in section in the cutting. The railway line was too near to make systematic excavation very feasible or very safe, but Père Fleisch visited the site frequently from 1946 onwards, studying the section, and collecting flints, all of which proved to be of Levalloiso-Mousterian type (Fleisch 1955).

Towards the end of 1958 work was begun on a road tunnel which was to pass diagonally through the headland. It was obvious that if the cave ran far enough into the rock, this operation would cut through its inner end, and this in fact was what happened early in 1959. The Director of Antiquities was able to ensure that the breccia exposed should be left in place, and asked me to come to Beirut at once. The situation was as follows. At least half of the cave had been destroyed when the railway was built; now the inner end had been nipped off, so to speak, over an area of two by ten metres. The deepest deposits, however, had not been reached by either operation. All that remained completely untouched was the segment, 8 metres long, contained in the rock wall between the railway cutting and the road tunnel. I had hoped to excavate this, at least in part, but Antiquities and Public Works vetoed the plan owing to the state of the roof. We were therefore confined to the breccia left in place in the tunnel, and to a small sounding which the Lebanese Railways, with some misgivings, authorized us to make alongside the permanent way.

Even this limited excavation gave important results, although it involved some unorthodox methods (Garrod & Henri-Martin 1961). The piercing of the tunnel was still in progress, and the pandemonium set up by pneumatic drills and periodic blastings was unfavourable to quiet work on the spot. The breccia was therefore removed layer by layer and square by square in labelled blocks, and packed into 2,000 sacks. These were then transported to the National Museum in Beirut, where work on the second stage of recovering the material was carried out in 1960 and 1961.

The full report on Ras el-Kelb is not yet finished, but the essential results can be given here. The animal bones are still in the hands of Dr Hooijer, but observation on the spot showed the presence of deer in abundance, and a considerable number of rhinoceros teeth—in fact, at a first glance, nothing which differed from the usual Middle Palaeolithic fauna. The flints are Levalloiso-Mousterian throughout, with broad flakes and scrapers dominating, as in Tabun C. As I had hoped, the earliest occupation level proved to be in direct contact with marine deposits of the 6 metre shore-line. A layer of pebbles and sand, with fragments of sea-shells, was first reached at 7.70 metres above sea-level in the tunnel, and at 6.40 metres in the railway trench, the difference in height corresponding with the general downward slope of the cave deposits and of the rock floor. This is presumably a storm beach, thrown into the cave when the sea was still not far from the 6 metre level. The occupation layers continued below it to a thickness of

30–40 centimetres, and were found to be resting on steeply sloping bedrock in the tunnel, but in the railway trench on a shingle conglomerate with sea shells, at 5.80 metres above sea-level. We were able to break through this to a depth of 50 centimetres, at which point we came to a hard surface which appeared to be bedrock. The space in the bottom of the trench was, however, so limited that this needs confirmation, which will be difficult to get as long as the railway is in use.

It was already known that a part, at least, of the Levalloiso-Mousterian was later than the 6 metre shore-line. The Ras el-Kelb dig shows that the earlier Levalloiso-Mousterian was contemporary with the very beginning of regression from this level. It follows that the 12 metre and succeeding regression deposits at Abri Zumoffen, with their Amudian-Yabrudian associations, must be older, and belong almost certainly to the Tyrrhenian II complex, as I have already suggested. This is not all. A sample of burnt bone collected from hearths 1 metre above the Ras el-Kelb storm beach have given a radio-carbon date of $>52,000$ years. One must not count too much on a single reading, but if this should be confirmed it would have a bearing on the age of the 6 metre shore-line. There is no reason to suppose that the horizon tested was very much older than 52,000 years; as we shall see in a moment, this already represents an interval of 8,000 years between Ras el-Kelb and the next dated Levalloiso-Mousterian horizon, at Ksar Akil. This being so, it is impossible to imagine that the occupation layers which separated the sampled horizon from the storm beach of the 6 metre shore-line could go back to the 90,000 years B.P., or more which would be necessary if that shore-line dated from the Riss-Würm Inter-glacial. The most probable answer is that the 6 metre high sea-level belongs to one of the early Würmian inter-stadials which are now known to have preceded the Göttweig.

RADIO-CARBON DATES

A further series of radio-carbon dates for the Levalloiso-Mousterian has become available in the last few years, and completes very usefully the results obtained by excavation (Howell 1961; Oakley 1962). The list, including the figure already cited for Ras el-Kelb, is as follows:

		B.P.
Palestine	Tabun B. Gro. 2534	$39,500 \pm 800$ years
	Tabun C. Grn. 2695	$40,900 \pm 1000$ years
	Kebareh. Gro. 2552	$42,000 \pm 1000$ years
Syria	Jerf Ajla. N.Z.	$43,000 \pm 2000$ years
Lebanon	Ksar Akil 25. Gro. 2574/5	$44,000 \pm 1200$ years
	Ras el-Kelb Gro. 2556.	$>52,000$ years

This list calls for some comments. The samples from Ras el-Kelb, Jerf Ajla and Kebareh were taken from 'live' digs. The others are from trenches that had remained untouched for many years—twenty-eight in the case of the Tabun—but every precaution was taken to identify correctly the various horizons.³

All the dates are from Groningen, with the exception of that for Jerf Ajla. This cave lies somewhat to the east of the others, in the Syrian desert, near Palmyra, but the industry of the dated layers appears to be typically Levalloiso-Mousterian (Coon 1957). It

is satisfactory that the figure obtained for it from New Zealand should tie in so well with the others.

The dated horizons of Kebareh and Ksar Akil, if judged on stratigraphy and typology alone, would be counted as late Levalloiso-Mousterian, and at Ksar Akil there are even Emiran traits in the industry of this level. Yet Tabun C, with a position in the sequence and a typology which seem to call for an earlier dating, gives a figure later by some 3,000 years. Although I no longer think that typology alone is a sufficient guide when dealing with the different stages of the Levalloiso-Mousterian, it should be recorded that the Tabun samples gave a good deal of trouble, the first runs resulting in a sequence which decreased in age from above downward. I am inclined to agree with Waechter, who collected the samples, that the figure finally obtained, after three runs, for Tabun C is probably too young, and that the second result, $45,000 \pm 2000$ years, is perhaps nearer the truth. Nevertheless, even if some checking of individual dates may eventually be necessary, the general picture appears consistent enough to be satisfactory. We see the Levalloiso-Mousterian of the Near East, with a range of 12,000 years or more, stretching from the end of an early Würmian inter-stadial, Brörup or Loopstedt, into the first half of the Göttweig, a position which makes it contemporary with the latter part of the Mousterian in Europe. This result, if not so dramatic as some of the theories that have been proposed, appears thoroughly reasonable and credible, even to those who, like myself, formerly thought the Lower Levalloiso-Mousterian to be somewhat older.

THE DATING OF MOUNT CARMEL MAN

It is unfortunate that no firm date has yet been obtained for a horizon containing remains of Mount Carmel man. No charcoal or burnt bone is available from the intensely hard breccia of the Skhul, and we have seen that the figure for Tabun C is open to question. The general dating of the Levalloiso-Mousterian makes it certain that the Mount Carmel men as a whole were contemporary with Neanderthal man, but leaves unsolved the relative dating of the Skhul and Tabun types, a subject which is much in evidence to-day.

McCown & Keith (1939), while treating the Wady el-Mughara remains as those of a single people with a very wide range of variability, admitted the possibility that the Tabun type was the older of the two. In this they were supported by Dorothea Bate, who suggested that the animal remains indicated for the Skhul a date intermediate between Tabun C and B. This presented no difficulty to the archaeologist, but in the last few years there has appeared a tendency to widen the gap to a point where it no longer remains acceptable. The most extreme position is that of Higgs and Brothwell, working from the point of view of palaeontology and anthropology respectively.

Higgs's argument for an age difference of the order of 10,000 years between Tabun C and the Skhul is based on a study of faunal changes, in which he extends the data used in the *Dama-Gazella* graph to include the large Bovines. I am not going to consider it here because the relation of faunal to climatic changes in sites which have been occupied by man is still open to debate. Hooijer's (1961) recent study of the animal remains from the Lebanese shelter of Ksar Akil suggests that, as far as food animals are concerned, the hunter's choice may have played a larger part than changes of climate in producing

different percentages from layer to layer. What I propose here is to examine the thesis of Higgs and Brothwell from another point of view.

In considering the interval of 10,000 years which they suggest as separating Tabun from Skhul man, it should be noted that both accept an inter-glacial date for Tabun C, a position which is no longer tenable. If the time-span of the Levalloiso-Mousterian is not much more than 12,000 years in all, any difference in age which may have existed between the two human types which occupied it cannot have been so very great. I still think it possible that they were, at least in part, contemporary.

At this point I must draw attention to the substantial advance which could be made in unravelling this problem if it were possible to use the evidence from Jebel Qafseh, of which the study was cut short by Neuville's untimely death. In this cave, the remains of five individuals were found at the bottom of six Levalloiso-Mousterian occupation levels having a total thickness of 4 metres (Köppel 1935; Neuville 1951). One skull is nearly complete, the others fragmentary. They are definitely of Skhul type, possibly even rather closer to *Homo sapiens* (Boule & Vallois 1952; Howell 1957; 1961). From their stratigraphical position it is clear that they do not date from the close of the Levalloiso-Mousterian, but nothing more can be said until the industries and fauna of all the Levalloiso-Mousterian layers of the cave have been studied, and samples obtained, if possible, for radio-carbon tests. Failing this, the relative dating of the Tabun and Skhul peoples must remain uncertain for the present.

THE MIDDLE PALAEOLITHIC OF NEIGHBOURING REGIONS

Before finally drawing conclusions from the evidence which I have put forward, it will be useful to see whether neighbouring regions have anything to offer. If we look to the north, recent work in Anatolia suggests that the palaeolithic succession, at least in the south, may prove to have affinities with that of the Southern Levant. We know that a form of Levalloiso-Mousterian exists in the caves of the Taurus, (Kilik Kökten 1955) but so far not much more.

Between the Levant and Egypt there is a rather mysterious loss of contact from the Middle Palaeolithic onwards. Neither in the Nile Valley nor in the oases is there any trace of Yabrudian, and even the Upper Levalloisian, which Caton-Thompson (1946) correlates with the 6 metre shore-line, is rarely sufficiently retouched to be described as Levalloiso-Mousterian. The Levalloisian finally peters out rather drearily in a series of so-called epi-Levalloisian industries which here take the place of the Upper Palaeolithic blade cultures.

In view of the break between Egypt and the Levant it is interesting to find the coastal deposits of Cyrenaica yielding a Levalloiso-Mousterian closely comparable with that of the Palestinian caves, and like it, later than the 6 metre shore-line (McBurney & Hey 1955). How did it get there? And why do we not find any trace of it in Egypt? I do not at present feel able to answer either of these questions.

When we turn to the East, we have to go 800 kilometres before we find stratified palaeolithic deposits. The caves of Southern Kurdistan, in the mountain country between Rowanduz and Sulaimani, have yielded a succession which differs from that of the Levant (Garrod 1930; Solecki 1954; 1957; 1961; Braidwood & Howe 1960). The Mousterian of this region, in which the Levallois influence is slight, is characterized

above all by narrow, heavily retouched points. In the important cave of Shanidar, Solecki found remains of seven human skeletons at various levels in a deep Mousterian deposit, Layer D underlying an Upper Palaeolithic to mesolithic sequence. Here, as in Palestine, the Middle Palaeolithic people buried their dead in the home.

A preliminary report (Stewart 1959; Solecki 1960) suggests that Shanidar man has affinities with Mount Carmel man, but is closer to the Tabun than to the Skhul type.

Radio-carbon figures for the upper part of Shanidar D have been obtained from Groningen and checked in American laboratories. They give a date of round about 50,000 years, that is, not far from Ras el-Kelb. In view of this, it is interesting to note, with all necessary reserve, that a trace element study undertaken by the University of California indicates a probable inter-stadial climate for a sample taken low down in Shanidar D, with a shift to cold conditions in one from a higher level (Solecki & Leroi-Gourhan 1961). These findings are provisionally supported by Arlette Leroi-Gourhan's identification of the not very numerous pollen grains from the same horizons. It is obviously tempting to suggest a relation between this still rather shadowy early inter-stadial in Kurdistan and the 6 metre beach of the Eastern Mediterranean.

SUMMARY AND CONCLUSIONS

Having considered the contribution of the last twenty years to the study of the Middle Palaeolithic in the Near East, it remains to see what is now reasonably certain, what still in suspense.

The chronological framework on which the whole thing depends has already taken shape, but it needs reinforcement. Its main planks are the beach deposits of the Tyrrhenian II and III and a handful of radio-carbon dates. The structure is more solid from the time of the 6 metre shore-line onwards, partly because it is for this later stage only that we can call on radio-carbon determinations.

To resume the combined results obtained from shore-line deposits in the open and in caves; a rudimentary Levallois technique began to appear in the Acheulean and Taya-cian industries associated with the Tyrrhenian I and the succeeding regression, but the first true Levalloisian was found in the shore-line deposits of Tyrrhenian II. As the sea began to fall from this level, the makers of an early blade industry, the Amudian, occupied a rock shelter, where their relics are now found in beach conglomerates at 12 metres above sea-level. The Amudian continued into the period of the Tyrrhenian II/III low sea-level, and was followed by the Yabrudian, in the same regression. The cave at Ras el-Kelb showed the Levalloiso-Mousterian in contact with the Tyrrhenian III shore-line, and dated as older than 52,000 years. This industry continued far into the great regression which followed on the 6 metre shore-line, and is found in numerous caves, and in dunes and other sub-aerial deposits. The radio-carbon dates which cover this last stage range from 44,000 to 40,000 years B.P., that is, well into the Göttweig inter-stadial.

Briefly then, it appears from this that the Middle Palaeolithic industries of the Near East divide into two main complexes, Yabrudian and Levalloiso-Mousterian, which run successively from the end of the Last Inter-glacial, through the Early Würm into the Göttweig. Taken together, they are therefore substantially contemporary with the Mousterian of Europe. The two complexes are not exclusively associated with different races of men. The Galilee skull, almost certainly Yabrudian, is only a slightly more

archaic form of the Levalloiso-Mousterian Tabun type. The break, if break there is, between Tabun and Skhul man comes later than the break in the industrial tradition.

The questions that still remain unanswered relate mainly to the Yabrudian complex. The Yabrudian of the Abri Zumoffen clearly falls in the Early Würmian regression, but it is by no means certain that there were not earlier stages in the Last Inter-glacial. At the Tabun, the Amudian was concentrated in the upper half of the great Yabrudian layer, Tabun E. At Yabrud the blade industry horizons were inter-stratified with the last stages of the Yabrudian. The question is, whether these levels are contemporary with the Amudian of Abri Zumoffen. If they are, then the earlier Yabrudian is missing at Adlun, and must be older than the 12 metre beach. This is what I myself am inclined to believe, if only because at Umm Qatafa and the Tabun we see the Yabrudian growing out of a Final Acheulean of which there is no trace at Adlun. The time-span of the Yabrudian would thus be extended to take in a part of the Last Inter-glacial. This chronology agrees with that proposed by Neuville (1951) and Howell (1959).

If its chronology seems reasonably assured, the Yabrudian in itself still presents a problem. What is this industry which seems to break abruptly into the picture of a local evolution from Levalloisian to Levalloiso-Mousterian, and why is there no trace of it at Ras Beirut or other coastal sites? The intensive occupation of the Tabun suggests a long stay, and a certain typological evolution on the spot, yet the bearers of this culture seem to have confined themselves to a very limited number of sites. I leave this problem to future investigators, since any theorizing must at present be purely speculative.

A final question is that of the Amudian, and what I have called the Yabrudian-Amudian symbiosis. Between these two industries, which differ so widely in technique and typology, there is a link which remains unexplained. Apart from this, the mere presence at so early a date of a well developed blade industry is an anachronism which some prehistorians find it hard to accept. The evidence from Adlun means that an interval of at least 50,000 years may separate the Amudian from the earliest Upper Palaeolithic blade industries of Europe. It is inconceivable that there should be any relationship over so long a period without traceable connecting links. As far as can be seen, the Amudian disappeared with the Yabrudian, and the blade technique had to be invented all over again many thousands of years later.

I have said enough to make it clear how much has already been done, first of all in digging up the Middle Palaeolithic of the Near East, and then in trying to interpret it, and I have indicated the particular problems which remain to be solved. What is needed, is to continue investigation on the spot, with the improved means which we can now command. But, above all, we must not forget that the first requirement is excavation, and that the digger, who is after all a trained archaeologist and not a mere handyman, is the person who is first on the spot, and in a position to make irreplaceable observations. As in medicine, no amount of laboratory work can entirely dispense with the picture obtained by the family doctor at the bedside.

NOTES

¹ Delivered in the rooms of the Royal Society, Burlington House, on Friday, 2 November, 1962.

² I am grateful to Dr Richard Hey for his comments on the Adlun and Ras el-Kelb beaches.

³ I am indebted to Dr J. Waechter, who has communicated the results obtained from samples collected by him at the Tabun and Ksar Akil in 1959.

Correlation Table for the Tyrrhenian Shore-lines in the East Mediterranean

Shore-lines	Glacial correlations	Industries	Cave sites	Open-air sites
Tyrrhenian I + 45 metres	Mindel-Riss	Acheulean		Ras Beirut
		Tayacian		Ras Beirut Bahsas
		↓		
		Final Acheulean	Umm Qatafa G Umm Qatafa F-E ² . Tabun G Umm Qatafa E ² -D. Tabun F. Yabrud	
Tyrrhenian II + 15 metres	Riss-Würm	Yabrudian	Umm Qatafa D. Tabun Ed-c Yabrud	
		Levalloisian		Ras Beirut, Chekka
	Amudian		Zumoffen. Tabun Eb. Yabrud	
Tyrrhenian III + 6 metres	Early Würm I	Yabrudian	Zumoffen. Tabun Ea. Yabrud	
	Inter-stadial	Levalloiso-Mousterian	Ras el-Kelb > 52,000 B.P.	
	Early Würm II		Tabun D-B. Skhul. Ksar Akil. Kebarch, etc.	Fossil dunes
	Göttweig Inter-stadial	↓	44,000-40,000 B.P.	

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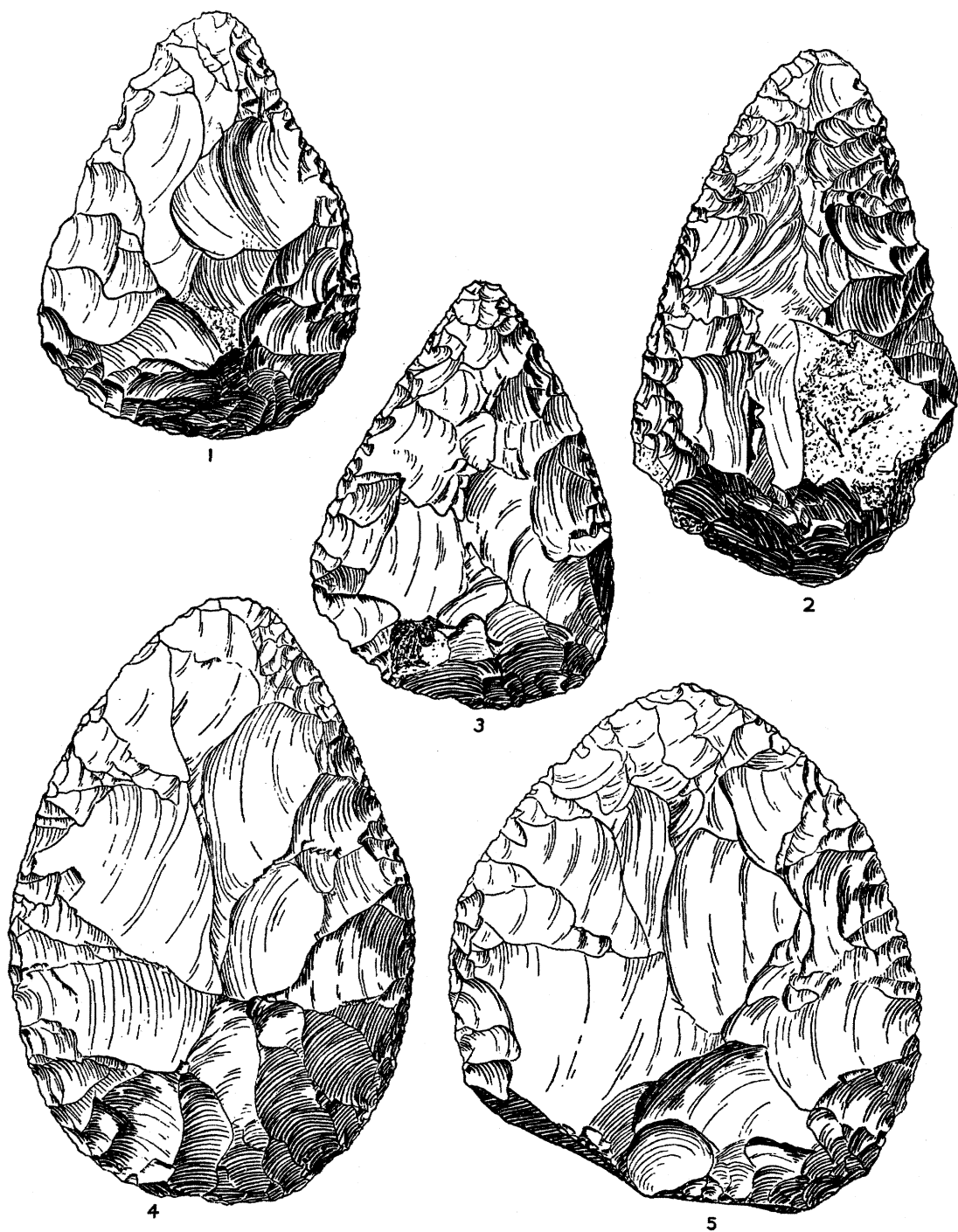


FIGURE 1. Tabun Cave. Final Acheulean. Layer F. ($\times \frac{5}{8}$).
(After Garrod & Bate 1937.)

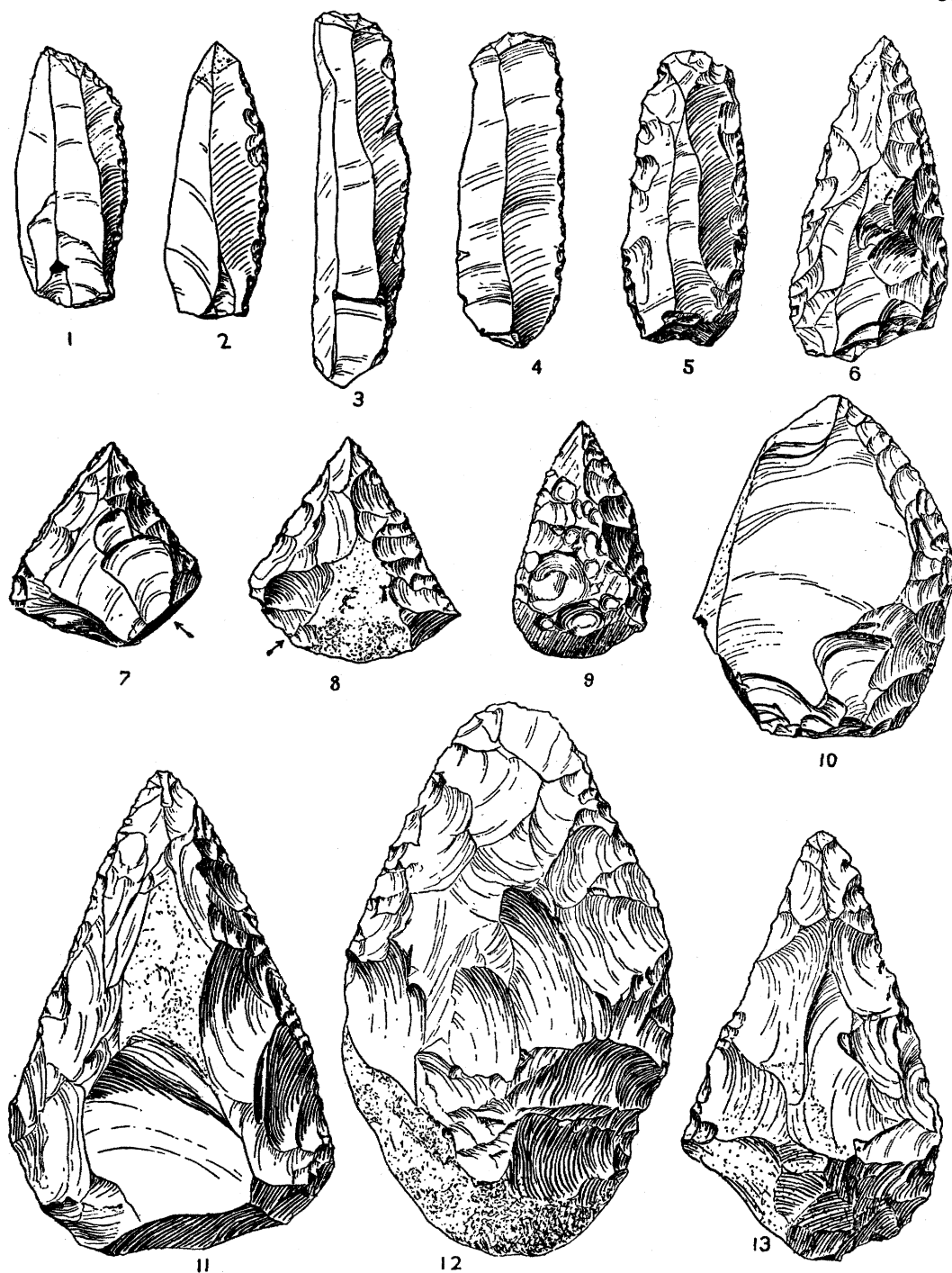


FIGURE 2. Tabun Cave. Yabrudian, Layer Eb. Nos. 1-4, Amudian nibbled blades. ($\times \frac{5}{8}$)

(After Garrod & Bate 1937.)

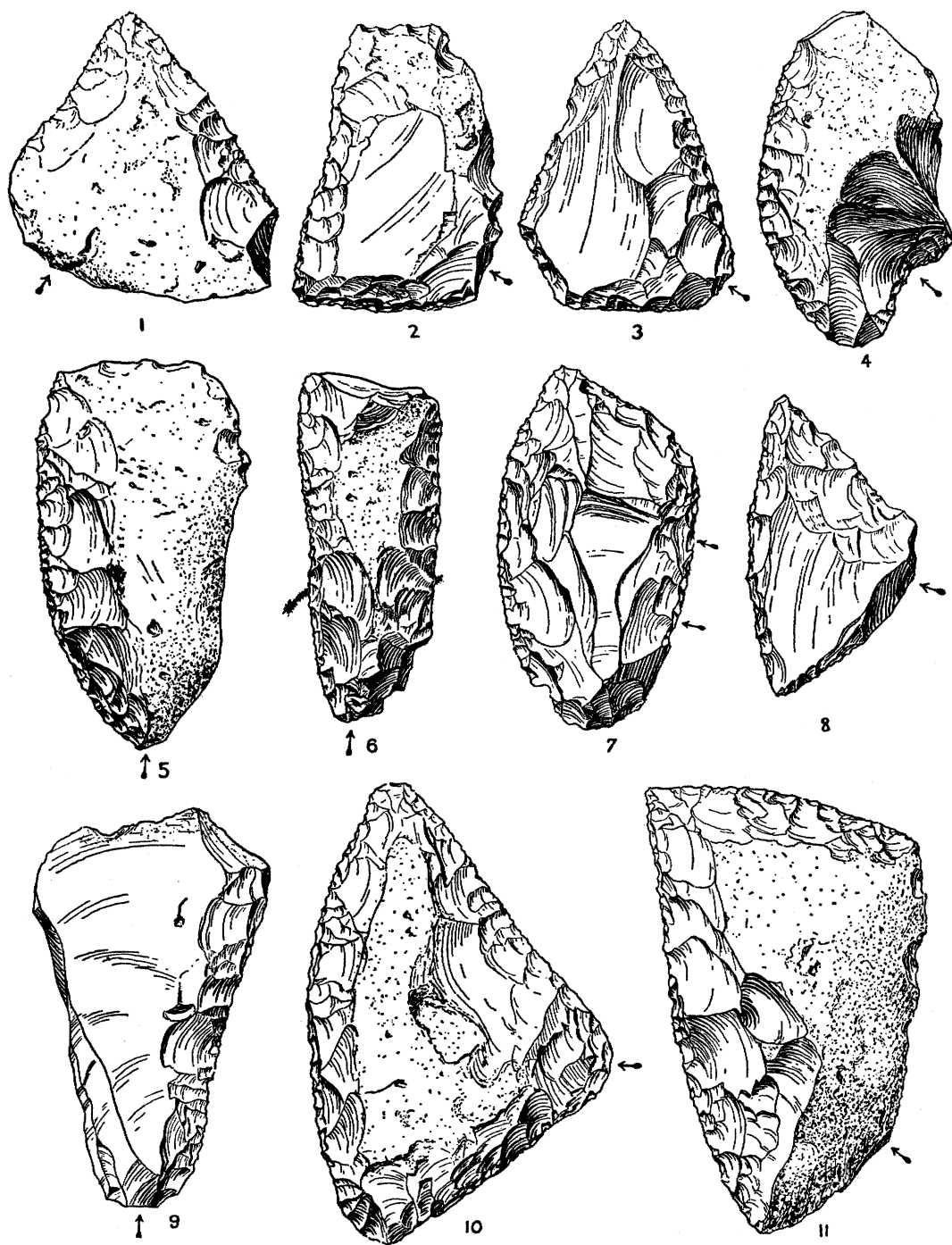


FIGURE 3. Tabun Cave. Yabrudian, Layer Ea. ($\times \frac{5}{8}$.)
(After Garrod & Bate 1937.)

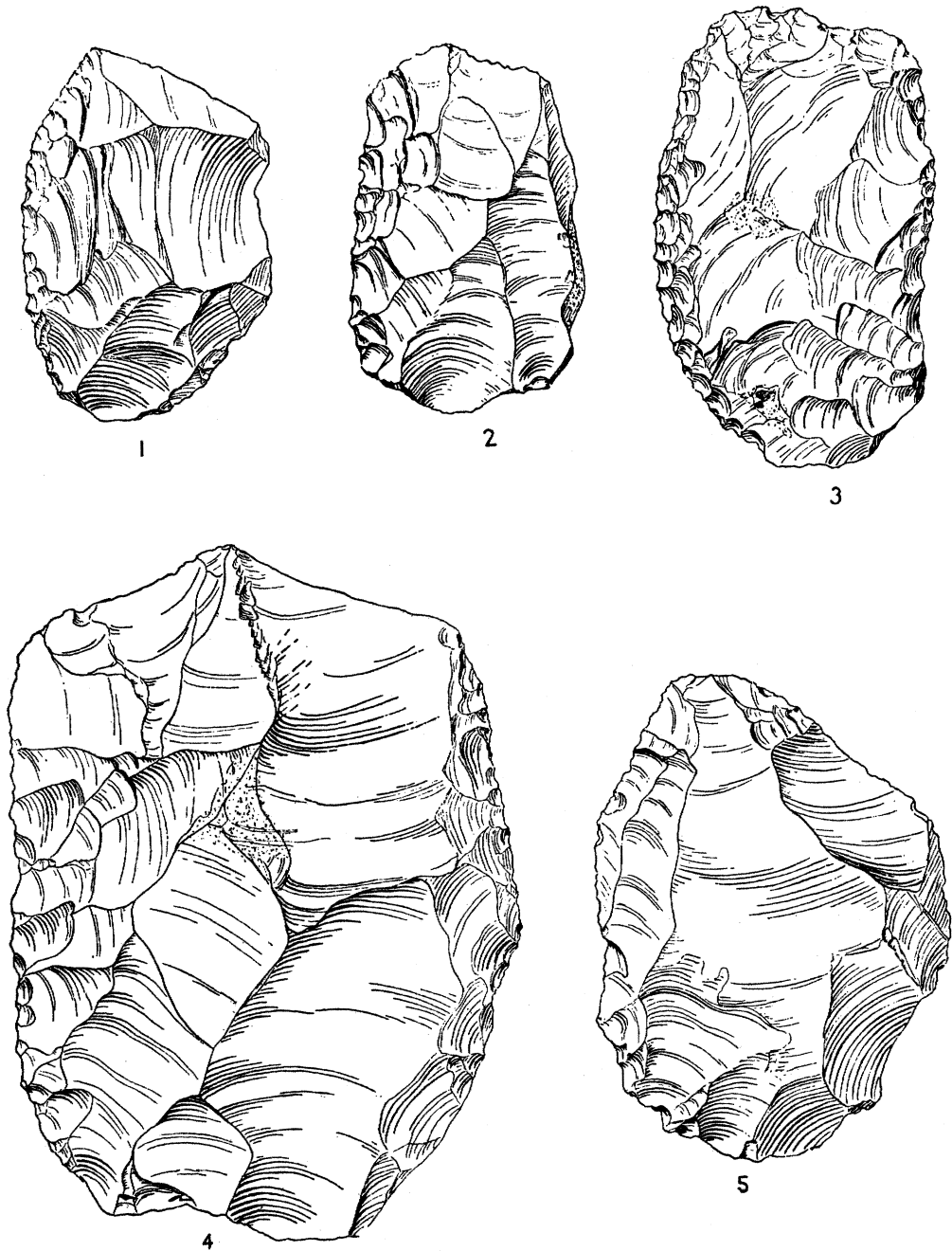


FIGURE 4. Tabun Cave. Levallois-Mousterian, Layer C. ($\times \frac{5}{8}$.)
(After Garrod & Bate 1937.)

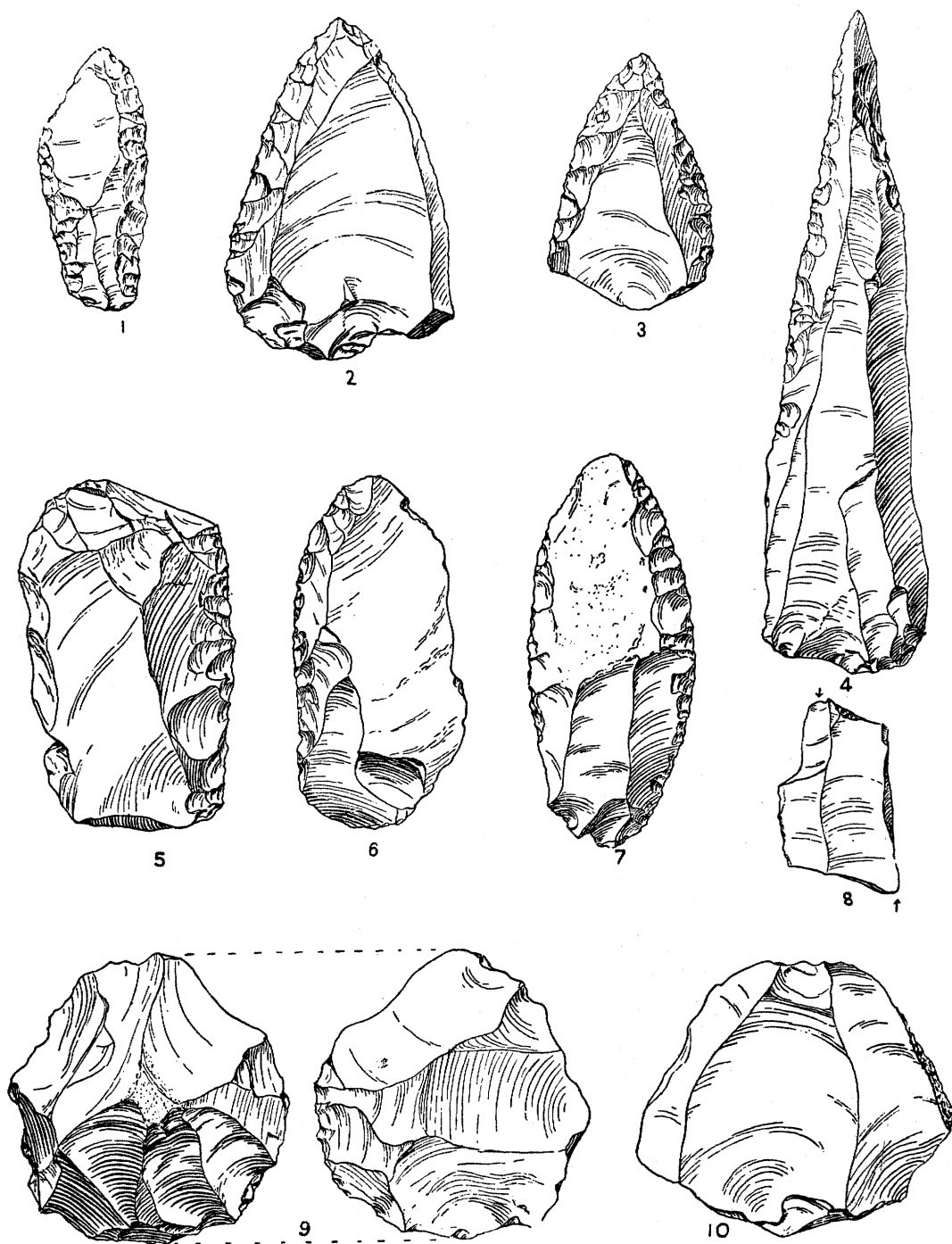


FIGURE 5. Tabun Cave. Levallois-Mousterian, Layer B. ($\times \frac{5}{8}$)
(After Garrod & Bate 1937.)

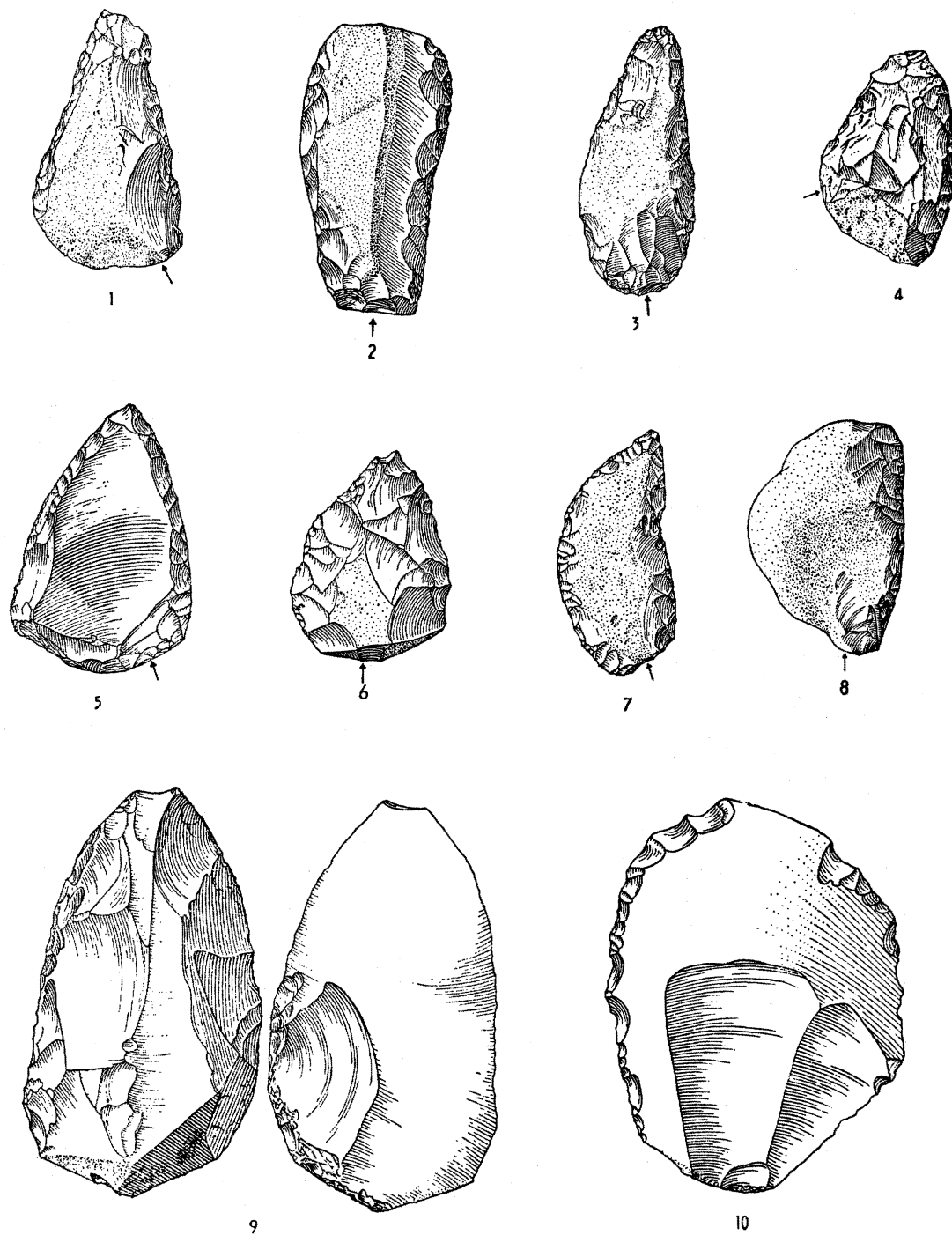


FIGURE 6. Abri Zumoffen. Yabrudian. ($\times \frac{5}{8}$)
(After Garrod & Kirkbride 1961.)

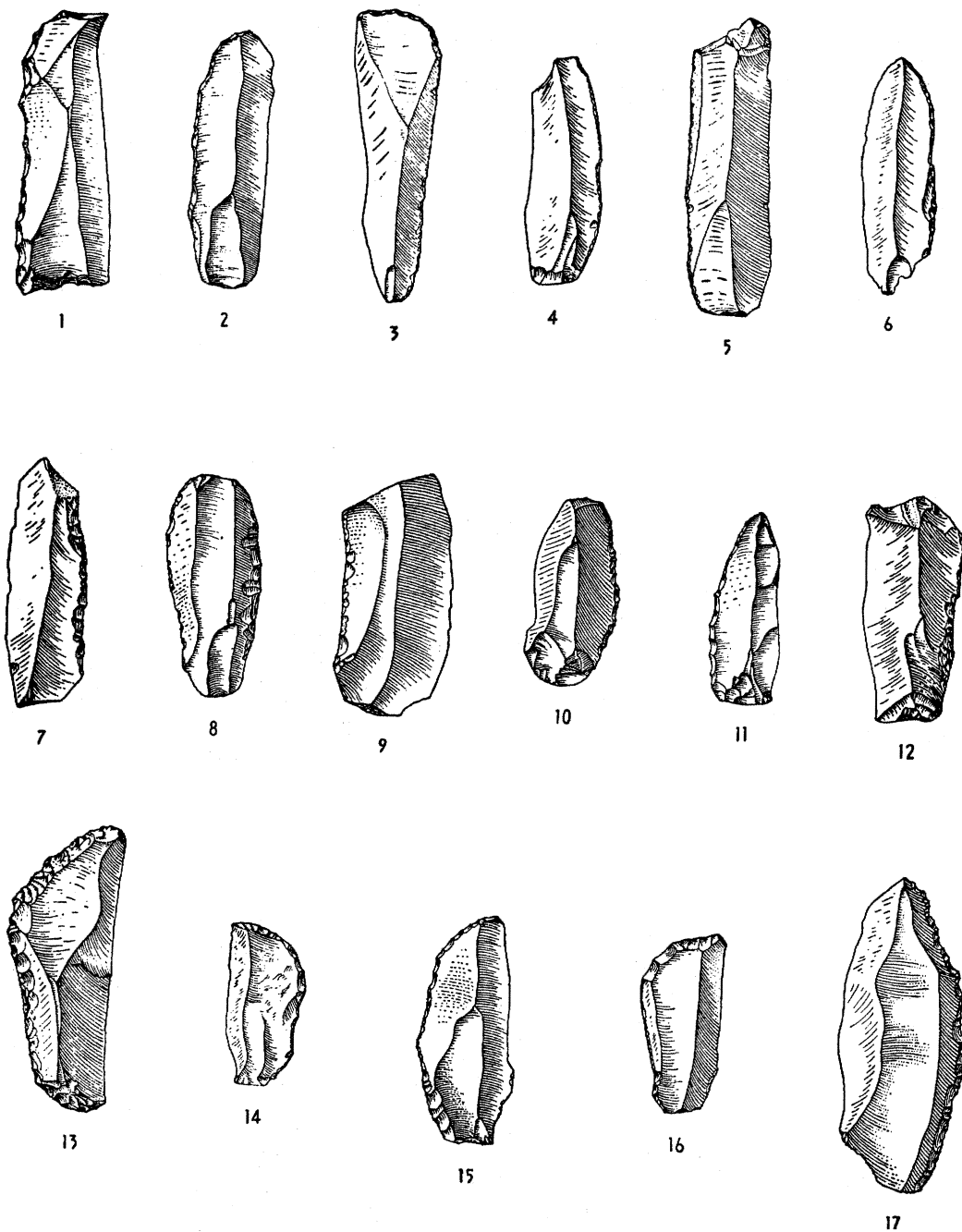
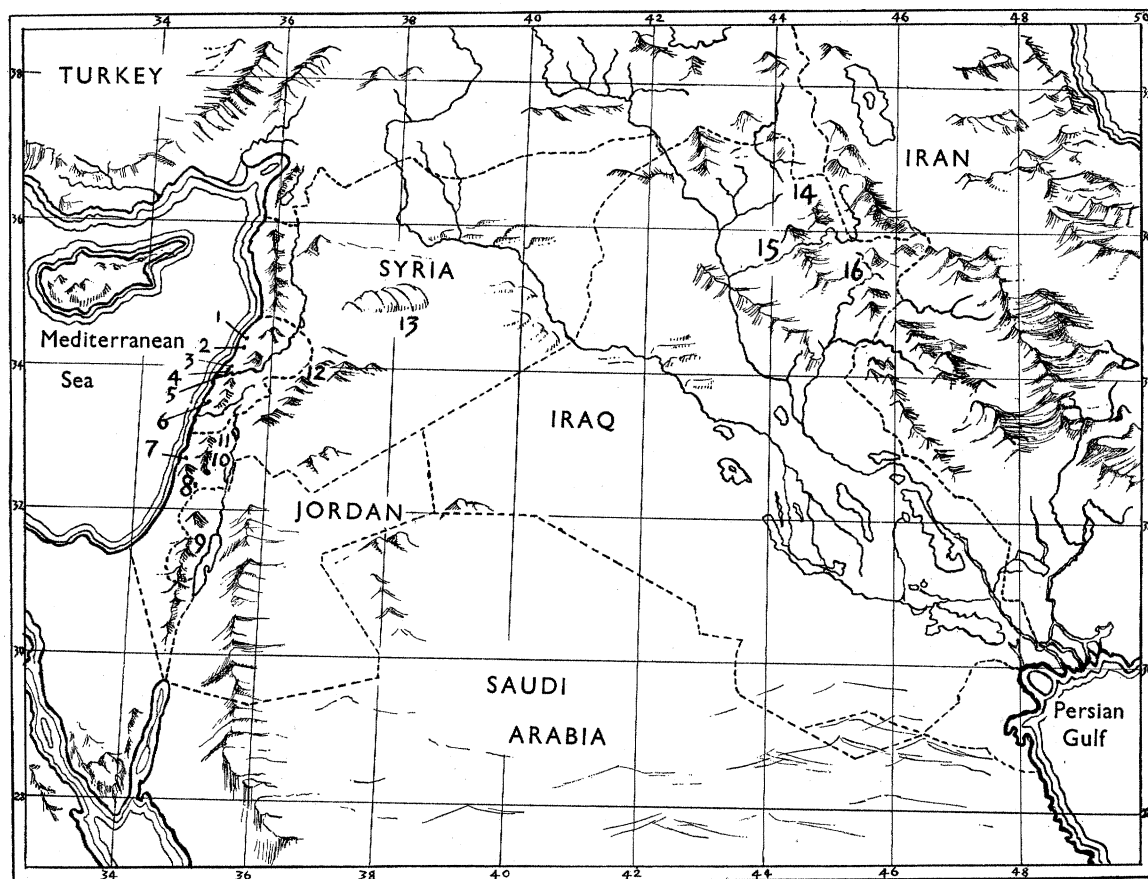


FIGURE 7. Abri Zumoffen. Amudian. ($\times \frac{5}{6}$)
(After Garrod & Kirkbride 1961.)



Middle Palaeolithic sites in the Near East

- | | |
|----------------|--------------------------|
| 1. Bahsas | 9. Wadi Khareitun |
| 2. Chekka | 10. Jebel Qafzeh |
| 3. Ras-el-Kelb | 11. Sea of Galilee sites |
| 4. Ksar Akil | 12. Yabrud |
| 5. Ras Beirut | 13. Jerf Ajla |
| 6. Adlun | 14. Shanidar |
| 7. Mt Carmel | 15. Zarzi |
| 8. Skukbah | 16. Hazar Merd |