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The Pleistocene in South-West Africa

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[ABSTRACT]

TOWARDS the end of the Tertiary a period of extreme aridity must have brought river action to a stillstand, whilst the upwarping of the continent created a big potential of erosion for the Early Pleistocene pluvials. These pluvials are therefore represented by an incision of all the major rivers. The first Pleistocene gravels, present in all the river systems, belong to the Kanjeran pluvial. The terraces of this stage are always calcified and have yielded abundant Late Chelles-Acheul tools. Fauresmith assemblages are rare. It is not yet certain whether this is due to climatic circumstances or to the comparatively short duration of this transition culture, or both. The Late Pleistocene pluvial is well represented by non-calcified gravel terraces containing South African Middle Stone Age implements. Later M.S.A. assemblages are rare and confined to the neighbourhood of springs showing thus the approach of a new arid phase, during which the Kalahari dunes were on the move again. The latest phase of the M.S.A. seems to be completely lacking. When climatic conditions became more favourable again the country was occupied by people practising a Smithfield culture. Typical Wilton seems to be confined to the Kalahari fringe.

The Tertiary

The Tertiary seems, on the whole, to have been a time of quiet. Sediments, reaching thicknesses of up to 800 feet, accumulated in the Etosha-Ovamboland basin and in the bigger river systems of the Kalahari. Even the rivers leading from the inland plateaus directly down to the Atlantic Ocean show aggradations of up to 400 feet. The sediments range from wind-blown sands to very coarse, ill-sorted, calcareous conglomerates. Climate, as deduced from the nature of the sediments, seems to have varied from extreme aridity to periods with a considerably higher rainfall than today. But even then a torrential rainy season and a long dry winter seem to have been the rule. The end of the Tertiary brought again a period of extreme aridity with the deposition of enormous volumes of aeolian Kalahari sand. River action must have come to a complete stillstand. During this time the continent rose at least 2,000 feet, bequeathing to the Pleistocene a big, unused potential of erosion.

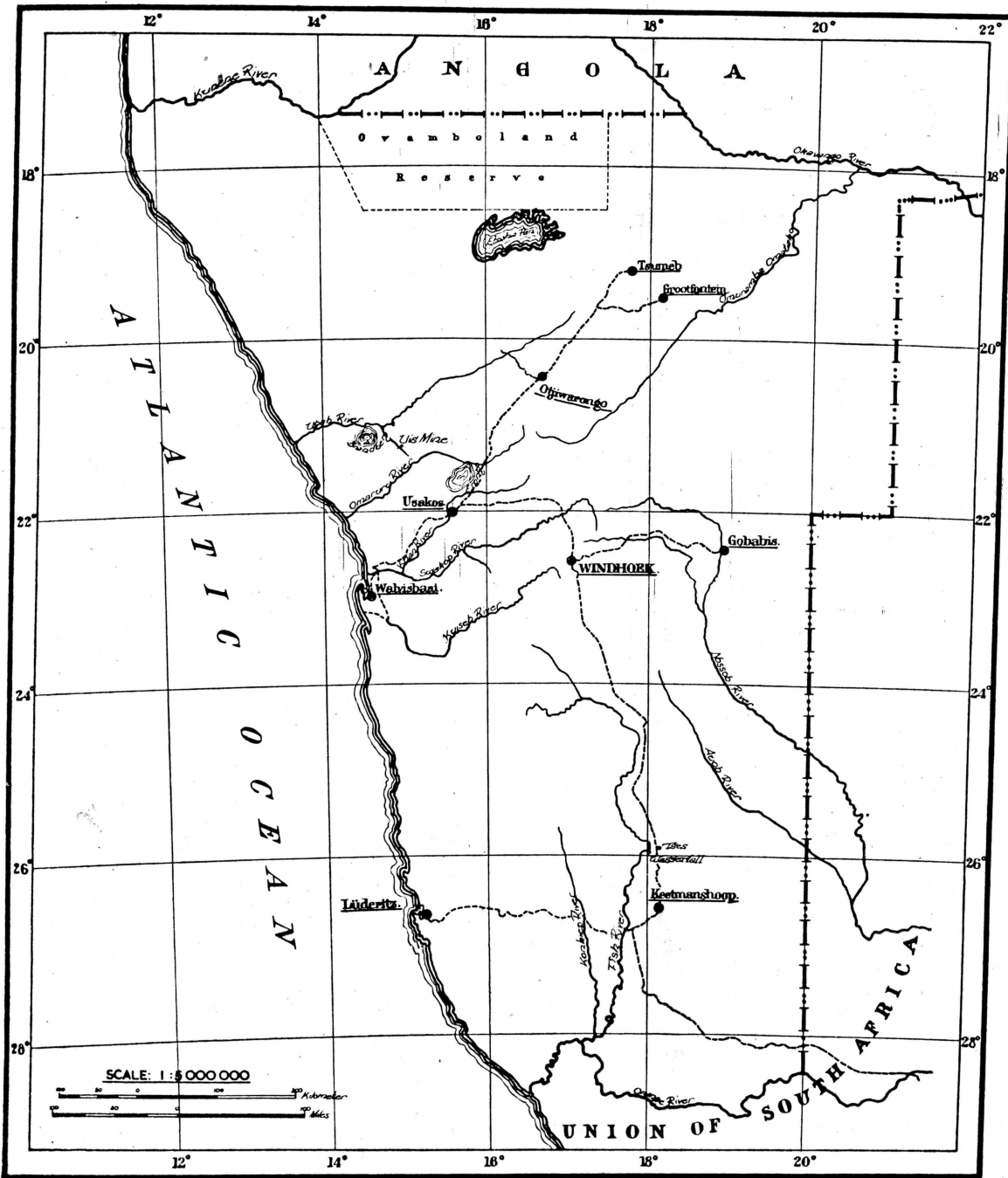
The Early Pleistocene Pluvials

The return of pluvial conditions led to a rapid incision of all the bigger rivers. In the Auob and Nossob valleys (southern Kalahari) maximum incision reached 150 feet (45 m.), in the valleys running westwards to the Atlantic Ocean 400 feet (120 m.). The Omuramba Omatako, a tributary of the Okavango (see Map), is the only bigger river showing only a very slight incision into the broad Tertiary valley plain.

Though the incised valleys show often well preserved rock benches, no gravel terraces attributable to the Early Pleistocene pluvials have yet been discovered. From the fact that older as well as

* Deceased.

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Map of South-West Africa

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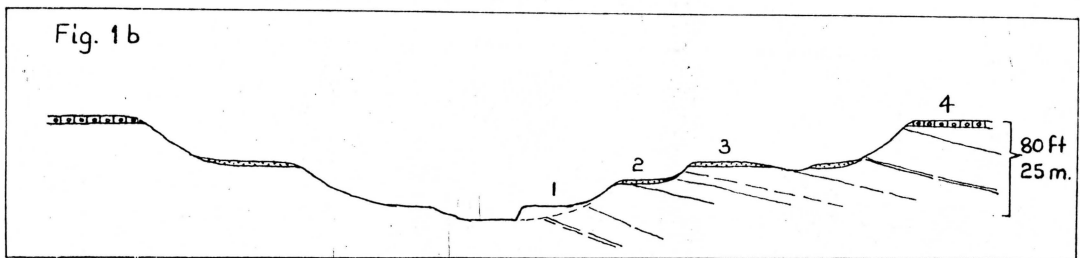
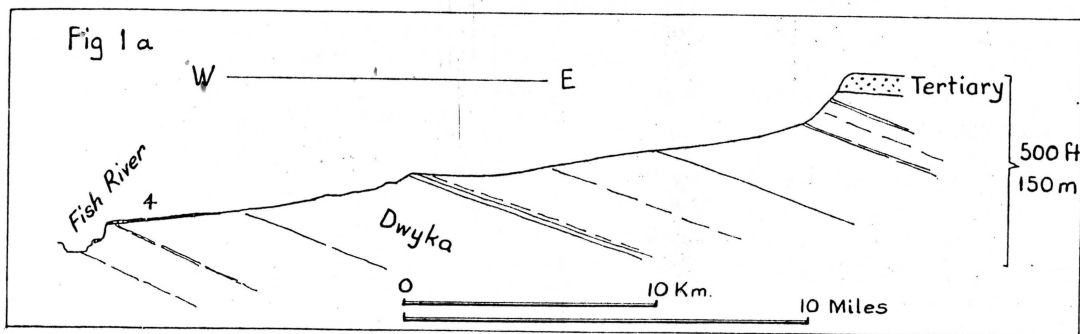


FIG. 1a. Section of Fish river valley at Wasserfall. 4 calcified Chelles-Acheul gravels (Kanjera)

FIG. 1b. The Pleistocene terraces at Wasserfall. 1 flood plain, 2 and 3 non-calcified gravels, 4 calcified Kanjeran gravels

younger calcified gravels have been well preserved, it can perhaps be deduced that the Lower Pleistocene had a more uniformly humid climate, unfavourable to calcification. But the general distribution of the rainfall must have followed a pattern resembling the present one. This is indicated by the fact that not one of the rivers between the Kuiseb and the Orange River was able to cut through the Tertiary deposits, proving that the area with the lowest rainfall today had a lower rainfall than the rest of the country already during the Early Pleistocene.

The Middle Pleistocene Pluvial

The Middle Pleistocene is in all the river systems represented by calcareous gravels. These gravels, having at numerous localities yielded Chelles-Acheul implements, can safely be attributed to the Kanjeran pluvial.

The calcified gravels form conspicuous terraces along many rivers. Along the middle course of the Fish river, between Gibeon and Tses, the Kanjeran terrace has a height of 60-80 feet (20-25 m.). At other rivers it is much lower, for instance at the Auob and Nossob rivers in the Kalahari only 15 feet (5 m.).

Fossils have so far only been found in the terrace of the Khan river at Usakos (Gevers, 1933). The fossils support the conclusion that these deposits correspond to the Chelles-Acheul gravels of the Vaal river (Haughton).

In the canyon stretches with which the rivers Kuiseb, Swakop, Omaruru and Ugab traverse the Namib desert a calcified gravel terrace of 100-200 feet height is present. It is probable, though not proved by finds of implements, that this is the Kanjeran terrace. The narrow, flood-swept canyons were probably unfit as living sites.

At the Fish river, the rivers Auob and Nossob and many of the smaller rivers, the gravels form a layer, only 3-6 feet thick, capping a platform of older rocks. Fig. 1a shows a typical section of the

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Fish river valley at Wasserfall, 10 miles to the west of Tses. The calcified gravel is simply packed with Chelles-Acheul implements representing stages III-V of the Vaal river. Tools of stages III and IV are found everywhere and are always slightly rolled. Stage V is usually confined to distinct localities (living sites) and is never rolled. A high percentage of cleavers is characteristic for these sites. Fig. 2 shows implements from a site just south of Tses, collected on the corresponding terrace of a small tributary of the Fish river.

The thin gravels, spread over broad, well graded valley floors seem to indicate very stable climatic conditions for the whole later part of the development of the Chelles-Acheul culture (stages III-V of the Vaal river). The gravels can hardly be called aggradations, they make far more the impression of gravels left and reworked by shifting river channels on a stable flood plain.

In South-West Africa no sediments have been observed which could be correlated with the calcified sands overlying the younger gravels in the Vaal river basin (Söhngé, Visser and van Riet Lowe, 1937). There is therefore no geological evidence for an arid period following the deposition

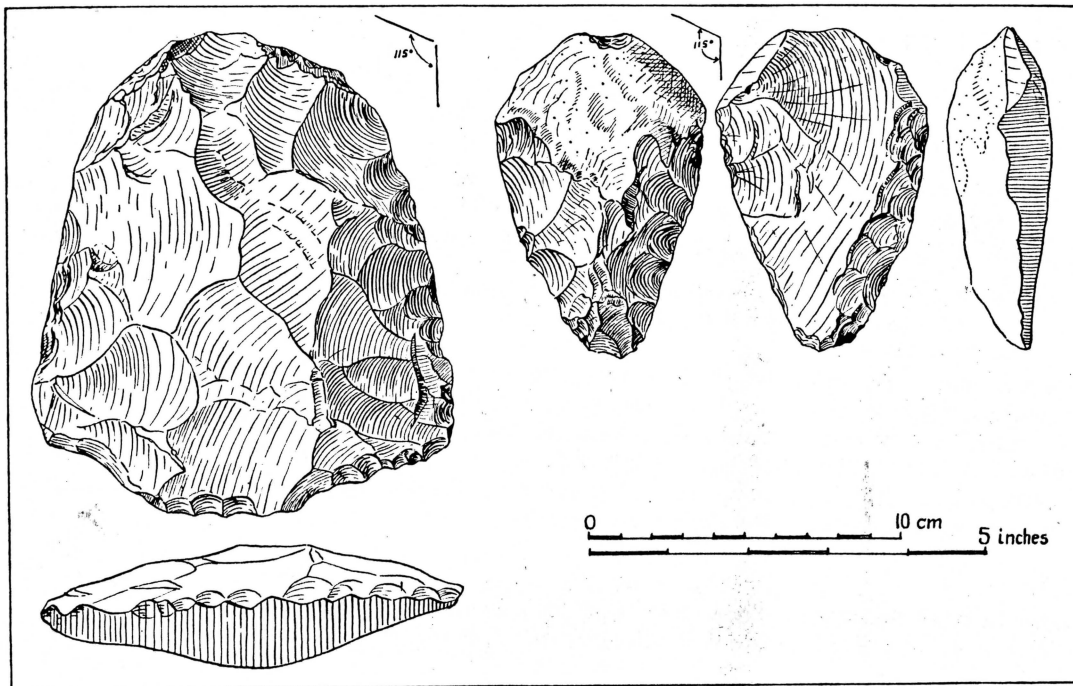


FIG. 2. Unrolled Stellenbosch V tools from the top of the calcified gravels at Tses. Cleaver made from flake (indurated shale). Small hand-axe made from flake (quartzite)

of the Middle Pleistocene gravels. But there can be little doubt that, as elsewhere on the continent, a dry period intervened between the deposition of the calcified gravels and the phase of erosion which is the next recognizable event.

In the country as a whole open Chelles-Acheul sites are numerous and they occur occasionally at spots which, today, are miles removed from even the nearest temporary water hole.

The End-Pleistocene Pluvial

This pluvial is well represented by an erosion into the Kanjeran gravels and by ubiquitous non-calcified gravels accompanying all the rivers as low terraces. Only some of the rivers ending in pans

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in the Namib dunes have not been able to cut a channel into these youngest gravels. Their rare floods are still using an End-Pleistocene flood plain.

For the earlier part of this pluvial the archaeological evidence is still inconclusive. Only 3 or 4 Fauresmith sites have so far been found in South-West Africa, a fact suggesting that climatic conditions may have become too dry for human occupation or that the Fauresmith period was too short to have left plentiful relics.

Future work will perhaps reveal a Fauresmith terrace. This is indicated by a collection made on the 40-foot (12 m.) terrace of the Fish river at Wasserfall (Fig. 1*b*). This collection though consisting of only 20 implements, has a strong Fauresmith flavour (Fig. 3). There is of course no proof that

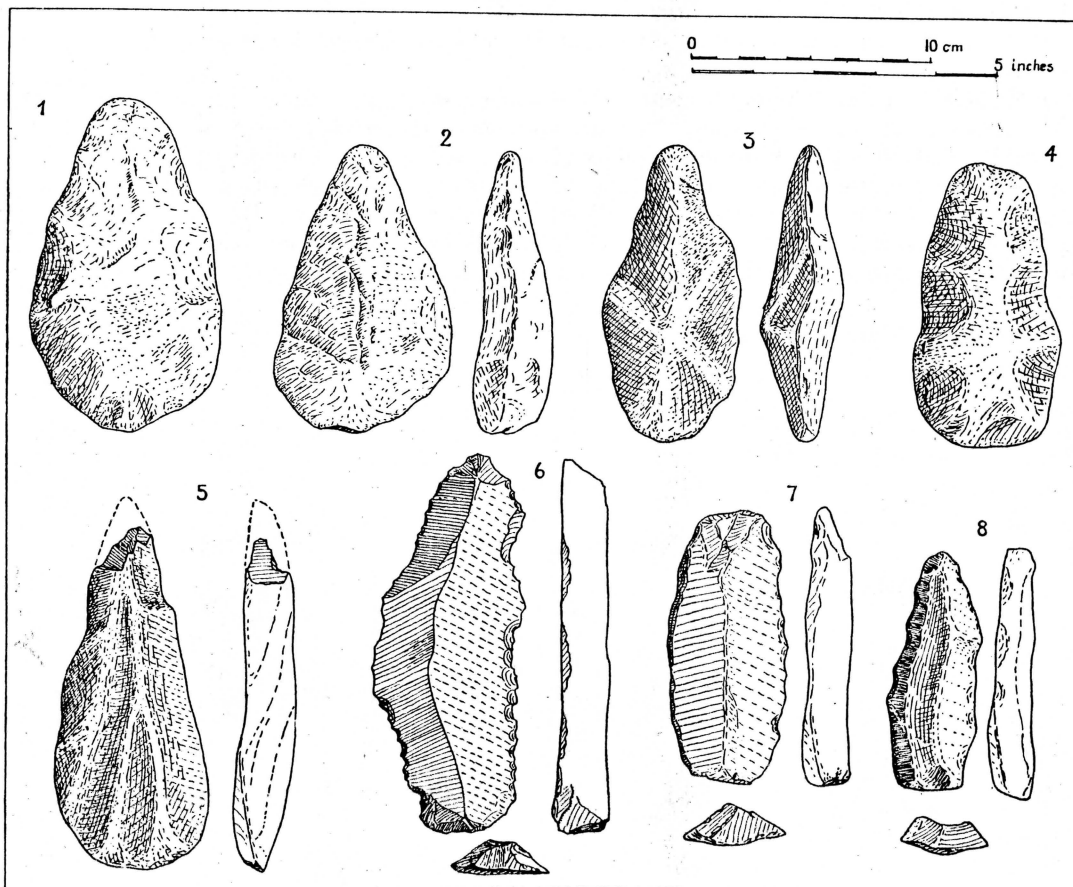


FIG. 3. Fauresmith? Implements from 40-foot terrace at Wasserfall. Note rough workmanship of No. 3 compared with tools in Fig. 2. All implements made from quartzite

the small hand-axes, all heavily rolled, are not derived from the higher terrace, where the late Chelles-Acheul sites already contain a fair proportion of small hand-axes. But even discounting the hand-axes, the heavy, rolled and unrolled blades are more suggestive of the Fauresmith than of the South African Middle Stone Age.

That water may have been not too plentiful during Fauresmith times is suggested by the fact that the only Fauresmith living site, discovered so far, is situated at the mouth of the Orabes gorge

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at the Brandberg, where there is a spring even today. At this site the implements are weathering out of a sandy tufa.

All evidence regarding the Fauresmith is still very inconclusive.

It is not yet clear whether the End-Pleistocene pluvial consists of one or of two wet phases. Fig. 1*b* suggests that the lowest terrace, on which no implements were found, represents a second wet phase. It is not impossible that along the smaller rivers the two terraces practically merge into one another. If this should be the case then the second wet phase was probably the more pronounced one, as implements, rolled and unrolled, belonging to the South African Middle Stone Age have been found at numerous localities in the unconsolidated gravels.

The existence of pluvial conditions during this period is further proved by the wide-spread occurrence of M.S.A. implements in the driest parts of the Namib desert.

M.S.A. implements from open sites are usually characterized by a red patina. Such a patina was never observed on the younger Smithfield assemblages.

Towards the end of the M.S.A. period the climate seems to have become drier again. Whilst the earlier stages of the M.S.A. are to be found everywhere, the final stage, characterized by retouched and bifaced points, is rare and always confined to the neighbourhood of springs or to old spring deposits. Fig. 4 shows implements weathering out of a tufa hill at the homestead of farm Doornkom No. 173, Otjiwarongo District. The tufa hill rises about 10-15 feet above the sand covered plain. Its origin as a spring deposit is clearly revealed by numerous, silicified reed stalks. A borehole sunk on the hill struck hot water at a depth of 108 feet, proving that a hot spring must have existed here during Late M.S.A. times.

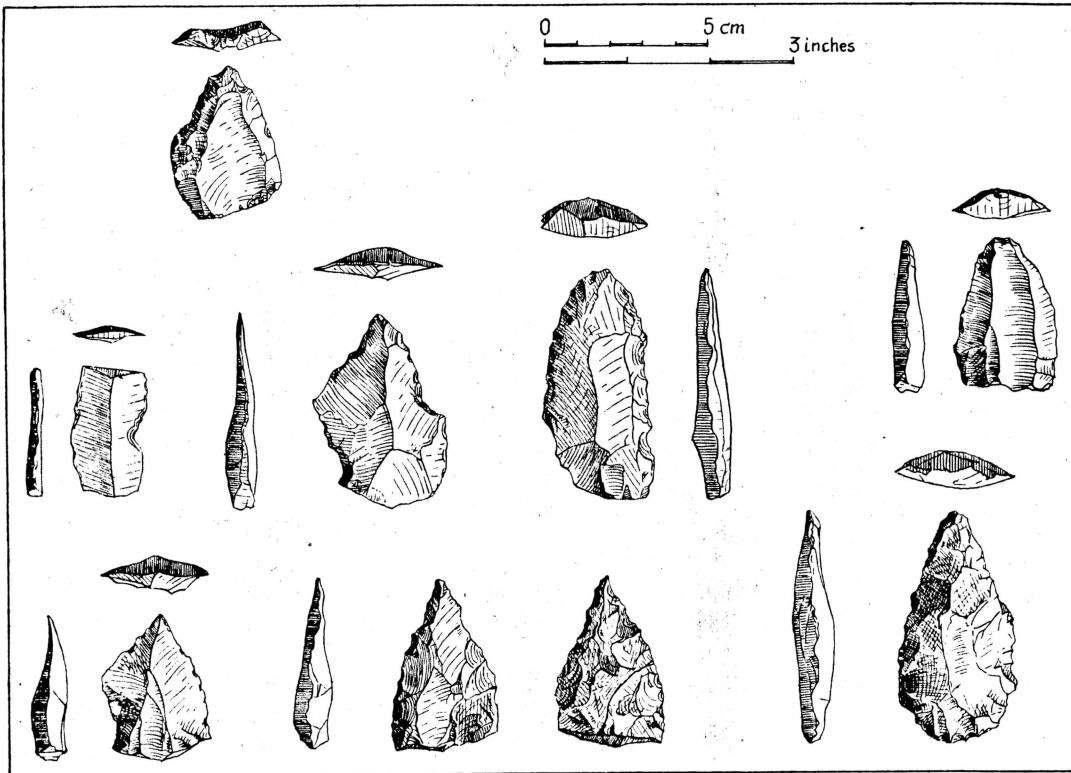


FIG. 4. Late Middle Stone Age implements from tufa hill on Farm Doornkom. All the implements are made from indurated shale

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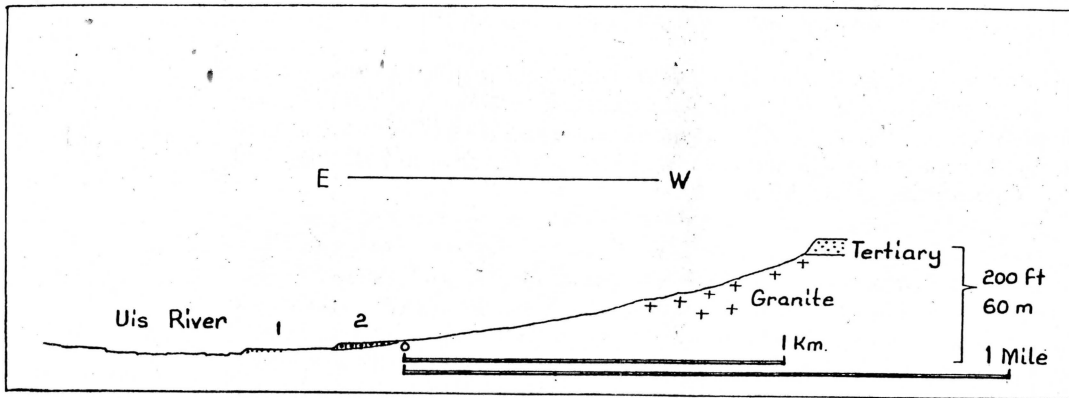


FIG. 5. The terraces of the Uis river near Tsisab Bank. 1 non-calci-fied terrace with M.S.A. implements. 2 calci-fied gravels with Late Chelles-Acheul implements

In the Namib too a Late M.S.A. culture was found in a spring deposit on farm Sukces No. 133, Maltahöhe district, at a spot where the water table is today 70 feet deep. On the whole the distribution of the Late M.S.A. seems to indicate a climate slightly wetter than the present one.

The Epi-Pleistocene

The latest stage of the M.S.A. seems not to be represented in South-West Africa. The climate seems to have become too arid for human occupation. During this period the Kalahari dunes were probably heaped up to their present shapes.

The return of more favourable conditions brought a renewed erosion of the rivers down to their present levels and the occupation of the country by people practising a Smithfield culture. The famous rock paintings of the Brandberg and Erongo mountains seem to be connected with the Smithfield culture. This is indicated by the fact that three excavations in painted shelters in the Tsisab gorge (Brandberg) and one in Phillip's cave (Erongo) have yielded only Smithfield implements. Although M.S.A. is plentiful in front of the shelters and in the neighbourhood, none was found in the excavations right down to bed-rock, and the only younger cultural elements on the surface were a few potsherds (Mason, 1954). More excavations are of course necessary before certainty can be reached on this point. An approximate age of 3,300 years for the earlier (?) stage of the Smithfield culture is indicated by a C14 date, obtained by Prof. Libby, for charcoal from layer II of the Phillips cave excavation (Breuil, 1954; Martin and Mason, 1954).

Wilton, characterized by crescents, has so far only been found at two localities, at Haruchas in the Auob valley on top of a small dune and on the banks of the Okavango river at Sambio.

The microlithic sites of the Namib seem to belong to the Smithfield.

Climatic Changes during the Pleistocene

The climatic changes which affected the western rim of the subcontinent during the Pleistocene are well exhibited by the terraces of the Uis river.

The Uis river is a 25-mile long tributary of the Ugab river, joining the latter to the east of Brandberg. It runs parallel to the 4-inch (100 mm.) isohyet. This means that river action cannot have been influenced by climatic changes affecting only part of the river system, a conclusion justified by observations in other parts of the country which indicate that the general distribution pattern of the rainfall has remained unaffected by the gross variations of precipitation. The river not only runs parallel to the isohyets but parallel to the coast too. Its gradient can therefore not have been altered by the upwarping of the continental margin. Neither was the river system affected by

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tectonic movements or by the loss or capture of tributaries. Everything seems to justify the conclusion that the varying gravel sizes of the different terraces are a direct expression of the variations of rainfall.

Fig. 5 shows the terraces in the neighbourhood of Tsisab Bank. The calcified Chelles-Acheul gravels, containing numerous rolled and unrolled late Acheulian tools (Stellenbosch III-IV), are composed of pebbles with maximum diameters of 20-25 cm. The non-calcified 5-foot terrace, containing rolled and unrolled Middle Stone Age tools, shows pebbles with maximum diameters of 8-10 cm. The present day river bed shows only sand.

The smaller tributaries have not everywhere been able to cut through the calcified gravels. At Uis Mine one deposit was worked successfully for alluvial tin. The same deposit contains an abundance of Victoria West cores, speaking eloquently of Mid-Pleistocene quarrying operations (Collection Alice Bolitho, mentioned by Mason, 1955, and Collection Abbé Breuil). No alluvial tin deposits are formed under today's climatic conditions anywhere in the country, because alluvial ore deposits can only be formed under a far more humid climate with rivers flowing for a considerable part of the year. The occurrence of tin concentrations in the Mid-Pleistocene deposits thus corroborates the conclusion drawn from the size of the gravels.

Summing up the evidence, the following sequence of climatic changes emerges. For the early-Pleistocene pluvials a high precipitation and a generally humid climate must be assumed (absence of calcification).

The Kanjeran pluvial was, compared with today, characterized by a far higher and better distributed rainfall.

During the last stage of the Chelles-Acheul culture the climate became dry approaching today's conditions and it probably passed into an even drier phase during the height of the interpluvial.

There are indications that the End-Pleistocene pluvial consisted of two wet phases. The position of the Fauresmith culture is not yet certain, but there is little doubt that the main development of the Middle Stone Age industries took place during the last phase of the pluvial. The climate of this time was considerably wetter than today but not nearly as humid as during the Kanjeran pluvial.

A period of great aridity, followed by a minor wet phase, characterizes the Epi-Pleistocene.

The whole sequence seems to show, right through the Pleistocene, a decline of the rainfall on which the pluvial and interpluvial fluctuations are superimposed.

The rainfall curve for the Pleistocene of South-West Africa will probably, after elimination of the uncertainties, be very similar to the curve deduced by Cooke, 1946, for the Vaal river basin. The cultural sequence is closer related to the development in the Union of South Africa than to any other part of the continent.

The Coast

Very little is known about the Pleistocene deposits of the coastal belt.

All the bigger rivers reaching the coast show a well developed terrace of non-calcified gravels. At both the Swakop and the Omaruru rivers rolled M.S.A. implements have been found in these gravels. The terrace of the Omaruru river ends at the coast at a height of 63 feet, but the corresponding beach is probably lower.

Observations at the coast are made very difficult by the extremes of the desert climate. Sandblast and insolation have destroyed the pebbles on all the older surfaces to such an extent that it is difficult even to recognize a raised beach. Stone implements have of course had the same fate.

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