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Editorial Note

The distribution of our second Report (Pro Calima 2) brought a gratifying response from friends and colleagues, several of whom have asked how the work should be cited. This is a problem that was not foreseen when the first Report was printed in a small edition for private circulation. With increasing demand, the print order for No. 2 was raised to a level that compares with the subscription figures for many archaeological journals, and we suggest that for bibliographical purposes the Report should be treated as an annual journal or series, listed under the title *Pro Calima* (publisher: Vereinigung Pro Calima, Basel, Switzerland).

In keeping with our previous policy, we are glad to publish articles by any scholar, whether member of the project or not, who has an interest in this region of Colombia. The introduction of a Contents List in the present number is designed to take account of this and to bring Pro Calima into line with the more orthodox journals.

Report No. 1 is out of print, but some copies of No. 2 are still available. Anyone who wishes to receive Pro Calima, and who is not already on the distribution list, should write to Frau Ursula Kubli, Hubel, 3038 Kirchlindach, Switzerland.

Report on the 1981 Field Season in Calima

By Warwick Bray, Leonor Herrera and Marianne Cardale Schrimpff

1. Introduction

The schedule of research in 1981 followed the pattern established in previous years. Preparatory to the main field season, Leonor Herrera and Marianne Schrimpff visited Calima for two weeks in May in order to make a detailed reconnaissance of the El Dorado Valley area. The main season lasted from July until the end of September with, as usual, the participation of an international team drawn from Colombia and Europe. We also benefitted from shorter visits by specialist colleagues: Robert Eidt (who returned to collect more soil samples for phosphate fractionation analysis), Thomas van der Hammen (pollen studies), and Gonzalo Correal (who made a brief survey of the area in search of preceramic sites and also gave advice on stone tools).

As indicated in last year's report, the Valley of El Dorado had already been chosen as the focus of research for 1981 (Fig. 1). Most of the detailed mapping and excavation effort was concentrated on the ridge-top site of El Billar, with its associated settlement and tombs (v. Section 3 below). Activity in the swampy floor of the valley revived later in the season with the arrival of van der Hammen, who took two 5 m. pollen cores for analysis in Amsterdam (Fig. 2). As a final exercise, in preparation for the 1982 season, test excavations were carried out in one raised field and in one drainage system on the valley floor (Section 4). Pollen and soil samples from all these excavations are in course of analysis.

After the team dispersed in September, Gähwiler remained behind to carry out a survey in the Cordillera between Calima and the Cauca valley. A summary of her results is presented in the form of a separate article.

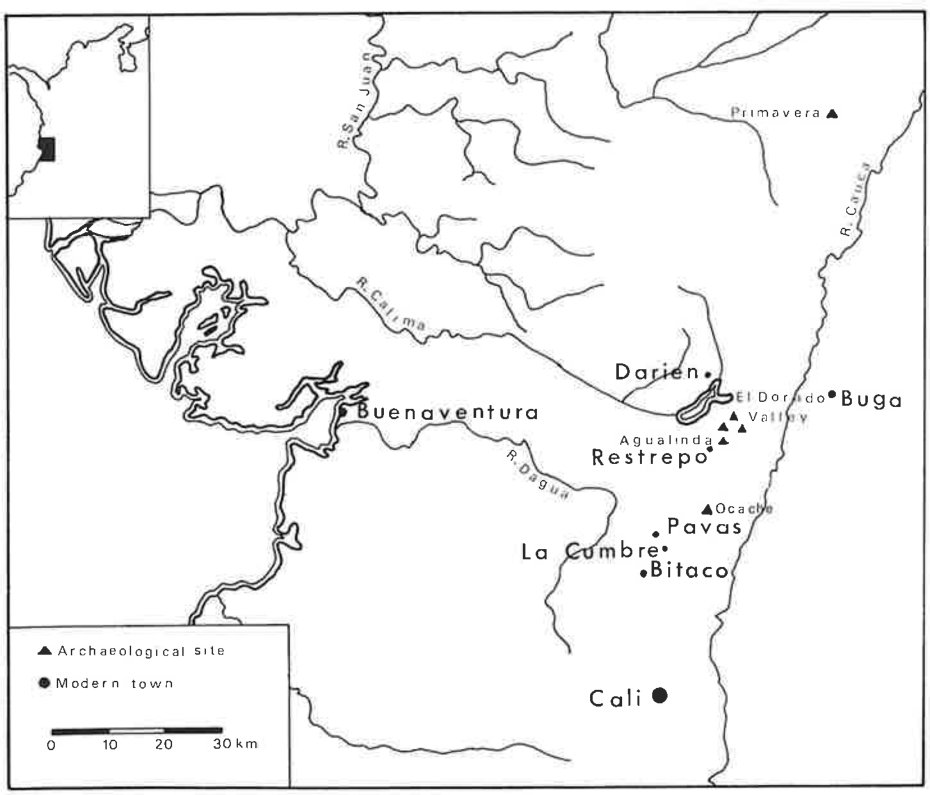


Fig. 1. The Calima region, with sites investigated in 1981.

2. Photointerpretation, reconnaissance and mapping

After two years of familiarizing ourselves with the very large numbers and wide range of archaeological remains still visible in the Calima area, we felt it was essential to map a reasonably large and representative section of the ancient landscape as completely as possible.

The first steps towards the production of a map were taken in Bogotá. A set of air photographs covering an area of 24 km², which included the valley of El Dorado and the adjacent slopes, was obtained from the Federación Nacional de Cafeteros de Colombia. These photographs, at a scale of 1:10,000, had been taken at midday for purposes of a coffee plant census. In

Fig. 2. The Valley of El Dorado. The dark lines in the valley bottom indicate where greener grass marks the course of an extinct drainage system. In 1981, two pollen cores were taken from the sediments in the valley floor: one from the little bog in the foreground, and the second one from the other side of the valley. These localities are marked X on the photograph and are also shown in Fig. 3.

consequence the archaeological features, which show better in oblique light, were not particularly favoured. On the other hand, the unusually large scale meant that a lot of detail was visible and that the photos could be blown up to a scale of 1:5000 without losing definition. It was fortunate that we also had two outstanding photographs, taken by Edgar Caldas, which showed one of the main archaeological areas of the valley, and which supplemented the Federación set. One of these Caldas photos was illustrated in *Pro Calima* 1 Fig. 26, together with a preliminary attempt at mapping the archaeological features (other than raised fields) before checking on the ground.

The photographs were examined with a stereoscope, and all visible archaeological remains were marked with coloured Chinagraph pencils on the enlargements. Two of us then spent a fortnight walking the area to check these features and to verify details.

Checking presented some practical difficulties. Since certain archaeological features may be altogether invisible in full light, work had to be done between 6 and 9 a.m. and 4 to 6 p.m., when the sun was low, though at times there was hardly enough light to transfer details onto the air photos. Seasonal variation also affects archaeological visibility. During the dry season, old ditches (which no longer carry water, but remain moister than the surrounding areas) show up as darker shades of green, while in the wet season overall dampness makes for a uniform colour. Relatively small changes in vegetation also have a marked influence over quite short periods; features very clearly observable in well kept or recently sown pasture will be almost invisible a few months later if ferns and weeds are allowed to grow. This means that not all details will be clearly visible on the ground at any particular moment. Nevertheless, photointerpretation followed by ground check showed good general agreement with evidence from those areas later mapped in detail by theodolite.

The next step after the field check was the transfer of the information to a base map (Instituto Geográfico Agustín Codazzi, Bogotá, 1976) enlarged to a scale of 1:5000. This was done in the offices of the Federación Nacional de Cafeteros, to whom we are indebted for general guidance on several aspects of map making. A zoom transfer aid was used to equalize the scales of the map and the air photos. The data from the basic physical map were checked and updated against the more recent Federación air photographs and our own increasing knowledge of the area.

A sample sheet of the resultant map is shown in Fig. 3. It must be emphasized that the overall map is still at a preliminary stage, and that corrections and additions are continuously being made as field work advances.

Five different kinds of archaeological features were mapped: artificial platforms of various sorts, looted cemeteries, field lines and ditches, ancient roads, and petroglyphs. The most common category was the small artificial platform, of which we counted more than 600. These generally measure between 5 and 10 m. across and are usually oval in plan, although they may occasionally be rectangular. Since they are a convenient size for the single house of a nuclear family, and since we have found substantial amounts of occupation debris on those we have excavated, we are calling these sites 'house platforms', though it is possible that some may have served other functions (for instance, garden huts for guarding the crops). Platforms tend to occur in loose-knit clusters, though isolated ones are also found. A favourite position is on a slope, which may be quite steep, overlooking a small stream. On gentler slopes, platforms are often at the edge of ancient fields and sometimes the traces of a path can still be seen leading from the platform to the stream below.

House platforms seem to be somewhat commoner on the lower half of the slopes surrounding the valley. A large area of the ridge bounding the southwestern side of the valley has considerable numbers of field lines but very few platforms, suggesting that there may have been a system of in-fields and out-fields, with some agricultural land near the house and some further away. Residential platforms of this type were built during both the Yotoco and the succeeding Sonso periods, but we have not yet been able to recognize temporal differences in shape or in distribution patterns.

These smaller platforms contrast sharply with a group of large ones that may measure 100 m. or more.

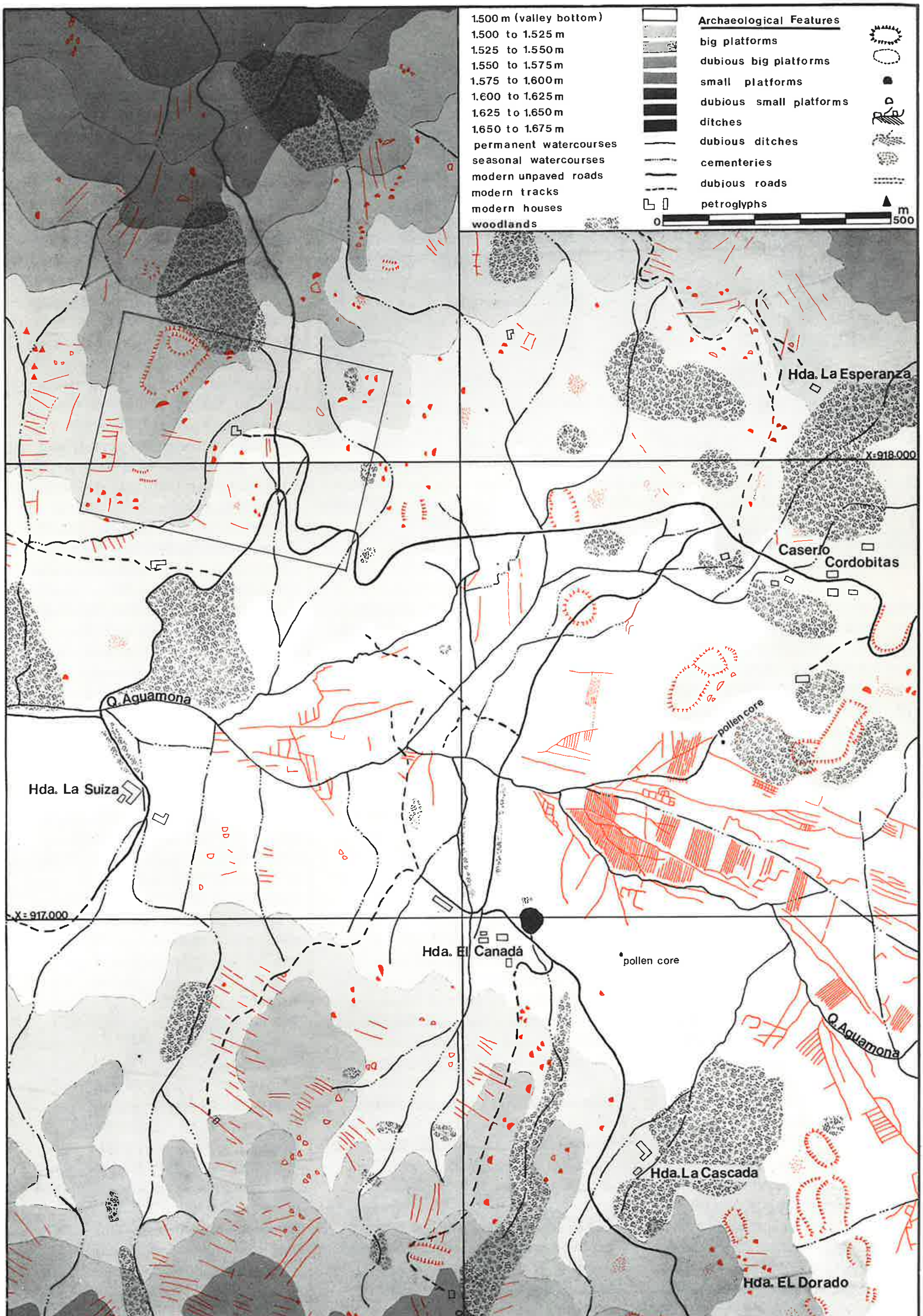

1.500 m (valley bottom)
1.500 to 1.525 m
1.525 to 1.550 m
1.550 to 1.575 m
1.575 to 1.600 m
1.600 to 1.625 m
1.625 to 1.650 m
1.650 to 1.675 m
permanent watercourses
seasonal watercourses
modern unpaved roads
modern tracks
modern houses
woodlands
Archaeological Features
big platforms
dubious big platforms
small platforms
dubious small platforms
ditches
dubious ditches
cementeries
dubious roads
petroglyphs
0
500
m
Hda. La Esperanza
X=918.000
Caserío
Cordobitas
Q. Aguamona
pollen core
Hda. La Suiza
X=917.000
Hda. El Canadá
pollen core
Q. Aguamona
Hda. La Cascada
Hda. EL Dorado

Fig. 3. Part of the archaeological map of the valley of El Dorado. On the original sheets, physical details and modern roads and buildings are shown in black, with archaeological features superimposed in red. The grid lines are oriented to the cardinal points, with north at the top of the map. The inset rectangle marks the main area of study in 1981 (see Fig. 7).

Fig. 4. Large platforms on the slopes just above the valley bottom in the Hacienda El Dorado.

We could distinguish at least three very distinctive and recurrent shapes. One is an ovoid platform with a pseudo-tumulus, built on the summit of a ridge by cutting away the central area and dumping the excavated material on the outer edge, leaving an untouched 'hump' in the centre or at the rear. We counted four such platforms in the valley area, and a fifth with two humps instead of the usual one. Another platform with a hump was found outside the valley, on a ridge midway between El Dorado and the Calima valley. The Billar (Fig. 8) is an example of this kind of platform, and was excavated in 1981.

A second variety of platform has a very distinctive plan, being T-shaped with the narrower part forming a back wall cut into the slope. We found two platforms of this kind in El Dorado, and there is another very well preserved example just to the north (v. *Pro Calima* 2, Fig. 13). The third variety of large platform has a squareish outline. Although at least one of these platforms was built near the crest of a ridge, more often they were placed on the slope.

In the southwestern area of the valley of El Dorado a group of huge, artificial platforms was constructed close together, in steplike fashion, very near to the valley bottom (Fig. 4). These platforms are surrounded by a greater number of small house sites, and further upslope is an ovoid platform with a 'tumulus hump' like those described above. The concentration of these features indicates that this area (the bottom right hand corner of Fig. 3) was a focal point of the valley. Excavations carried out in 1982 in four of these platforms showed that they (like the Billar) were constructed during the Sonso period.

The juxtaposition of the two kinds of platforms (flat and flat-with-hump) was observed at two other places in the valley of El Dorado and the surrounding region.

The combinations of major platforms are sited in such a way that a person standing on any one of them can see at least two other large platforms across the valley in the far distance. These platforms may therefore have served as vantage points from which a considerable area could be watched over or controlled. Sometimes a high concentration of small platforms is observed around the large ones, as in the area around El Billar and the Hacienda El Dorado (Figs. 3 and 7). However, this is not always the case. In one instance we find large platforms in a region where ordinary ones are sparse, forming a sort of boundary area near the steep slopes that drop down to the Cauca valley.

These networks of mutually visible platforms seem to be a characteristic of the El Dorado valley and its immediate surroundings, and do not appear to extend to the whole of the Calima region – though, since we have not mapped other areas of similar magnitude with the same degree of detail, this opinion is somewhat subjective. We have observed very big platforms on the slopes surrounding Lake Calima, in the Hacienda Ceylan. Unfortunately the bottom of the Calima valley is now covered by the waters of the reservoir and we may never know whether large platforms, like those of El Dorado, once existed in this area too.

The number of looted cemeteries is another eloquent testimony to the large number of people who must have lived in the valley of El Dorado in the past. Some of these cemeteries have as many as 200 depressions that represent graves dug by *guaqueros* (treasure hunters), and above the group of large platforms at El Dorado the craters were so large and so close together that we were reminded of a lunar landscape. These tombs were robbed a long time ago and we have been unable to find anyone in the area who remembers the event. It is fortunate, therefore, that a number of archaeologists have worked in the valley and have carefully documented their excavations of graves (Wassén 1936, Caldas et al. 1972, Cubillos unpublished). These excavated tombs were all of the Sonso period and, to judge from the large collections of Sonso pottery in the houses of the area and from the comments of local people, it seems probable that a relatively high percentage of all graves belong to this period.

Cemeteries of the Yotoco period are documented around the small modern house near the Billar and in the Hacienda El Dorado. Ilama pottery has also been found in tombs within the El Dorado valley, but we have so far been unable to obtain information on these cemeteries.

An important stretch of ancient road runs along the ridge bounding the El Dorado valley to the south west. Until a few years ago it was well preserved and could be followed as far as Madroñal at the edge of the Calima valley. This road dips down into the El Dorado valley behind the house at the Hacienda El Dorado and is lost in the valley bottom. However, it probably linked originally with a long and clearly visible stretch of ancient road which leads

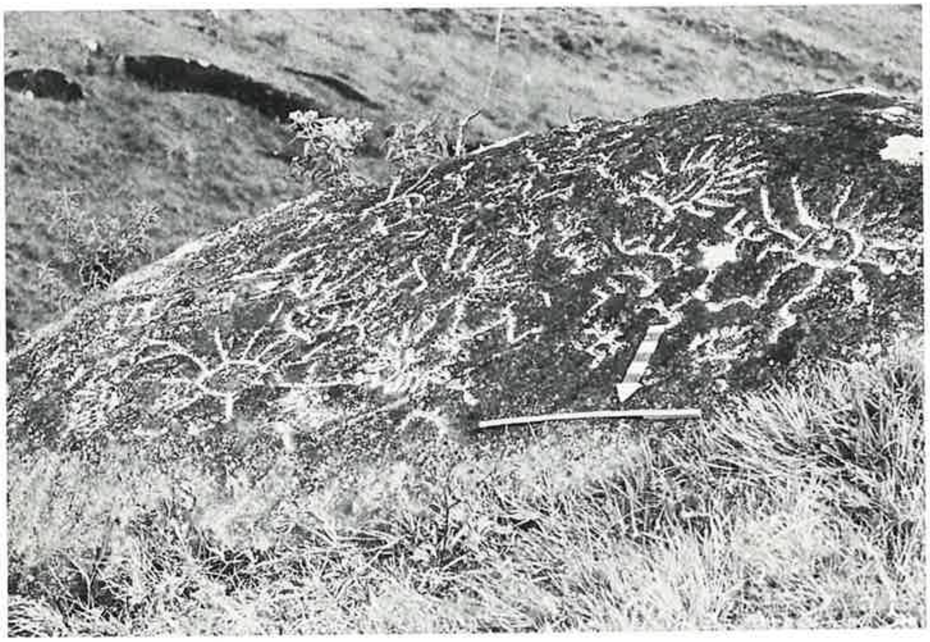


Fig. 5. Petroglyph, Hacienda La Suiza, Valley of El Dorado.

down to the River Cauca. At least three other short stretches of road have been plotted in the El Dorado valley but, although attempts were made to follow them, we were not able to link these segments of road into a coherent system.

Outcrops of rock are rare in the Calima area, since most of the parent diabase is covered by a thick mantle of weathered material. However, at the western end of El Dorado some large boulders are visible in a small valley near the Billar site and also along the course of the Quebrada Aguamona where it leaves the valley (at the left hand margin of the area mapped in Fig. 3). In both these places petroglyphs were found (Figs. 5 and 6).

The field lines, which are such a conspicuous feature of the archaeological landscape, present special problems of interpretation and are discussed in other sections of this report.

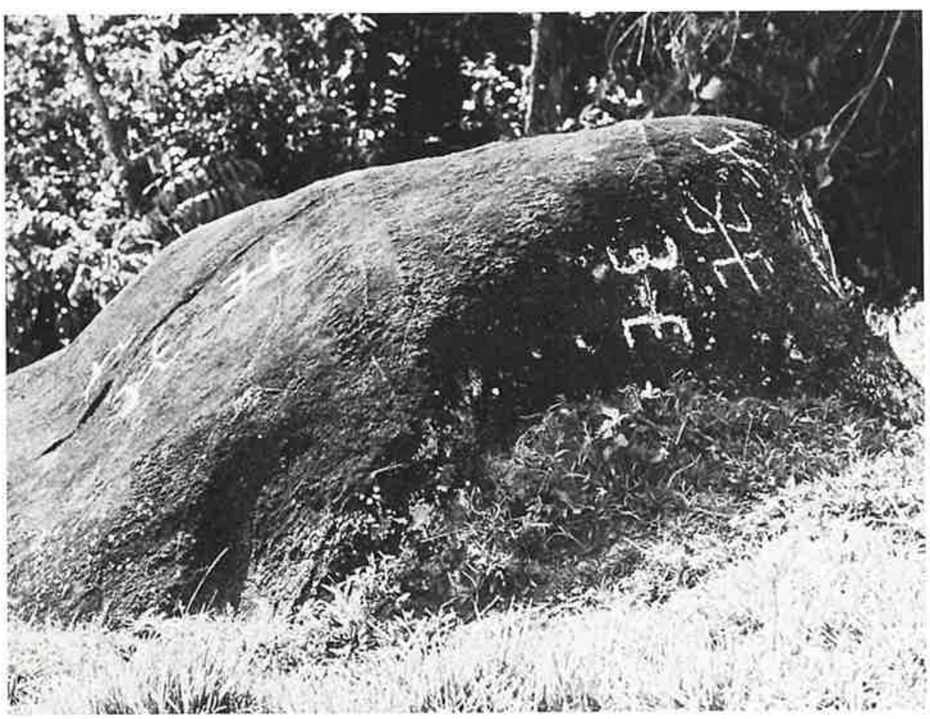


Fig. 6. Petroglyph, Hacienda La Suiza, Valley of El Dorado. The 'dancing figure' motif is one of the most frequent designs on carved boulders throughout the Calima zone.

3. Excavations at the Hacienda La Suiza

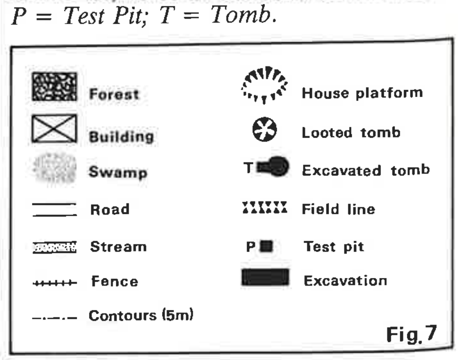
The area investigated in detail during 1981 is shown in Fig. 7, and forms part of the Hacienda La Suiza, whose owner, Sr. Byron López, generously gave permission for excavation.

The western portion of this area is occupied by a ridge, at present under pasture, with streams running down the miniature valleys on either side of it. The top of the ridge was cut away and levelled in prehispanic times to form a large, flat area locally known as El Billar (the Billiard Table) with an earthen mound at its northern edge (Fig. 8). On the slopes of the ridge are a number of house platforms and, near the southern end, a small group of looted graves. The sherds discarded by the tomb-robbers were of Sonso type, as were the few diagnostic sherds picked up on the sides of the ridge. Because of the grass cover, the extent of ancient settlement on the Billar is impossible to estimate by eye alone.

Running vertically down the slopes are several 'field lines' of the kind discussed in *Pro Calima* 2, pp. 10–12. One of the lines in this group was tested by excavation in 1982 (Section *c* below).

The area to the east of the Billar ridge (separated from it by the stream which divides the map into upper and lower sections) is relatively flat by Calima standards. Much of it had been freshly ploughed in 1981, to reveal a dense scatter of sherds,

Fig. 7. Hacienda La Suiza: the area surveyed and excavated in summer 1981. The Billar occupies the ridge in the upper one third of the map (for more detail see Fig. 9). The lower portion of the map, east of the stream, is the settlement area (see Fig. 32). The heavy black rectangle, A-V/O-15, indicates Collection Area No. 5. P = Test Pit; T = Tomb.



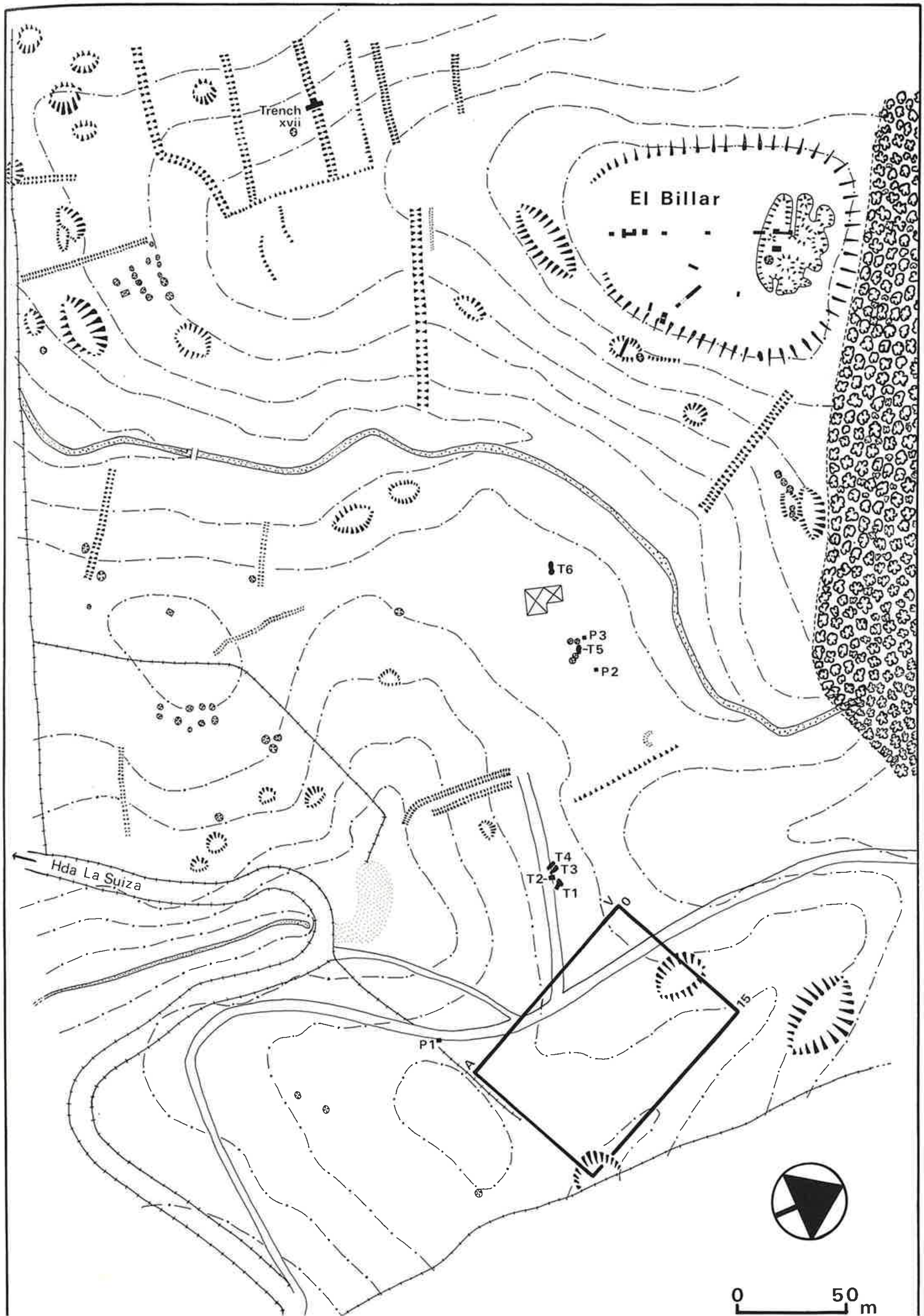

El Billar
Trench
xvii
T6
P3
T5
P2
T4
T3
T2
T1
V
0
15
A
P1
Hda La Suiza
0
50
m

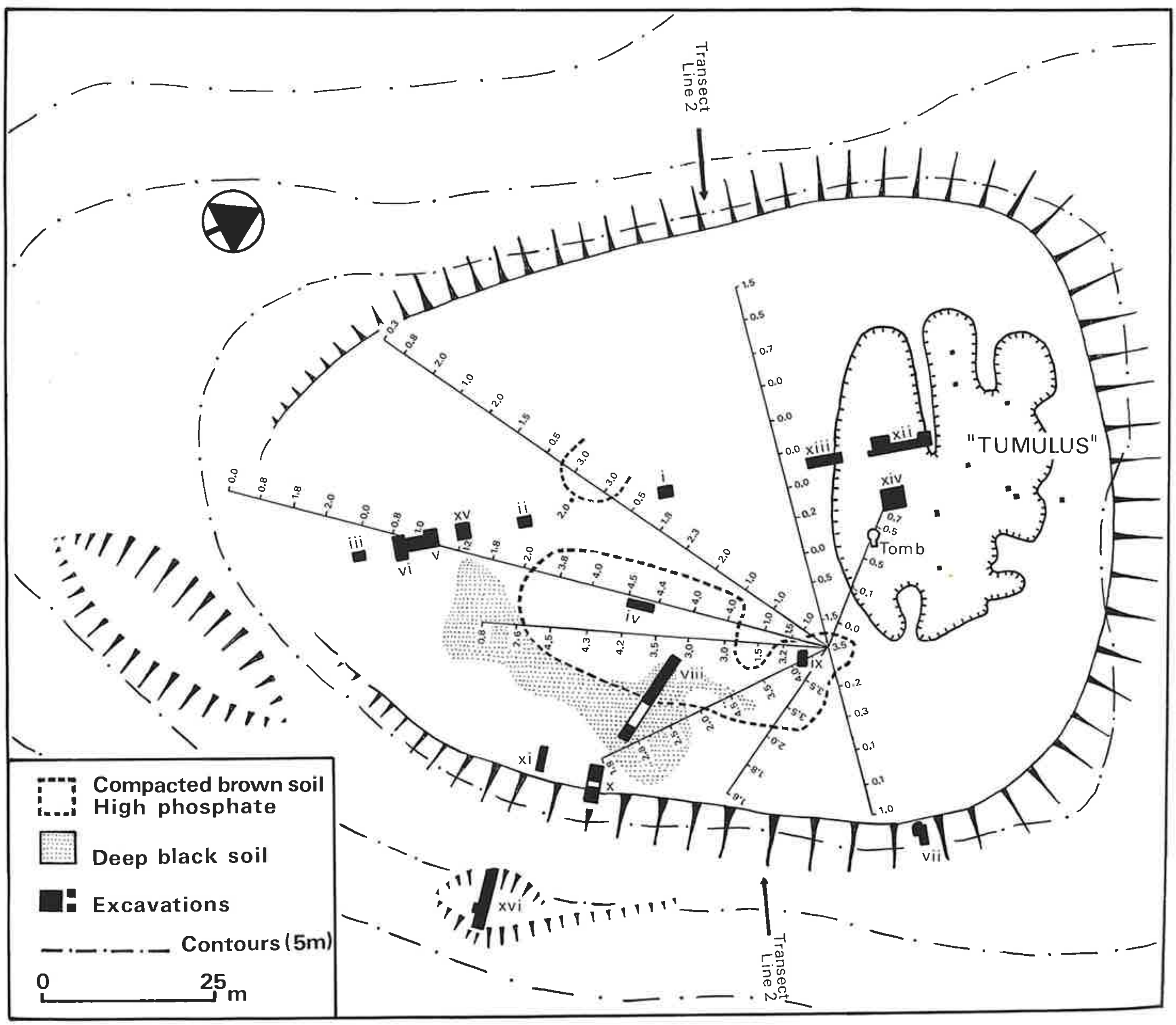
Fig. 8. The 'pseudo-tumulus' on the top of the Billar platform, La Suiza.

chipped stone, manos, metates and domestic rubbish of all kinds. Surface collections were made from all the ploughed areas (C1–C5 Fig. 32) and are described in Section *e*.

a) The Billar

The Billar itself is a ridge top that has been modified to create a flat area some 110 × 90 m. The constructional technique is similar to that used for ordinary house platforms, though on a much larger scale. The crest of the ridge was cut away, and the excavated material piled around the edges of the site so as to increase the horizontal area. Apart from the

Fig. 9. Hacienda La Suiza: Plan of the Billar, showing the 'Tumulus' and the excavation trenches. The radial lines give the surface phosphate readings, taken at intervals of 5 m. The media caña probes across the Billar along Transect Line 2 gave the cross-section shown in Fig. 11.



'Tumulus', discussed below, there are no visible surface features, and any sub-surface material is concealed by a layer of turf.

The sheer size of the Billar made it impossible to excavate more than a small proportion of its total area. Techniques of surface exploration were therefore employed, alongside excavation, in order to build up a more complete picture of the monument.

Eidt carried out a quantitative study of phosphate in the subsoil, using the rapid survey 'ring method' described in his contribution to this volume. The results of this survey are shown in Fig. 9. In general, a high quantity of phosphate in the soil indicates areas of more intense human activity in past times, and the technique can be used to distinguish between unoccupied vacant ground and former domestic zones with house sites, rubbish dumps and organic waste.

Eidt's survey identified one (and perhaps two) areas of phosphate concentration, defined by readings of 3.0 or higher on a scale of 0 to 5. These high readings contrast with the low figures for much of the Billar's surface, and the pattern suggests the presence of a good deal of open space, without many houses or other structures. At the same time, the Billar was examined by probing with a *media caña,* a device that serves much the same purpose as a soil auger by taking a continuous core sample of the underlying strata (Fig. 10). This technique gave advance information about the stratigraphy on top of the Billar and about the nature and depth of the constructional fill around its lip. This information not only helped with the siting of the excavation trenches, but also gave interesting evidence about the structure of the Billar.

Probe points were situated along six transects laid out across the Billar, with distances of 10 to 25 m. between each transect. Usually four points on each side of the platform were tested but, where necessary, additional probes were made to clarify details of the stratigraphy, making a total of 52 probes in all. The section along one of these transects (Line No. 2) is shown in Fig. 11, and the position of this transect line is marked on Fig. 9.

Fig. 10. A media caña; the instrument used by treasure hunters to find tombs, it has also proved its value for archaeological prospection.

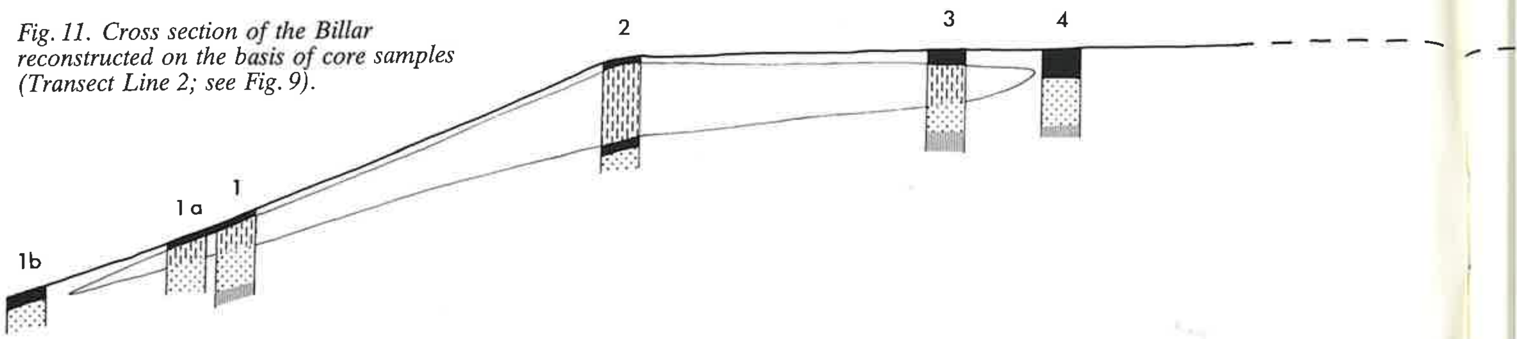
The central part of the transect, where no constructional fill is present, has been omitted to save space. Probe points 2 and 7 are situated on the lip of the flat area where the fill is deepest, with the rest placed at localities designed to reveal the extension and depth. At Point 7 the fill was too deep for its base to be reached with the *media caña,* but, to judge from neighbouring transects, the depth of fill is unlikely to have measured more than 2.50 m. Point 5, on the flat area, shows a truncated layer of yellow ashy material where the upper part had been shaved off during the flattening of the Billar; at Point 4, also on the flat area, the natural stratigraphy has been preserved intact. At most of the points on the slope it was possible to detect a dark layer, some 20–40 cm. thick, which represents the original topsoil of the hill, before this was covered during the construction of the platform. Below this soil, as everywhere, we find the yellow ashy material overlying the red clay. The probes revealed that the original slopes of the hill were usually fairly regular with gradients ranging from 1 in 2 to 1 in 4, though there were also some irregularities such as the one between probes no. 6 and no. 7. When freshly constructed, the platform must have presented an impressive and colourful sight with its red clay central area surrounded by a 'fillet' of reddish yellow fill. This fill increased the available flat area by amounts which today vary between 8 and 10 m. on both sides of the platform. Originally, this area may have been somewhat greater. It is easy to imagine that, initially, the loose fill may have caused problems by its tendency to roll down the slopes, covering potential agricultural land and even, perhaps, partially blocking the course of the stream to the north west. However, in the archaeological excavations on the lip of the Billar, no traces of anything resembling a retaining structure were found.

On the basis of the evidence from the probes, an attempt was made to estimate the total amount of earth moved during the construction of the Billar. For each of the six transects a vertical profile was drawn, reconstructing the stratification in the areas between the probes. At this stage it was possible to calculate the number of square metres of fill in the vertical section represented by the profile drawing. This figure was then averaged with the corresponding figure for the next transect, and the average multiplied by the distance between the two transects to give the approximate volume (in m^3) of the fill in that particular segment of the Billar. The sum of the figures for the individual segments gives the total volume of fill for the Billar as a whole. This figure was calculated at 3,653 m^3 (i. e. 1,573 m^3 for the S. E. side and 2,080 m^3 for the N. W. side). These figures can, of course, be no more than approximations. Nevertheless, it seems reasonable to suppose that, allowing for over half a millennium of erosion, the total was certainly no less than the figures suggest, and was probably rather more. In any case, both the amount of labour involved, and the degree of perfection attained in levelling the ridge, imply considerable organizational and engineering skills on the part of the Sonso people.

Excavations at the Billar

The excavation trenches can be divided into three groups, each group designed to investigate a different problem: the construction of the 'Tumulus' (Trenches XII, XIII, XIV), the nature and date of the constructional fill and the underlying black soil on the lip of the Billar (Trenches VII, X), and the age and density of occupation on the Billar platform itself (Trenches I-VI, VIII, IX, XI and XV). The positions of all trenches are marked on Fig. 9.

Fig. 11. *Cross section of the Billar reconstructed on the basis of core samples (Transect Line 2; see Fig. 9).*



The 'Tumulus' (Trenches XII to XIV).

The 'Tumulus' at the northern edge of the Billar has the appearance of an artificial, flat-topped mound, with a well defined edge at its southern perimeter (Fig. 8). Elsewhere the outline is less regular, and large pits or trenches have been gouged into the body of the mound from its edge towards the centre. Conditioned perhaps by our backgrounds in European archaeology, we provisionally named this mound 'The Tumulus', under the impression that we had to deal with a man-made construction of piled earth, extensively damaged at a later date by looters and treasure hunters.

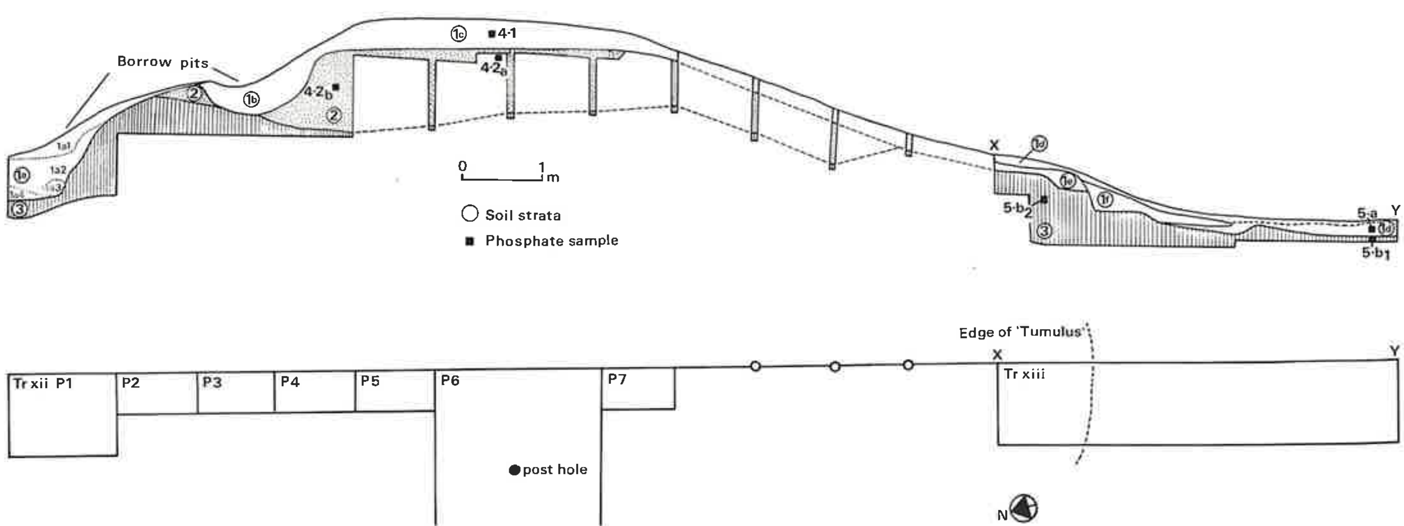
The excavation of Trench XII (Fig. 12) quickly corrected this impression by showing that the mound was composed not of constructional fill, but of the natural strata present everywhere in the zone – i. e. a reddish clay (Stratum 3 in Fig. 12), overlain by a yellow ashy layer (Stratum 2) with a soil on top (Stratum 1c). As always, the clay and ashy strata contained no archaeological material and showed no signs of human activity. At this stage of the investigation it became clear that the mound had not been built up at all, but instead consisted of a portion of the original ridge that had been left in place when the surrounding area was cut away and levelled to form the Billar.

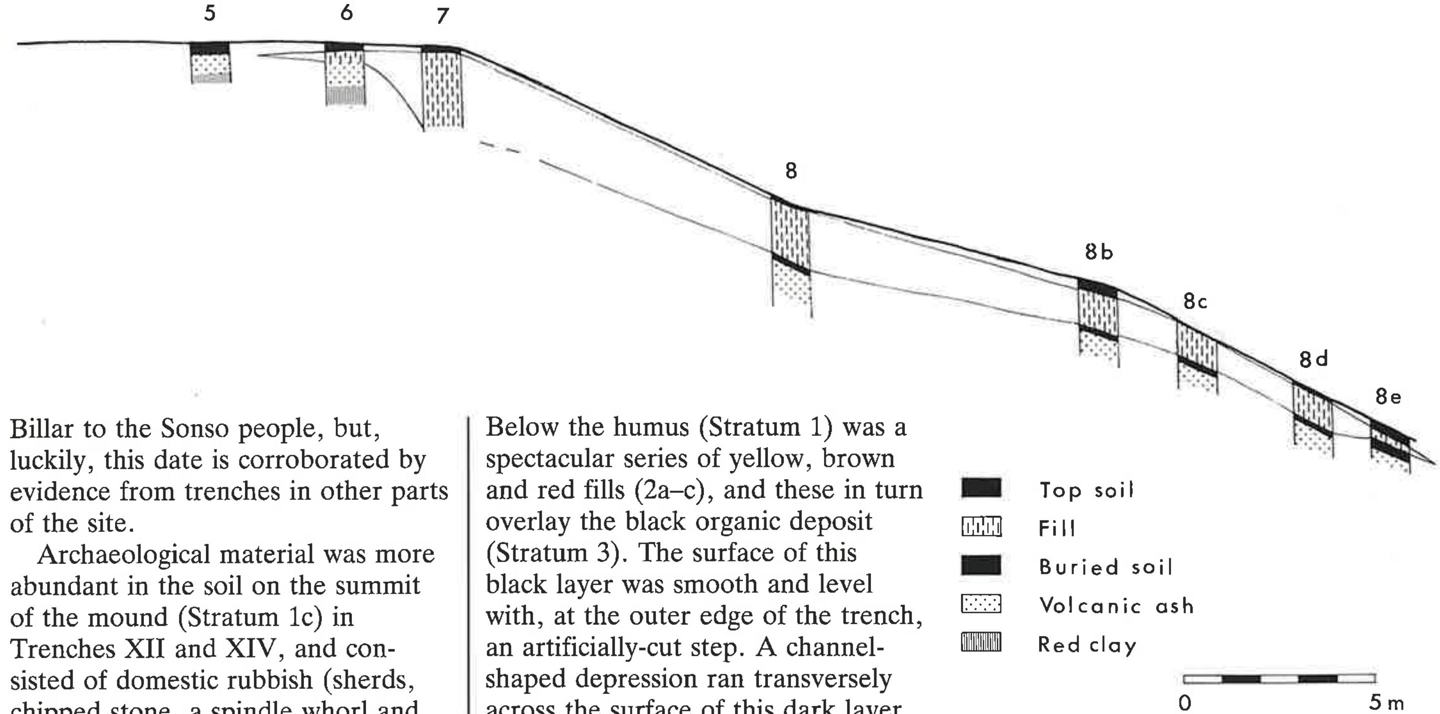
This fact caused us to revise our ideas about the pits and holes in the mound. These did not look like the typical looters' pits, which are all too common in Calima, nor was there any sign of the piles of discarded earth that normally surround holes left by treasure hunters. It seemed, in fact, that the material dug out of these large pits had been carefully removed from the locality and dumped somewhere else.

These two pieces of evidence led to the same conclusion: that the 'Tumulus' is simply a residue of the old ridge-top left behind for some reason when the Billar was levelled, and that the large and irregular holes in the mound are 'borrow pits' where construction fill was quarried, to be piled (with fill from the rest of the levelling process) around the edges of the site. In the course of time, the borrow pits became partially filled by material eroded from the mound (Strata 1a and 1b in Fig. 12), and a little earth also washed down the southern slope to appear in Trench XIII (Strata 1d and 1e).

Trench XIII was opened with the aim of investigating the edge of the mound and the area immediately outside it. This excavation confirmed that the construction of the Billar had removed all of the ashy stratum and the upper part of the red clay in order to create a huge level platform. Sherds found in Trench XIII, on top of this new man-made surface, are stratigraphically more recent than the levelling operation and should therefore provide a limiting date for the construction of the Billar. Unfortunately, the archaeological sample was very small (9 sherds and 1 fragment of stone). The only diagnostic sherd was a piece of Sonso incised ware. A single sherd is not, by itself, an adequate basis for attributing the construction of the

Fig. 12. Hacienda La Suiza; Excavations in the 'Tumulus' of El Billar (Trenches XII and XIII, east walls). The soil strata (ringed) are: 1a-e humus, topsoil and slopewash; 2 yellow ashy; 3 red clay. Black squares mark soil samples taken for phosphate fractionation.





Billar to the Sonso people, but, luckily, this date is corroborated by evidence from trenches in other parts of the site.

Archaeological material was more abundant in the soil on the summit of the mound (Stratum 1c) in Trenches XII and XIV, and consisted of domestic rubbish (sherds, chipped stone, a spindle whorl and occasional flecks of charcoal). In Trench XII was a single post hole. Most of the diagnostic pottery was of Sonso type, though a number of fine red-slipped sherds may be of the Yotoco period. The looted tomb on top of the mound is similar in its form and dimensions to those recorded from Yotoco cemeteries but, in the absence of grave goods, this dating is speculative.

The most plausible interpretation is that Stratum 1c represents the original surface of the ridge, elsewhere removed when the Billar was levelled. The presence of a few probable Yotoco sherds suggests that a Yotoco settlement may once have existed on this part of the ridge, or close by. Later, the area was reoccupied or modified in Sonso times. If so, the fill quarried from the 'Tumulus' area would inevitably contain sherds of both periods. This kind of mixture (predominantly Sonso with a little Yotoco) is precisely what was found in the constructional fill on the lip of the Billar in Trench X (see below).

Excavations on the edge of the Billar (Trenches VII, X, XI).

Trench VII (Figs. 13 and 14) was excavated on the eastern lip of the Billar in a locality where a *media caña* probe had revealed a thick black soil (Stratum 3) buried underneath deep constructional fill. The trench also included a looted tomb. Below the humus (Stratum 1) was a spectacular series of yellow, brown and red fills (2a–c), and these in turn overlay the black organic deposit (Stratum 3). The surface of this black layer was smooth and level with, at the outer edge of the trench, an artificially-cut step. A channel-shaped depression ran transversely across the surface of this dark layer.

The nature of the dark stratum is still uncertain. The black, organic quality of the *media caña* core had led us to expect a palaeosol (an old land surface) overlying the natural

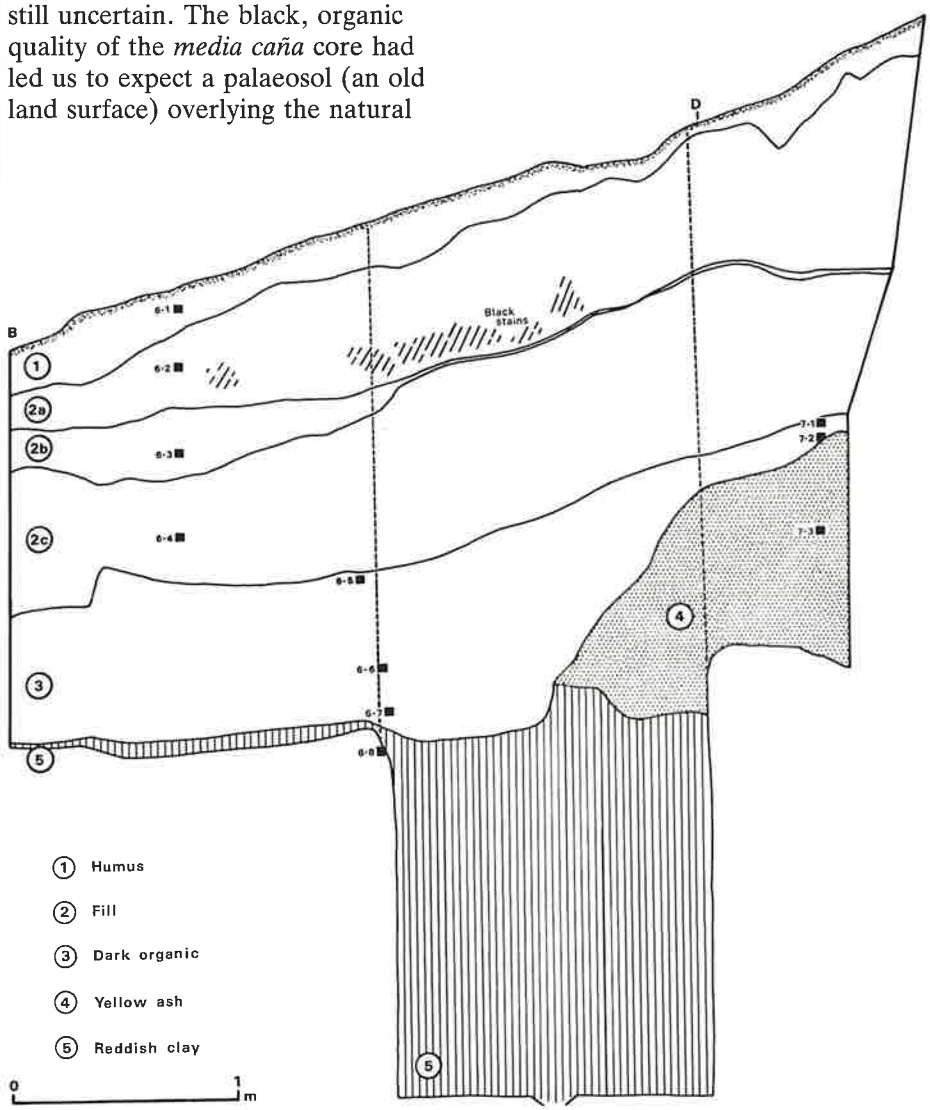


Fig. 13. Hacienda La Suiza; El Billar, Trench VII, south wall. The dotted vertical lines mark the shaft of a tomb which partially cut into the wall of the trench and was full of loose earth. To show the stratigraphy, the soil levels are drawn as they appeared in the wall of this tomb shaft. Black squares indicate soil samples for phosphate fractionation.

Fig. 14. The excavation of Trench VII on the lip of the Billar, at the Hacienda La Suiza. The scale measures 1 m. The photograph shows the surface of the black organic deposit (Stratum 3) cut by the shaft of a Sonso tomb.

clay and ash deposits (Strata 5 and 4) and buried beneath the later fill corresponding with the construction of the Billar. As excavation proceeded, this view became less convincing. Instead, as the profile drawing shows (Fig. 13), it appears that the black stratum represents some kind of man-made construction. In the outer half of the trench, the yellow ash and part of the red clay have been cut away, and the resultant step-shaped hollow filled with a black soil, either in a single operation or by a more gradual process of accumulation. Sonso and Yotoco sherds were found at all levels throughout this dark stratum.

The top of the black stratum is an old occupation surface, though it is unclear whether the occupation was of long or short duration. Charcoal from the upper 10 cms. of the black layer gave a radiocarbon date of a. d. 1190 ± 60 (Beta-4907), which falls within the earlier part of the Sonso period.

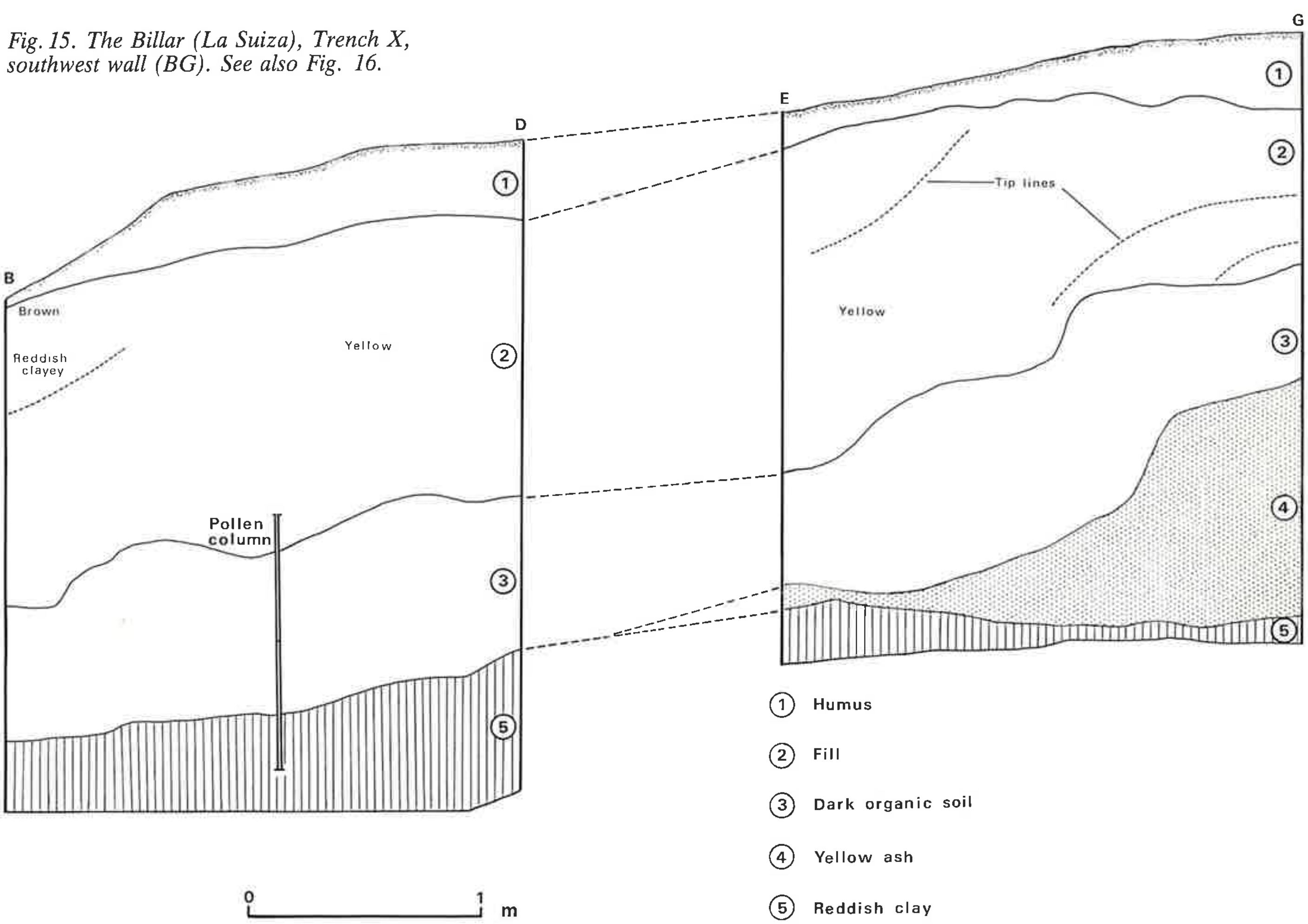
When occupation ceased, the black soil was covered by several layers of fill. The final stage of the story is marked by the construction of the tomb. Evidence of disturbance in the upper part of the shaft fill indicated that this tomb had already been emptied, but, in spite of the damage, it was clear that the shaft cuts through (and is therefore later than) all the layers of constructional fill. Excavation of the tomb was abandoned at 4 m. below the present ground surface, when the work became dangerous, though probing demonstrated that the shaft continued for another 4 m. or more.

Trench X, like Trench VII, was sited on the lip of the Billar and was designed to examine the fill and the black soil beneath it (Figs. 15 and 16).

Stratum 1 is a post-constructional soil disturbed by ploughing, which has also damaged the top few cms. of the underlying fill.

Stratum 2 is clearly a constructional fill, of mixed composition, and with recognizable tip lines. The bulk of the fill is a yellowish mixture of volcanic ash with clods of topsoil and patches of redder and more clayey material. These three components correspond with the three successive natural strata of the region: the red clay (5), yellow ash (4) and dark topsoil (1). Presumably, therefore, the fill consists principally of material derived from the levelling of the

Fig. 15. The Billar (La Suiza), Trench X, southwest wall (BG). See also Fig. 16.



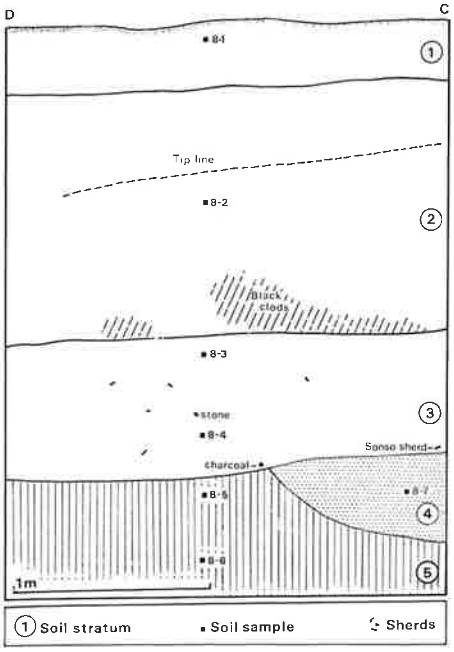


Fig. 16. The Billar (La Suiza), Trench X, east wall of lower cut (DC). Black squares are soil samples for phosphate fractionation. For soil conventions see Fig. 15.

central area of the Billar platform. This fill contains archaeological items (charcoal, chipped stone, Yotoco ànd Sonso sherds), indicating that rubbish from one or more habitation sites was incorporated into the building material.

Stratum 3 is a dark organic soil, lying directly on the yellow volcanic ash (4). It is fairly homogeneous in appearance, but contains occasional yellower patches and some darker clods. We are still uncertain – as were our visiting soil experts – whether this stratum is a dark fill or a true palaeosol, representing the ancient land surface at the time when the Billar was constructed. The general, if tentative, opinion favours the palaeosol interpretation, but detailed soil and pollen analyses are still awaited. This stratum also contained charcoal fragments, a little chipped stonework, sherds of the Sonso and Yotoco periods (Fig. 17), and even a probable Ilama fragment. For dating purposes, the most significant item is an incised Sonso rim fragment from the base of the black soil (Fig. 17,2), though it is possible that the whole stratum is thoroughly mixed as a consequence of either ancient cultivation or redeposition of material within constructional fill.

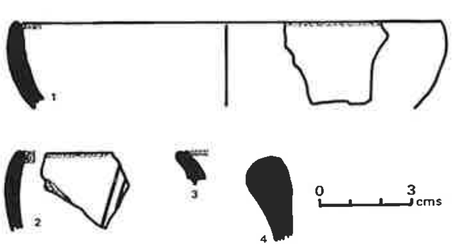


Fig. 17. Pottery from the black soil (Stratum 3) in Trench X at the Billar. For stratigraphy see Figs. 15 and 16. Sherds 1–3 are of the Sonso period; no. 4 is a probable Yotoco sherd. Stipped areas have red paint.

Strata 4 (yellow ash) and 5 (red clay) are the natural geological deposits found below the topsoil all over the region. As elsewhere, archaeological material is completely absent from these.

In summary, the presence of Sonso sherds in both the black soil and the fill corroborates the evidence from Trench VII and places the construction of the Billar within the Sonso period. The Yotoco sherds in these strata may derive from an earlier settlement on the Billar ridge, or else from fill scraped up from the nearby settlement area to the east, where Yotoco sherds are not uncommon in surface collections.

Trench XI was placed close to Trench X, but was excavated only to the surface of the constructional fill, where plough marks were clearly visible. A few Yotoco sherds found in this stratum presumably came from the fill where this was disturbed by the plough. Sonso sherds were also present.

Excavation in the central area of the Billar

Ten trenches were opened on the flat central area of the platform (Fig. 9) and, to a large extent, confirmed the results of Eidt's phosphate survey, which had indicated very low levels for most of the area, with figures well below what would normally be expected from settlement sites. In the trenches where the original top soil had been removed during the construction of the Billar (nos. I, XIII and possibly II), there was almost no cultural material.

The quantity of cultural debris increased markedly towards the southwestern tip of the Billar and also within Eidt's high phosphate area. (Trench III, the outermost point investigated, produced some 140 sherds, compared with only 1 sherd in Trench II). However, in the outer area the natural stratigraphy of the original hill is preserved, and it is clear that little or no scraping was necessary to make it conform to the new, flat surface of the platform. This raises the question of whether the cultural remains in this part of the site found their way there while the Billar was in use, or whether they could date from a

Fig. 18. Excavation of the small house platform (Trench XVI) on the flanks of the Billar. View from the outer edge of the platform towards the back wall.

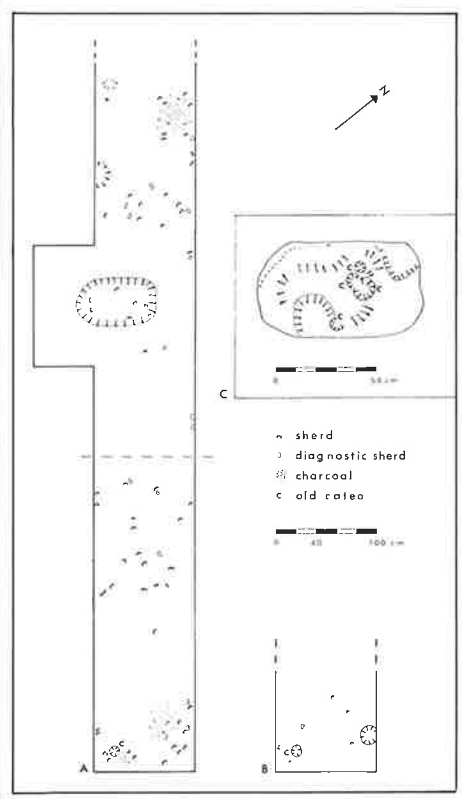


Fig. 19. Plan of the excavation at the Billar house platform (Trench XVI).

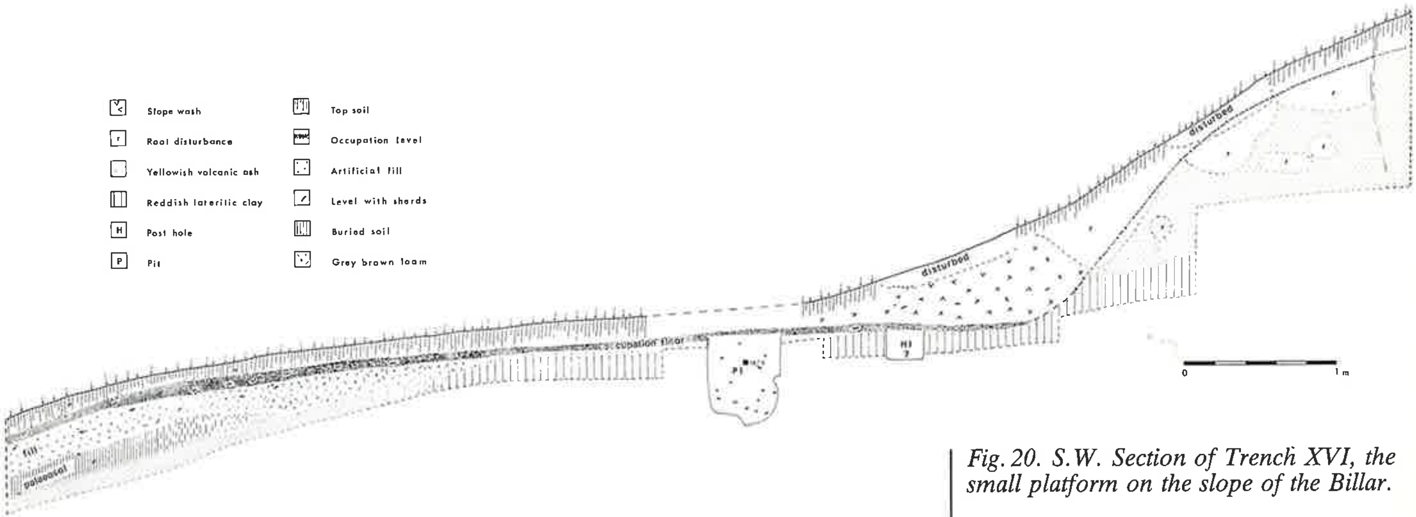


Fig. 20. S.W. Section of Trench XVI, the small platform on the slope of the Billar.

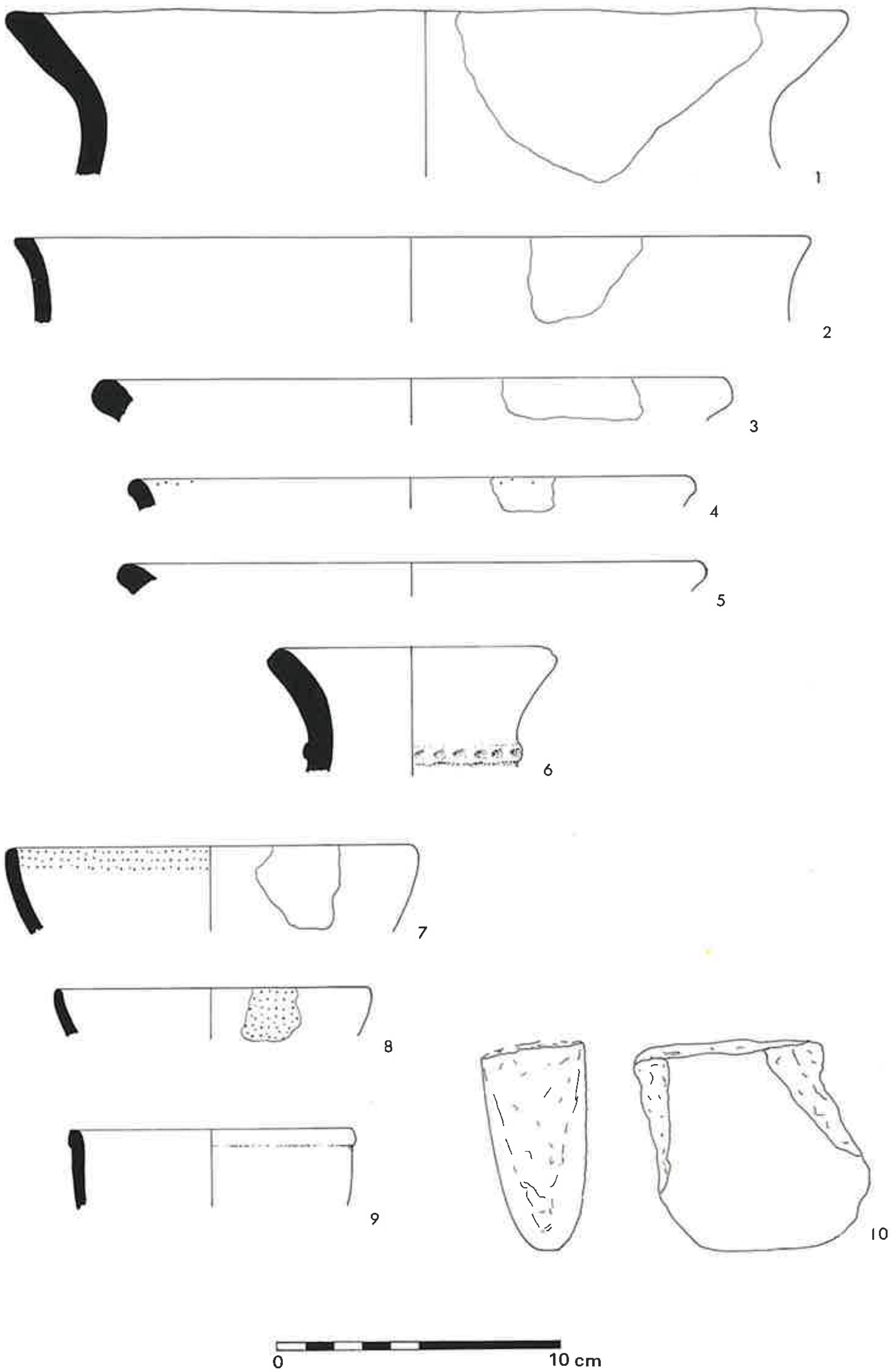


Fig. 21. Pottery and stone items from the small platform on the flanks of the Billar (Trench XVI). Stippling indicates red paint.

period before the construction. In this area sherds of both the Sonso and the preceding Yotoco periods are found in all the trenches, thoroughly mixed by the plough.

It is not clear at present whether the concentration of sherds in the areas with the higher phosphate levels reflect some different pattern of use for this part of the platform, or whether perhaps this density of sherds might be the result of a former occupation in a zone where the natural slope of the hill obviated much scraping when the platform was built. In all the trenches in this area (nos. IV, VIII and IX) the yellow ash which overlies the red clay has been preserved, suggesting that the original, pre-constructional, top soil may never have been removed. The presence of Yotoco as well as Sonso sherds (again mixed by the plough) also supports this hypothesis.

In Trench VIII was a large post hole measuring 25 cm. in diameter and 50 cm. deep. In spite of careful search in other trenches, the only other possible post hole was in Trench VI. This hole was smaller, measuring only 20 cm. across and extending no more than 8 cm. into the volcanic ash. As usual, the search for post holes was bedevilled by the innumerable holes made by treasure hunters who have prospected the area with their *media cañas*. These instruments leave a hole of much the same diameter (10 cm.) as the local bamboo which is much used today for house posts. The *guaqueros*

Fig. 22. View of the 'field lines' on the western slope of the Billar ridge, with the flat top of the Billar platform immediately in front of the trees. The black star marks the site of Trench XVII.

usually backfill their exploratory holes, and where ploughing has destroyed the upper part these can pose very convincingly as pôst holes.

b) Excavations on the 'house platform': Trench XVI

A number of artificial platforms are cut into the hillside in the immediate neighbourhood of the Billar, and one of these (Fig. 9, Trench XVI) was partially excavated in the hope of determining its age and function.

This platform is situated on the fairly steep, eastern slopes of the Billar, above a small, permanent stream. Our trench bisected the platform near its centre, starting at a point just above its rear edge on the natural slope of the hillside, crossing the platform floor and ending on the slope at its lower edge (Figs. 18–20). As with many structures of this kind, the front part of the platform was made up of a layer of fill – in this case a shallow one – dug out from the back of the structure and sealing the original ground surface beneath. A single (probable) post hole was found near the back wall (another in the buried soil dates to a period before the construction of the platform). An interesting feature was a large pit near the centre of the platform which may originally have been dug as a storage pit. The loose black earth and numerous small sherds found in it suggest that the pit was later filled with rubbish. Curiously enough, although one would expect relatively high levels of phosphate in a rubbish pit, in this case the figure was rather low (Eidt, this vol.) Sherds were found mainly in the layer of occupation debris on the artificial slope and at the back of the platform where this was protected by soil washed down from the slope above. There was very little in the central area of the platform, perhaps because this area was swept regularly. However, the absence of a clearly defined cultural layer suggests that this part of the site may have suffered from erosion. It is interesting to note that the phosphate levels recorded for this area of the site are not characteristic of habitation floors (Eidt, this vol.) Eidt further suggests that, since the second phosphate fraction is slightly higher than that from the Billar itself, the smaller 'house platform' may have a greater age.

Archaeologically, we were unable to resolve this problem. Since the pottery clearly dates to the Sonso period (Fig. 21), the ceramic evidence suggests that the platform could well have been in use at the same time as the Billar itself. It was not possible to check this stratigraphically, since the platform is too far below the edge of the Billar for either to have been affected by the construction of the other. There is no direct stratigraphical relationship between the two monuments, but a thin layer of mixed soil immediately above the platform is probably due to slope-wash after the Billar was constructed. Further light may be thrown on this problem once temporal changes within the Sonso pottery tradition are better documented.

If the platform was contemporary with the Billar, its function may have been related in some way to that of the larger structure. The fragments of broken pottery and the rubbish-filled pit suggest that the platform was a house site, but if it was merely considered an advantage to live near

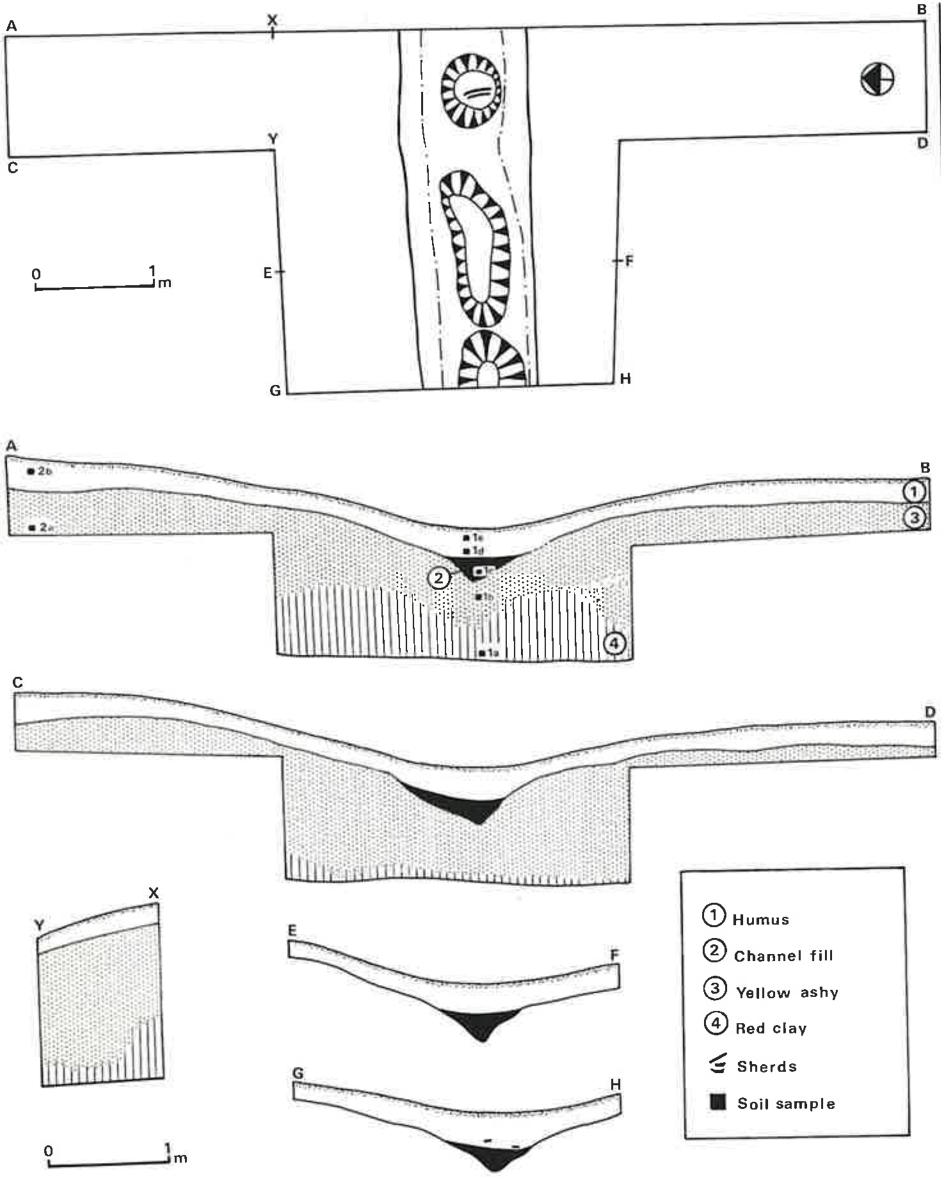
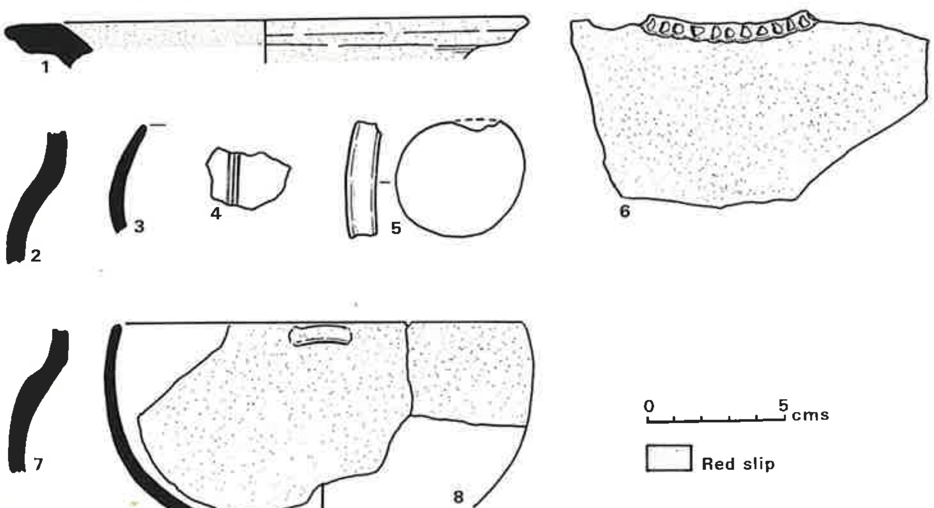


Fig. 23. Hacienda La Suiza; Plan (above) and sections of the excavation at the 'field line' on the slopes of the Billar (Trench XVII). Black squares indicate soil samples for phosphate fractionation.

Fig. 24. Pottery from the 'field line' on the slope of the Billar ridge (Trench XVII) excavated in 1982. Nos. 1–6 are from the topsoil (Stratum 1) and nos. 7–8 from the channel fill (Stratum 2).



the Billar one might expect fo find denser clusters of these constructions. When we know more about the usual pattern of Sonso period house platforms, it may be worthwhile to excavate this one completely to see if it differs significantly from the norm.

c) The 'field lines' on the slopes of the Billar ridge

Like many of the hill slopes in El Dorado, the Billar ridge has a number of 'field lines', or straight, linear channels running downslope at right angles to the contours. As part of our study of field systems, one of these ditches was excavated in 1982. It forms part of a complex of channels on the western slope of the ridge, approximately 120 m. south of the Billar platform (Fig. 7, Trench XVII; Fig. 22).

The channel is one of three, joined at their upper ends, just below the ridge top, by a horizontal cross-bank or step consisting of a negative lynchet. A similar lynchet defines the northern limit of the complex. Although never as common as isolated lines, groups of channels joined by a horizontal cross-bank are not infrequent in the Calima area, and one such (at Loma Larga) was illustrated as Fig. 23 in *Pro Calima* 2.

A plan and sections of the Billar ditch excavation are shown in Fig. 23. In Area ABCD the trench was excavated down to the red clay in order to study the natural stratification as well as the nature of the ditch. Elsewhere, in Area CDGH, our efforts were limited to clearing out the channel.

As the figure demonstrates, the ditch had been cut into the surface of the yellow ashy layer (Stratum 3) overlying an impermeable red clay (4). Before excavation, the ditch had the appearance of a straight and continuous, if rather irregular, channel. After clearance the ditch bottom proved to consist of a series of hollows or miniature basins of irregular size and shape. The same phenomenon can be seen today in roadside gullies where these have been exposed to the elements for a little while, and the irregular form of the Billar ditch is the result of similar processes of erosion.

The ditch fill (Stratum 2) is a dark-coloured clay loam which, in the bottom of the basins, tends to be more compact and more silty than in the upper part of the fill. There is no evidence for slow and gradual sedimentation within this deposit, and our soil specialists believe that the channel filled up very rapidly (information from Pedro Botero and Robert Eidt). The large size of the sherds in the fill suggests that the pottery was not exposed to damage on the ground surface for very long, which gives further support for this view. Immediately below the channel, some of the darker material has been carried down into the underlying yellow ash, which has a distinctly streaky appearance at this point. In wall AB, the surface of the red clay (Stratum 4) dips to conform with the outline of the ditch, but this configuration is not visible in wall CD, only one metre downslope.

Archaeological material was found throughout the fill of the channel, almost to its base (Fig. 24). The finds consisted of 37 sherds, 1 fragment of a mano or metate with use-polish, 1 chipped stone scraper, and 7 miscellaneous fragments of stone, including two probable pieces of debitage. Within the 3 m. length of ditch, several vessels were represented, some of them by 5 or 6 sherds, an indication that the pottery was broken more or less where it was found, and was not simply washed down from a habitation site somewhere on the ridge top above.

Two very large sherds (some 20 cms. across) from a red-slipped globular jar were found standing vertically in the fill of the channel in Area ABCD, within one of the basin-shaped depressions. Most of the other sherds were of ordinary domestic wares with buff, brown or red surfaces. The only reconstructable shapes in the excavated material were a necked jar (Fig. 24: 2, 6, 7) and a typical Sonso bowl with false handles below the rim (Fig. 24, 8). Both of these had red slip.

The channel fill is sealed by a layer of soil (Stratum 1). Within this stratum the archaeological material tends to concentrate in the depression that marks the line of the ditch (presumably a consequence of downslope erosion from the flanks of the channel), and is found only at the base of the stratum, just above the yellow ash. This level containing the sherds may perhaps represent the land surface of the Sonso period, buried by more recent, and sherd-free, soil accumulation.

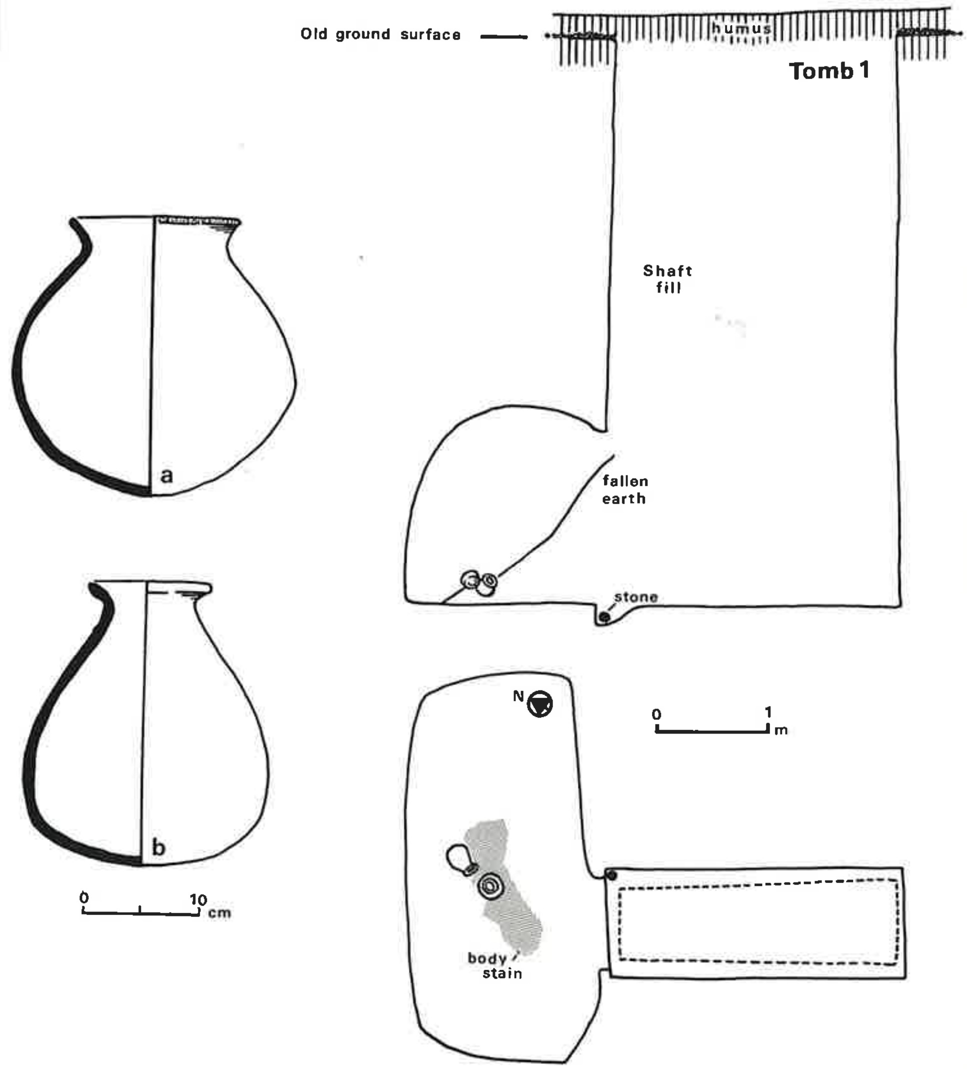


Fig. 25. Section, plan and contents of Tomb 1, Hacienda La Suiza.

The archaeological finds from Stratum 1 consisted of 70 sherds, 1 pottery disc made from a reworked sherd with its edges ground smooth (Fig. 24, 5), 1 fragment from a ground stone mano, and 7 miscellaneous chips of stone. All the diagnostic sherds were of Sonso type, and included fragments with incised lines and others with appliqué decoration (Fig. 24, 1–4, 6).

The presence of large (and sometimes joining) Sonso sherds in the primary fill of the channel suggests that the 'field lines' could well have been contemporary with the construction and main occupation of the Billar, but the function of the lines remains enigmatic.

In last year's report we suggested that these channels may have been for drainage, since many of them were recorded in areas of heavy clay soils (gleys) which become waterlogged during the wet season. However, this is by no means the general rule. At La Alsacia (*Pro Calima* 2, pp. 14–15) and at the Billar, the ditches are dug into an ashy deposit which forms a fairly thick stratum overlying the impermeable red clay. We do not yet know the extent of the drainage problem at the Billar, but the possible role of the ditches in draining the soil and in preventing slumps is discussed by Eidt and Botero in their contributions to this volume.

Without denying a drainage function, we must also consider the possibility that the 'field lines' are ancient property boundaries or ditches designed to separate one cultivation plot from another. Something similar can still be seen today in the region occupied by the Guambiano Indians near Silvia, in the Department of Cauca, where

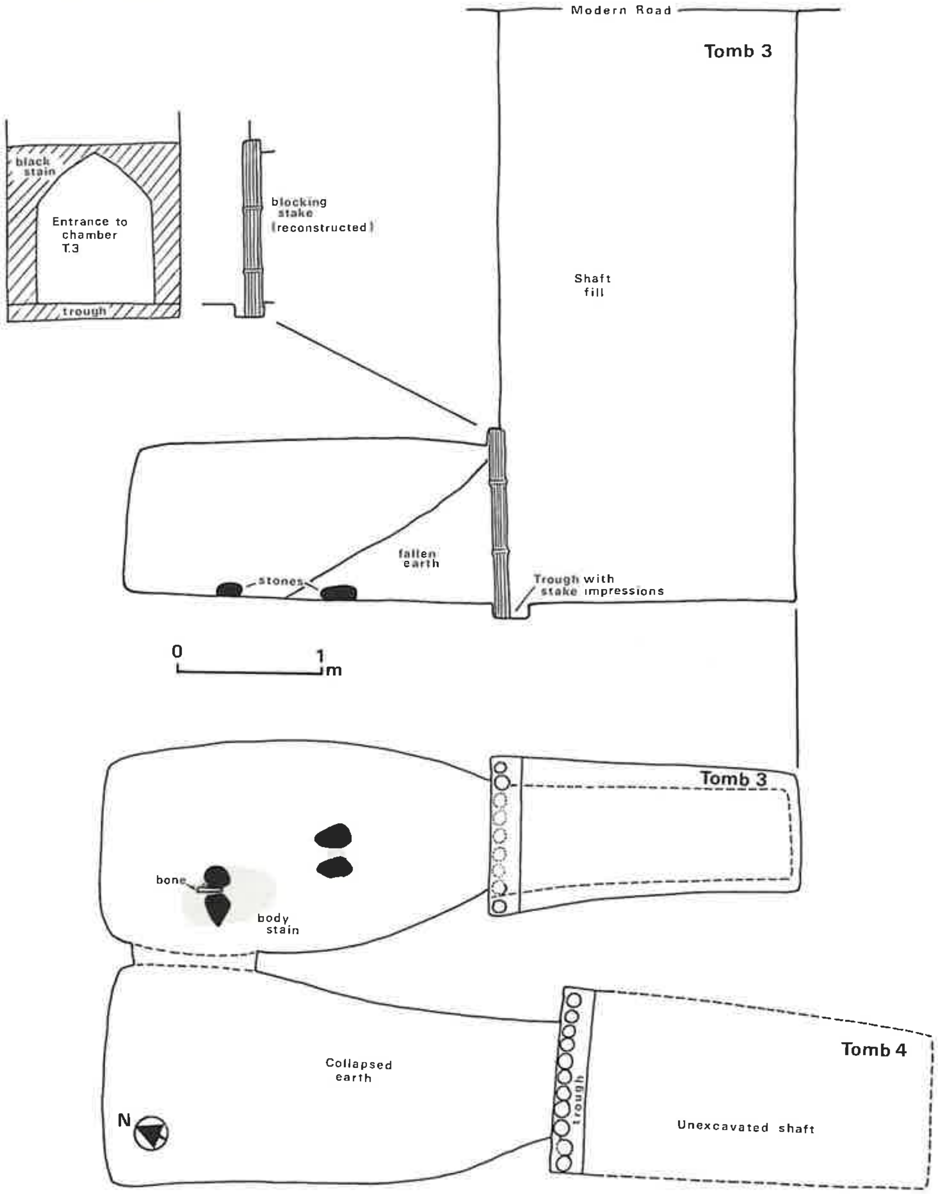


Fig. 26. Tombs 3 and 4 at the Hacienda La Suiza.

property lines run directly downslope and are marked by uncultivated strips, lines of trees or, in former times, by deep ditches (information from María Cristina Moreno and Linda Cheetham). Until recently the Guambianos also used mounded cultivation strips separated by drainage canals.

The Billar ditches, like those in Guambia, may have served several purposes simultaneously. One of the three Billar 'lines' has a marked bend and does not take the logical drainage route straight down the slope, nor can the cross-bank have had any drainage function. It is, in fact, a typical lynchet of the kind found at the upper margin of cultivated fields. Within the tilled area there is a tendency for the loose soil to move downslope, denuding the top edge of the field and producing a step-like bank where the cultivated surface has been lowered relative to the level of the surrounding area.

Our soil and phytolith samples may eventually resolve this problem. In the meantime, we can perhaps visualise the ridge as a zone of house platforms, cemeteries and cultivated plots, overlooked by the great platform of the Billar itself, which must surely have had some special role in the life of the community.

d) Tomb excavations at the Hacienda La Suiza

Five tombs (Fig. 7, T1–T5), were excavated in 1981, and an additional one (T6) was examined in 1982. These graves can be divided into two groups: a cemetery of the Sonso period (Tombs 1–4) on the northern edge of the road, and two tombs (T5, T6) of probable Yotoco age in a much looted cemetery close to one of the houses that served us as a base.

Tomb 1 (Fig. 25) was of the usual shaft-and-chamber type, 5.20 m. deep, and slightly narrower at the mouth of the shaft than at its base. The road had cut through the shaft of the tomb, and in the road bank a thin line of reddish-yellow subsoil material was visible in the middle of the humus layer, marking the position of the former ground surface at the time when the tomb was constructed. In digging out the tomb, its builders had dumped the excavated earth on the ground around the shaft; then, after the funeral ceremony, the hole was refilled, but not all the earth went back into the tomb. Some of it remained lying on the surface, or trodden into the turf, just as it does today around looted tombs or old archaeological trenches. Since the day when the tomb was sealed (some time between AD 1000 and 1600), 15–20 cms. of soil have accumulated on top of the old ground surface, giving a rate of build-up in the region of 1.5 to 5 cms. per century.

The walls and roof of the funerary chamber were even and regular, though tool marks had not been smoothed away. At the threshold of the chamber was a shallow trough, or trench, designed to hold a row of blocking stakes of the kind employed in Tombs 3 and 4. A round cobble had been placed at one end of this trench.

The interior of the burial chamber was partially filled with loose earth, which had fallen in when the blocking stakes decayed and collapsed, allowing the shaft fill to slump into the chamber. Resting in this earth, some 10 cms. above the floor, were two Sonso jars, one of them (Fig. 25, a) with a band of red slip on the rim. These vessels were everyday cooking pots, of the kind found in household rubbish of the period, and they presumably held offerings of food or drink when they were put into the tomb. The outside of vessel *a* is crusted with soot from the cooking fire, and traces of the contents remain in the form of a

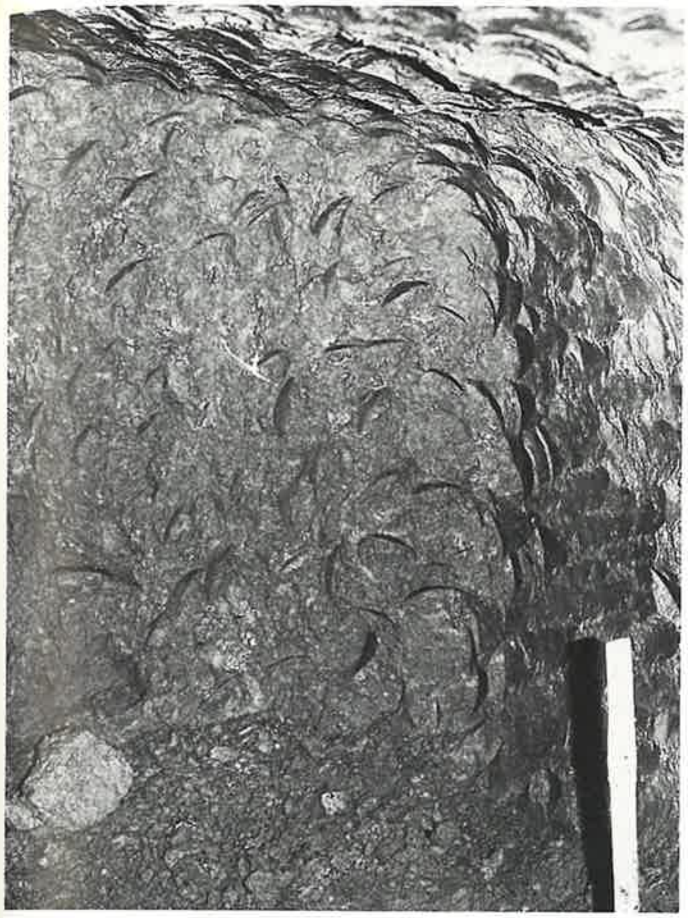


Fig. 27. La Suiza Tomb 4. Tool marks on the walls and ceiling of the burial chamber.

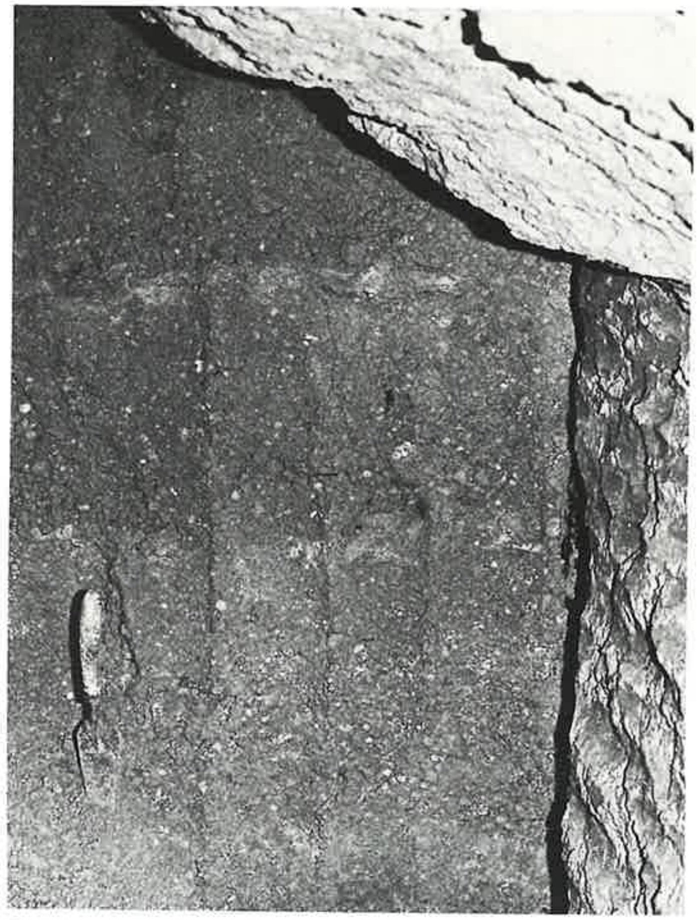


Fig. 28. Interior of the burial chamber of Tomb 4 at La Suiza, looking towards the shaft. Although the blocking stakes have decayed, the compacted fill of the shaft has remained in place and still preserves their imprints in the form of vertical grooves.

black, organic residue. Because of the high soil acidity, the body had completely disappeared except for a patch of dark organic staining, only 1 cm. thick, in the centre of the floor.

Tomb 2. This was a simple shaft of rectangular section, with no funerary chamber and no signs of a body. The only contents were a few sherds of probable Sonso type.

Tomb 3 (Fig. 26). This tomb was of the customary shaft-and-chamber kind. The entrance to the chamber was in the form of a pointed arch, and the details of the blocking technique could be reconstructed. A shallow trench marked the entrance to the burial chamber, and a corresponding step had been cut in the roof above to take the upper ends of the blocking poles. In the fill of the trench, at the ends, where the walls gave some protection against pressure from the earth in the shaft, the imprints of four round stakes were still recognizable. Assuming that the missing stakes were of comparable diameter, there would originally have been 9 or 10 in all, completely sealing off the entrance to the burial vault. The rectangular area surrounding the entrance to the chamber was stained black from decayed wood, a sample of which (in the form of uncarbonized and very fibrous material) was collected from the fill at the threshold of the funerary chamber. The size of the post sockets, together with the stringiness of the wood, suggest that the blocking stakes were made of lengths of bamboo.

The chamber contained no grave goods, but four large stones had been arranged in pairs on the floor. All that remained of the corpse were two fragments of long bone (as soft as butter) and, in the region of the stones, a thin layer of black organic staining. Since this staining did not continue underneath the stones, we can assume that the body, with or without a coffin, had been laid on top of the boulders and raised a few cms. above the floor of the tomb.

In the northwest corner of the funerary chamber, the side wall had collapsed at some time in the past, giving direct access to the chamber of Tomb 4.

Tomb 4 (Fig. 26). These unusual circumstances allowed us to crawl from Tomb 3 into the chamber of Tomb 4 without first excavating the shaft. The burial chamber was half full of loose earth from the collapse of the wall, but in other respects was in pristine condition. Tool marks covered the ceiling and walls (Fig. 27), and – remarkably – the shaft fill had not collapsed into the chamber. Although the blocking stakes had decayed and disappeared, the consolidated fill of the shaft preserved their imprints in the form of closely set, vertical grooves. (Fig. 28).

Because of the fragility of the wall between Tombs 3 and 4, and the risk of further collapse, no attempt was made to remove the debris from the floor of the tomb or to disturb the shaft fill. The form and dimensions of the shaft were determined by probing at the surface, and were not checked by excavation.

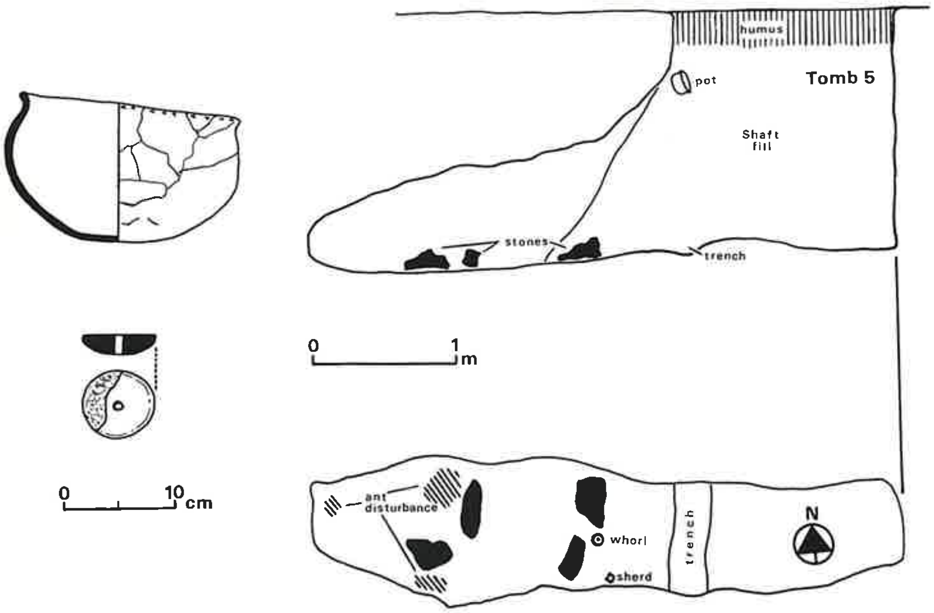
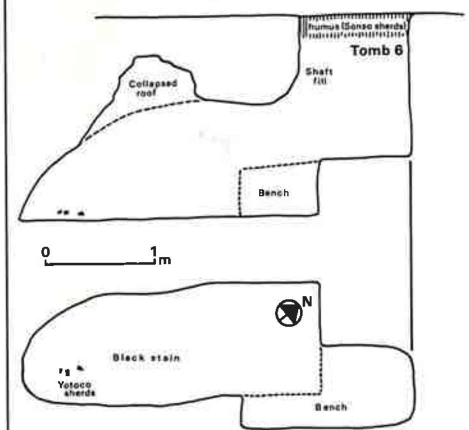


Fig. 29. Hacienda La Suiza, Tomb 5.

Fig. 30. Hacienda La Suiza, Tomb 6. Plan and section of the tomb.



Tomb 5 (Fig. 29). This tomb is some 20 m. east of our base, in an area where Yotoco sherds predominate in the topsoil. The excavation was carried out by the student contingent.

Unlike the deep tombs of the Sonso period, this one was shallow, with a long and rather irregular burial chamber. From the humus in the area of the shaft came 18 sherds and 2 pieces of stone. Lower down, the fill of the shaft yielded another 47 pottery fragments, of which 10 were clearly of Yotoco type. High up in the shaft, and resting on its side, was a broken but complete bowl with a row of impressions on the rim.

Traces of a threshold trench were visible at the entrance of the chamber, and 4 stones were arranged on the floor of the vault. The sole offering was a spindle whorl made of baked clay.

Tomb 6 (Fig. 30) is in the same general area as Tomb 5, though on the opposite side of the house, and was excavated in 1982. In the 20 cms. of humus sealing the mouth of the shaft were sherds of Sonso appearance, though this soil is probably more recent than the construction of the tomb. At the bottom of the shaft and extending into the southeast corner of the burial chamber, a bench of clay had been left. The chamber itself was full of earth, some of which was the result of a roof fall. The floor of the tomb had the usual black stain from a decomposed body, and the few sherds included a typical Yotoco fragment. This sherd, and the form of the tomb (with its shallow entrance shaft and elongated funerary chamber), indicate a probable Yotoco age.

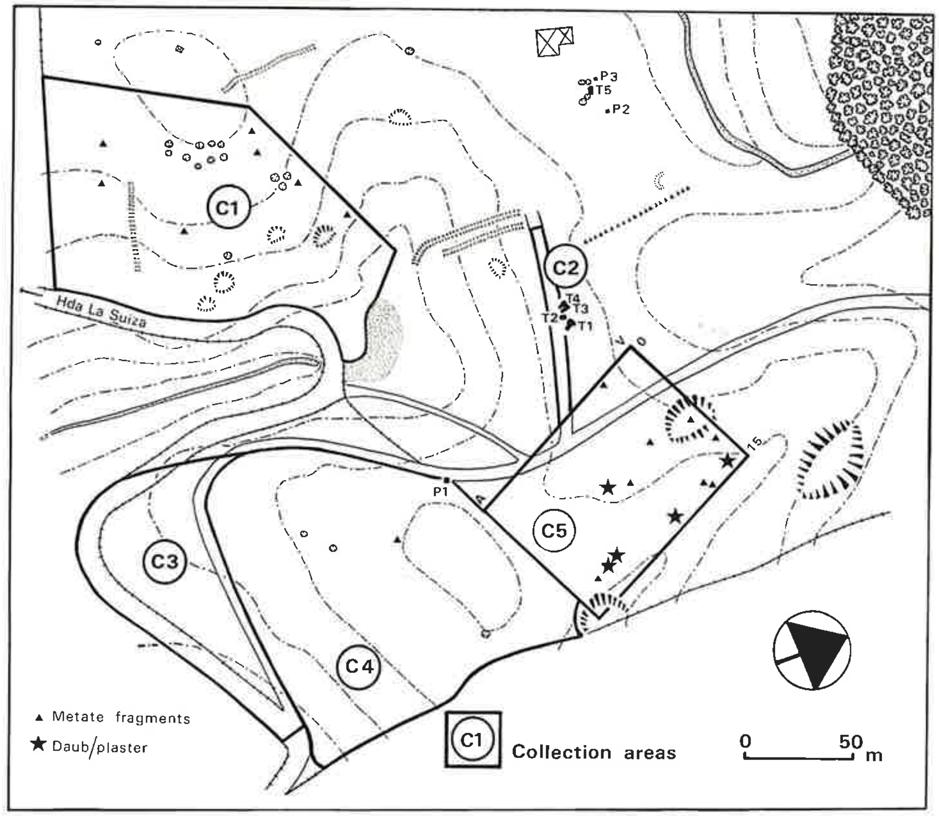
e) Surface Collections in the Settlement Area

The area to the east of the Billar, and separated from it by a small valley with a stream in the bottom, consists of a broad, gently sloping, and rather flat-topped ridge (Fig. 31 and 32). In a region like El Dorado, where expanses of level ground are rare (and the bottom of the main valley is too swampy for habitation), this locality has obvious attractions. In 1981, much of the area had been cleared for cultivation, and signs of ancient settlement were abundant in all the ploughed fields.

The full extent of the site is unknown. To the west it extends beyond the house, where the terrain slopes down to the stream. In this area, where surface remains are concealed by turf, two test pits (P2, P3) produced mainly Yotoco sherds, although Sonso fragments were also present. To the north, the right hand edge of the map (Fig. 32) approximately coincides with the limits of the dense sherd scatter, though isolated patches of material (representing single houses) continue well beyond the main village area. The southern edge of the survey area is delimited, quite arbitrarily, by a fence and a road, but the settlement area undoubtedly extends beyond

Fig. 31. Hacienda La Suiza; the settlement area to the south east of the Billar ridge (see Figs. 7 and 32). The gently sloping area in the foreground, bisected by the road, is

Fig. 32. Hacienda La Suiza: the settlement zone south east of the Billar (see Fig. 7), showing the principal areas (C1–C5) where surface collections were made.



these. The eastern border of the survey area is marked by a fence, beyond which the ground slopes down to the next valley and is grass covered, with no sherds visible on the surface.

At a conservative estimate, the sherd scatter covers at least 8 hectares, not counting unsurveyed zones or outlying houses separated from the main group. This makes it the largest settlement area so far discovered in the Valley of El Dorado, and one of the largest from the Calima zone in general.

The stratigraphy was revealed, without the need for excavation, in the banks of the roads that cut through the site: a single cultural stratum resting directly on top of the natural yellow ash. At one locality (P1 in Fig. 32) a carbonized branch was exposed in the road bank, and a test pit was opened here by Dr. Ernst Müller. Fig. 33 shows this exposure before excavation, with the charcoal almost at the base of the darker, sherd-bearing, stratum just above the level at which this grades into the lighter ash below. The identifiable sherds from Müller's test pit were of Sonso type, and the charcoal gave a radiocarbon date of a.d. 1280 ± 80 (Beta-3509).

Collection Areas

The stratigraphy observed in Pit 1 is repeated in road banks throughout the settlement area, and no further excavation was carried out. Instead, our efforts were concentrated on surface collections from areas where cultivation and road-building made this a feasible proposition. Five Collection Areas were defined, and are indicated in Fig. 32 (C1–C5).
Collection Area C1. This was a freshly ploughed field on the flank of

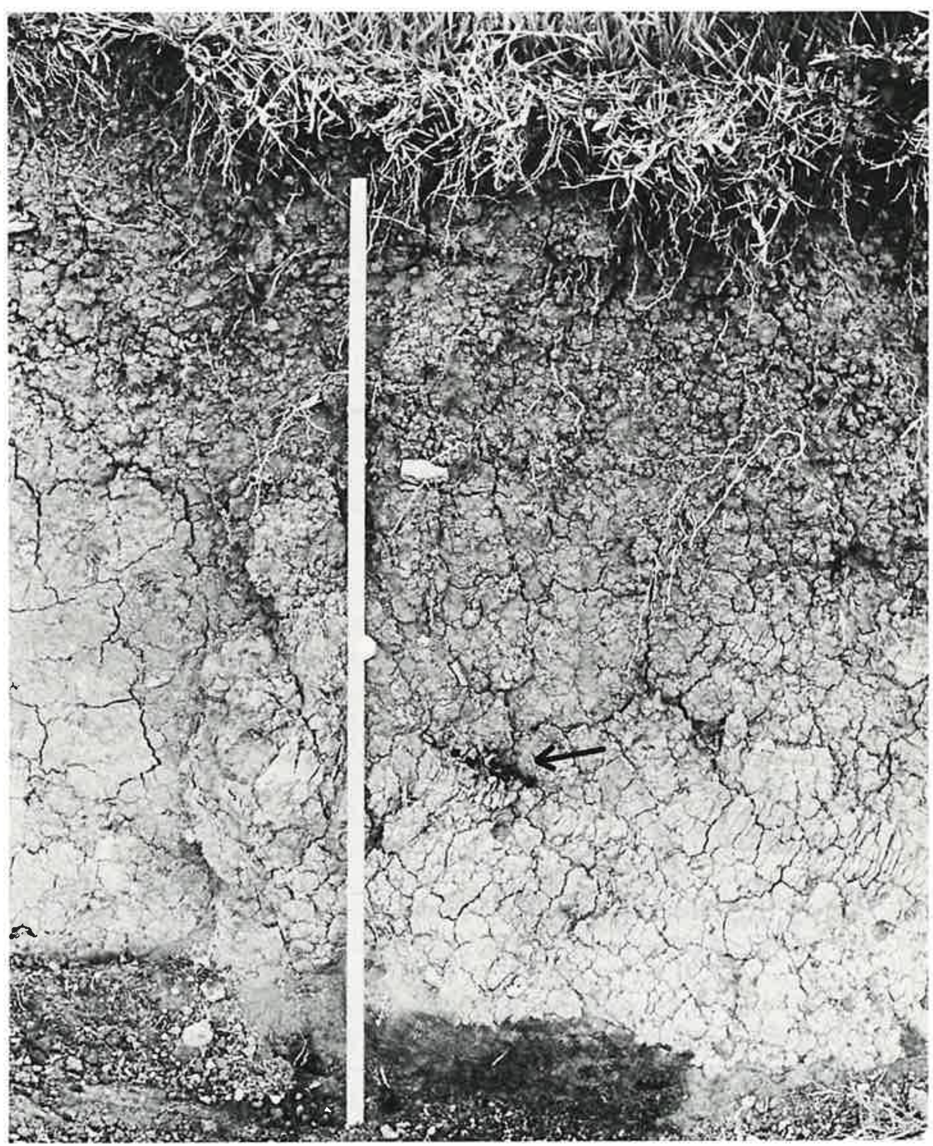


Fig. 33. Carbonized wood exposed in the road bank at the site of the ancient settlement at La Suiza. This area was later excavated (marked P1 in Figs. 7 and 32). The charcoal gave a radiocarbon date of ad 1280 ± 80 years, which falls within the Sonso period. The charcoal lies near the base of the cultural deposit, which overlies a lighter stratum of yellow volcanic ash. The Scale represents 1 m.

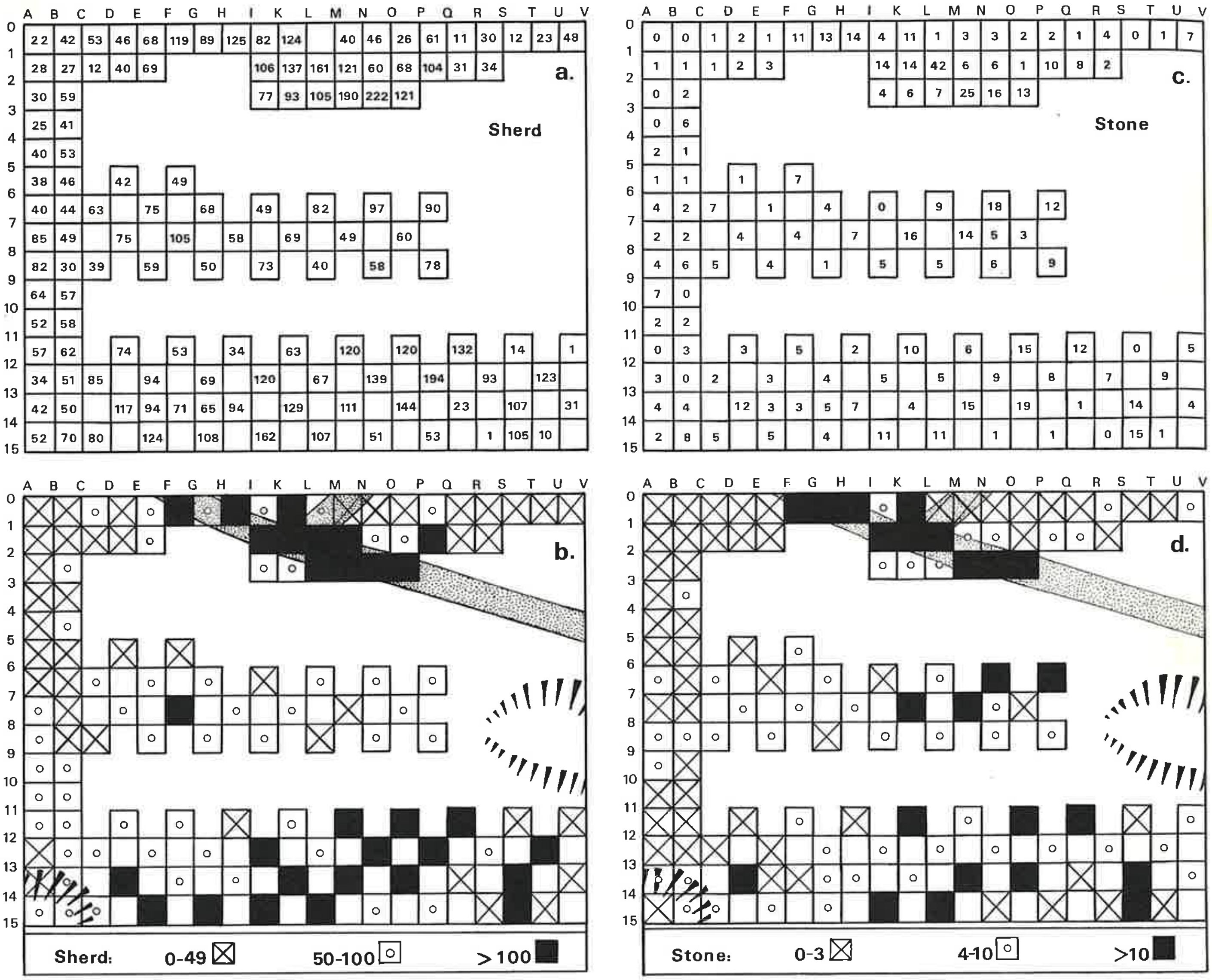


Fig. 34. Surface distribution of sherds and stone fragments in the survey grid of Collection Area C5 (Fig. 32) at the Hacienda La Suiza. Each small square is 5 × 5 m. In diagrams (b) and (d) the stippled area represents the road, and the hachured zones are house platforms.

a valley with a stream fed by a spring on the edge of a small marsh. The ploughed area, which slopes fairly steeply from west to east, included 1 'field line' (see Section 3c), 4 house platforms and several looted tombs.

Forming up in line abreast, the survey team swept this field twice, picking up every rim sherd or decorated fragment and all chipped or ground stone. Metate fragments, some of them large and heavy, were mapped before removal. No attempt was made to plot the distribution of sherds, but pottery was abundant all over the fenced area, with no particular concentration on the house platforms.

The bulk of the pottery belonged to the Sonso period, with a few Yotoco sherds. From this area came a single Ilama (Early Calima) sherd, the only one picked up in the entire season's work.

Collection Area C2. This consisted of a dirt road, recently bulldozed, with a vertical bank on its north side and a pile of loose earth along the southern edge. Diagnostic sherds were collected but, because of disturbance, the material was not mapped. Sherds (predominantly Sonso) continued in the fields on both sides of the road. The excavation of the Sonso cemetery in Area C2 has already been described (Section 3d).

Collection Area C3. This sector was a mixture of exposed road surface, young coffee plantation, and open weedy zones. It was 'swept' in the same way as C1. Although no house platforms were visible, sherds were fairly abundant and belonged to both Sonso and Yotoco periods, with an unusually high percentage of Yotoco fine paste wares.

Collection Area C4. This is a gently sloping hill, with open weedy zones and young coffee bushes. Given the gentle topography, there would have been no need to construct house platforms, and the quantitiy of archaelogical material suggests that the whole field was once covered with houses. It had been intended to make a systematic surface collection from the area, but time did not allow this. The collection from C4 is therefore a 'grab sample' of diagnostic sherds and stonework, with no claims to be either random or complete. No attempt was made to map the distribution of artifacts. The one stone item marked on the map is a large and unbroken boulder metate, so heavy that it has probably not been moved far from its original

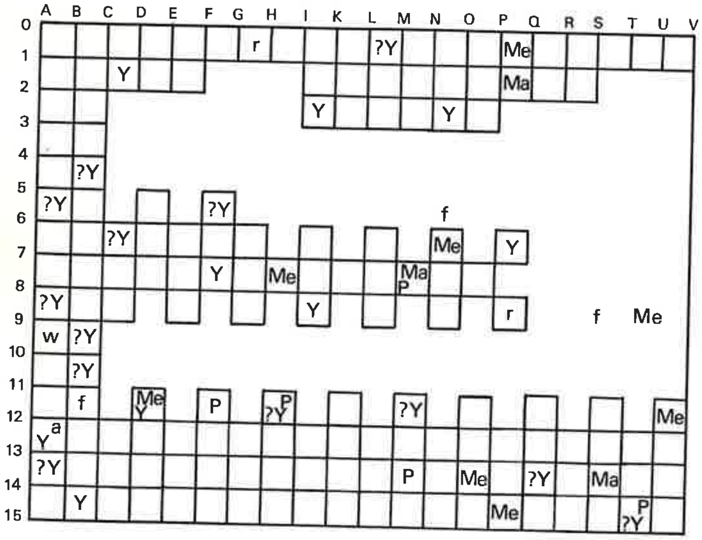


Fig. 35. Distribution of selected categories of artifact in Collection Area C5 at the Hacienda La Suiza (for locality of C5, see Fig. 32).
Me = metate
Ma = mano
a = axe
f = figurine
w = spindle whorl
r = roller stamp
P = constructional plaster
Y = Yotoco sherd
?Y = probable Yotoco sherd

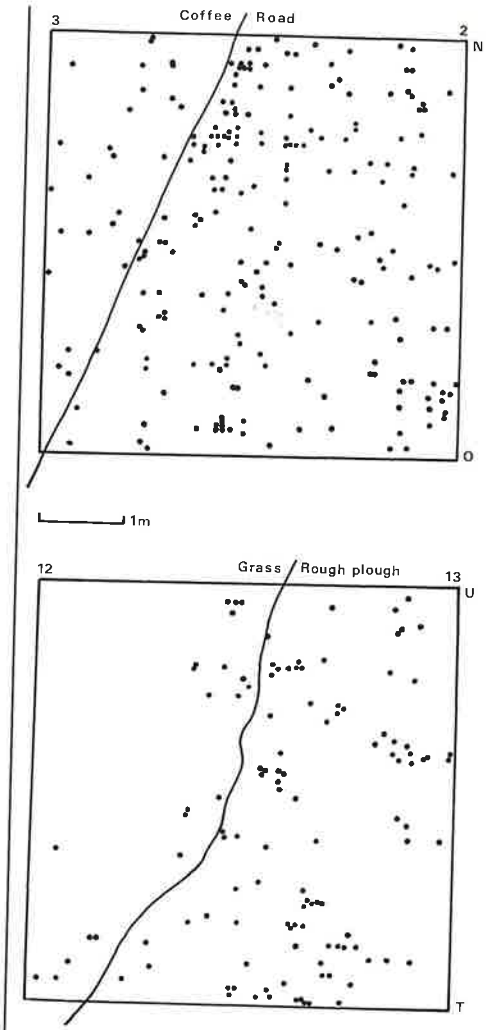


Fig. 36. Two sample squares from the surface survey grid in Collection Area 5 at the Hacienda La Suiza (Fig. 32). Each dot represents a sherd. Almost nothing is visible on the surface in areas under grass; rather more can be seen in ploughed areas, and more still in the road, where the surface has been entirely bulldozed away.

location. Other metate fragments were observed but not plotted.

Collection Area C5. This area had just been cleared for coffee. Part of it was already planted with young bushes; the rest had a light growth of weed, except at the northwestern edge of the rectangle where the house platform and adjacent zone were still turf-covered. Archaelogical material was scattered in reasonable quantities all over this gently sloping terrain, and sherds were not confined to the environs of the platform.

In Area C5 we decided to try an experiment in controlled surface-collecting. The aims were (1) to get a total sample of artifacts from a large, but limited area; (2) to look for 'activity areas' with concentrations of special-purpose materials; (3) to see what kinds of surface material are found in areas without house platforms; and (4) to study the effects of vegetation cover, land use and topography on archaelogical visibility, as represented by the density of surface material.

A rectangle 100×75 m. was marked out and subdivided into a grid of 5×5 m. squares. Each square was defined and labelled by its coordinates, in letters along one axis of the grid, and numbers along the other. This gave 300 squares in all. The contents of each individual square were mapped by a team of two persons, using different symbols for sherds and stone, and simultaneously making thumbnail sketches of the more important finds. All material was kept for analysis. Mapping these squares was the least popular job of the season, since it took on average 40 minutes of crawling, crouching and grubbing among roots to complete a single square. It was this time factor that eventually caused problems. The intention had been to map every square, but this work began to interfere with other jobs of higher priority, and the original plan had to be modified. In the event 126 squares were mapped (Figs. 34–36).

The experiment must be regarded as only half completed, but, even so, the results were instructive. In Figs. 34 and 35 are given the counts for sherds, stone fragments and selected artifacts. The Stone chart includes worked and unworked material, after discarding the small pebbles that are a natural constituent of the local soil.

Comparison of the various charts shows that, in general, the sherds and stones have similar distributions. The areas with the highest sherd counts have the greatest concentration of stone, and there is also a good correspondence between the areas with low figures. The one exception to this pattern is in the central part of the survey area, where the relatively high figures for stone are not matched by the pottery count. The discrepancy is not easy to explain, and may be due to chance. Figures of 12–18 fragments of stone per 5 m. square hardly suggest a specialized workshop area.

The distribution pattern allows us to draw some conclusion about archaeological visibility within the collection grid. It soon became clear that the present distribution of artifacts is the result of several factors. The low figures at the left of the chart (columns A,B) seem to reflect a genuinely reduced level of activity in this area during the Sonso period, since vegetation cover is light and the sherds are easily visible. In this case we may be dealing with a purely cultural phenomenon. Elsewhere (as might be expected) one of the main determinants of visibility is the degree of surface disturbance. This accounts for the high readings in the vicinity of the bulldozed road, an area of otherwise rather low density. The road, with the earth piled at its sides, had the most sherd and stone; the coffee plantation gave figures in the middle ranges; grass-covered zones showed almost nothing on the surface. Two sample squares (Fig. 36) make this quite evident. This factor explains the

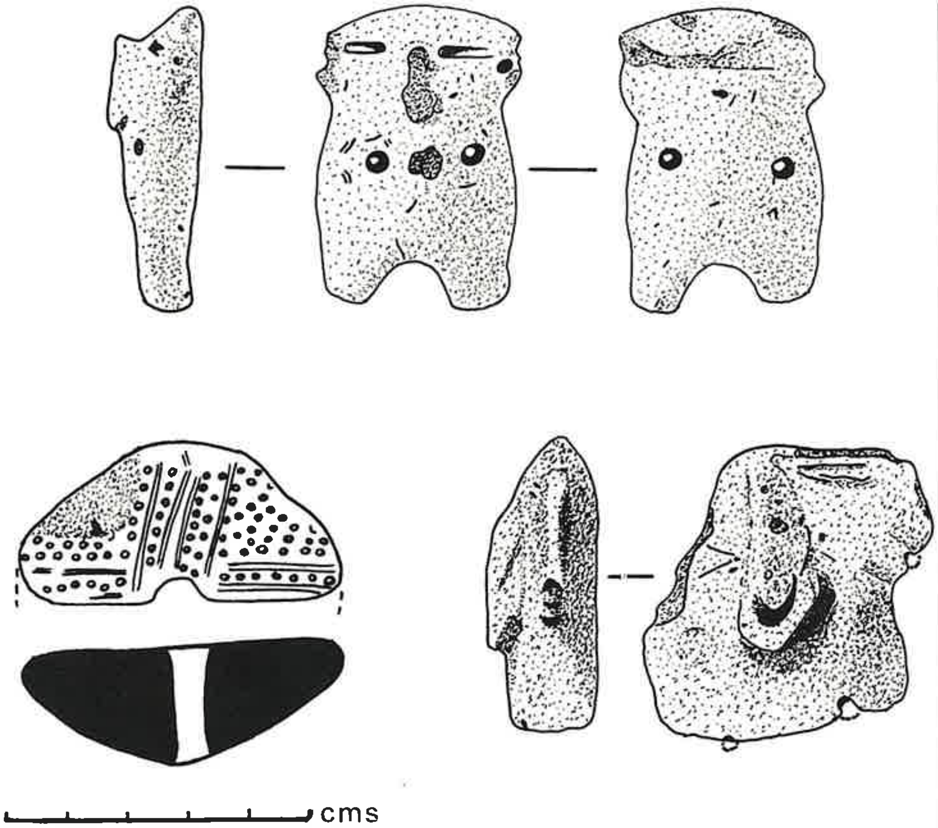


Fig. 37. *Two Sonso figurines and a clay spindle whorl found on the surface in Collection Area C5 at the Hacienda La Suiza.*

few house platforms and the density of archaeological debris is no greater on the platforms than in the areas between them. The distribution of surface finds suggests that houses were grouped close together, and that (if most of the site was occupied at the same time) we may be dealing with nucleated villages.

There is no way of knowing how many of these sites once existed in Calima. Our guess is that many more of them remain to be discovered. If so, the settlement pattern and socio-political organisation of the Calima zone cannot be reconstructed simply by mapping and counting house platforms. For the same reasons, population figures based solely on platform counts will be far too low. Our impression, after three years of work, is that by the Sonso period (and probably also during the Yotoco phase) *all* of the landscape was used in one way or another, either for agriculture or for settlement, and that there are no blank spaces on the archaeological map.

the northern (bottom right) corner of the grid, in squares N-V/11–15. Squares with low readings were wholly or largely grass-covered, and it is the ploughed squares, with their much higher figures, that give the 'true' density.

Allowing for this, there is a distinct tendency for material to cluster on the lower slopes of the survey area (rows 11–15) and in the bottom of the little valley that marks the northeast boundary of the grid. As a natural trap for rainwater and runoff it is unlikely that the valley bottom was ever occupied by dwellings, though there are house platforms on both flanks. The concentration of material on the lower slopes is probably due to a combination of factors: natural (downslope movement) and human (the tossing out of rubbish from house sites higher up the hill).

Besides providing a wide range of finds (Fig. 37) the exercise also proved the virtue of large samples for revealing early occupations masked by a dense scatter of later material. Yotoco sherds, or probable Yotoco sherds, came from 22 out of 126 squares, more than would have been anticipated from casual inspection. Since Yotoco fine paste vessels are fragile and break into small, inconspicuous fragments, often no larger than a thumb nail, these tend to be overlooked in rapid surveys, and are under-represented in most surface collections. Somewhat to our surprise, we discovered that 32% of all sherds from the grid squares were smaller than 1 cm^2.

Conclusions. Combining data from all five collection areas, certain general conclusions emerge.

Scattered house platforms are not the only kind of settlement in Calima. Large, nucleated villages probably are present, but are unlikely to be recognized in pasture land. In 1982, the settlement area at La Suiza was well on its way back to invisibility, as weeds and grass took over the abandoned fields. In a year or two, the site will be lost again.

La Suiza is not unique. Similar large sites have turned up elsewhere in areas of gentle topography: in the region of La Aurora (v. *Pro Calima* 2) and at La Morena in the Calima valley upstream from Darién. Both these sites were revealed by agricultural clearance.

Because of their situation on fairly level ground, these large sites have

4. Excavations in the valley bottom at the Hacienda El Dorado

Although the main emphasis of the 1981 season was on the excavation of the Billar, a small amount of exploration and test trenching was carried out on the valley floor, with its raised fields and drainage systems of various ages. This work was designed simply as a feasibility study, to see what kind of preservation could be expected in waterlogged conditions, and to assess the possibilities for investigation on a larger scale in 1982.

The sites described below are within the Hacienda El Dorado, and we are grateful to Sr. Nader Calero and family for permission to excavate and for their constant support.

Although traces of fields and drains show clearly on air photos (see *Pro Calima* 2, p. 21), it is far from easy to distinguish these features on the ground. The valley bottom is pasture land, planted with tussocky Pará grass and grazed by cattle. The very slight undulations of the raised fields become almost

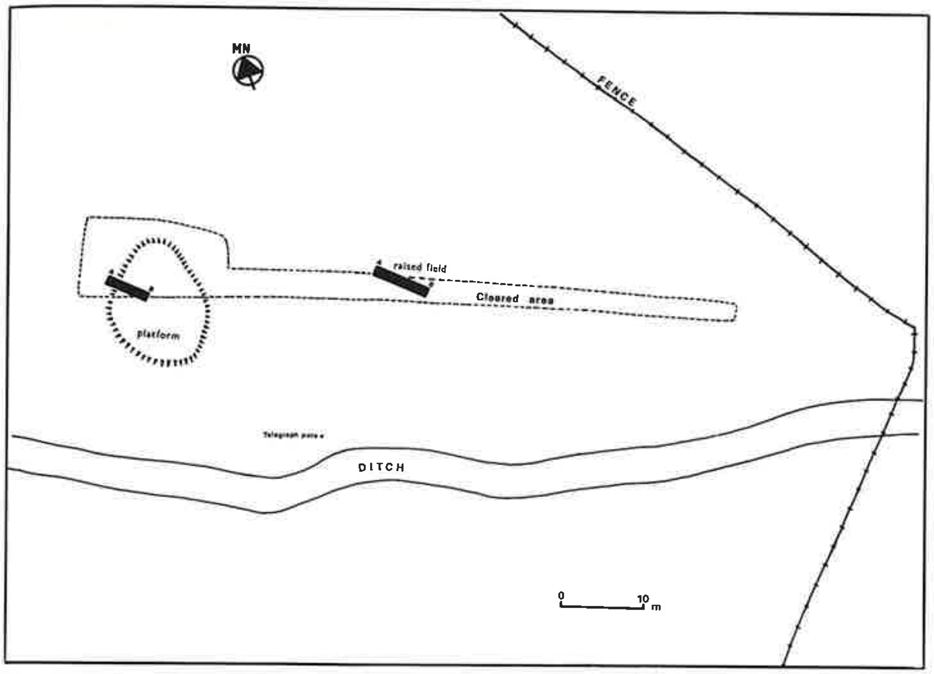


Fig. 38. Valley of El Dorado: the valley bottom, showing the cleared area, the round platform (Figs. 39 and 40) and the position of the raised field excavation (Figs. 41 and 42).

Fig. 39. The round platform, Valley of El Dorado, after clearance but before excavation. The platform consists of a roundish, level area surrounded by a ring-shaped depression. The smooth area of the platform contrasts with the tussocky appearance of the pasture around it. Scale 2 m.

invisible at ground level, and cattle-trampling has further damaged (and in places almost obliterated) the ancient cultivation systems. Nevertheless, walking over the ground one feels a slight rise and fall, or alternation of harder and softer ground, and there are occasional patches of darker green grass, or level areas unaffected by the action of cattle.

Finding undisturbed areas for excavation turned out to be a problem, for small variations in surface relief were masked by the long grass. Our eventual solution was to remove the vegetation entirely, and a strip of land 75 m. long was cleared down to the level of the soil, revealing a roundish platform and a section of raised field in a reasonable state of preservation (Fig. 38).

a) Excavation of the 'platform':

This showed up on the ground as a zone of darker green grass, with a fairly level surface that contrasted with the trampled and tussocky appearance of the surrounding area (Fig. 39). The edge of the 'platform' was surrounded by a circular, ditch-like depression.

A 5×1 m. test trench gave the profile shown in Fig. 40, in which Stratum 1 is a dark humus or topsoil, and Stratum 2 a heavy, grey, gleyed soil with a high clay content. This deposit is found all over the valley floor. In this clay were 4 undiagnostic sherds, presumably of pre-European date. From the overlying soil came a metal bottle cap and cattle bones of recent age.

It is still not clear whether the platform is a natural phenomenon or is man-made, nor (if, indeed, it is man-made) what its age might be. This is the only locality on the valley bottom (including the sites excavated in 1982) to have yielded any European material, and it is possible that in some way the platform is a product of modern farming, or perhaps the result of differential trampling by animals. None of the inhabitants of El Dorado recalls any deliberate platform construction in recent times. Evidence of mottling in both the strata shows that, in the wet season, the clay substructure would be completely waterlogged, though the present day soil surface would remain dry during most of the year. For the moment, then, this platform remains an enigma, and the problem cannot be solved without further excavation.

b) Excavation of the raised field:

The cleared strip cut across a series of much-damaged raised fields, marked by long parallel ridges some 5 m. wide and separated by shallow ditches or depressions. One of these ridges was tested by excavation (Figs. 41 and 42).

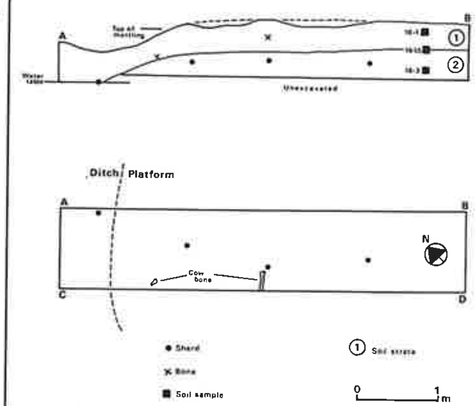


Fig. 40. Valley of El Dorado: plan and section of the excavation at the round platform. All the archaeological material is projected into Profile A–B.

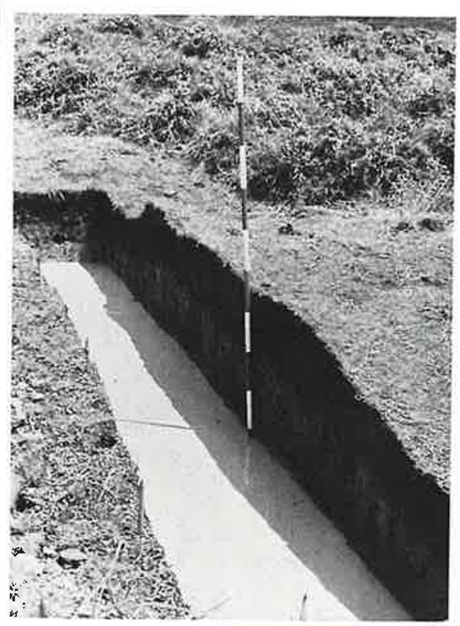


Fig. 41. Valley of El Dorado: excavation of a raised field, showing the dry season water table 80 cms. below the surface. The scale (2 m) is placed at the highest point of the field surface.

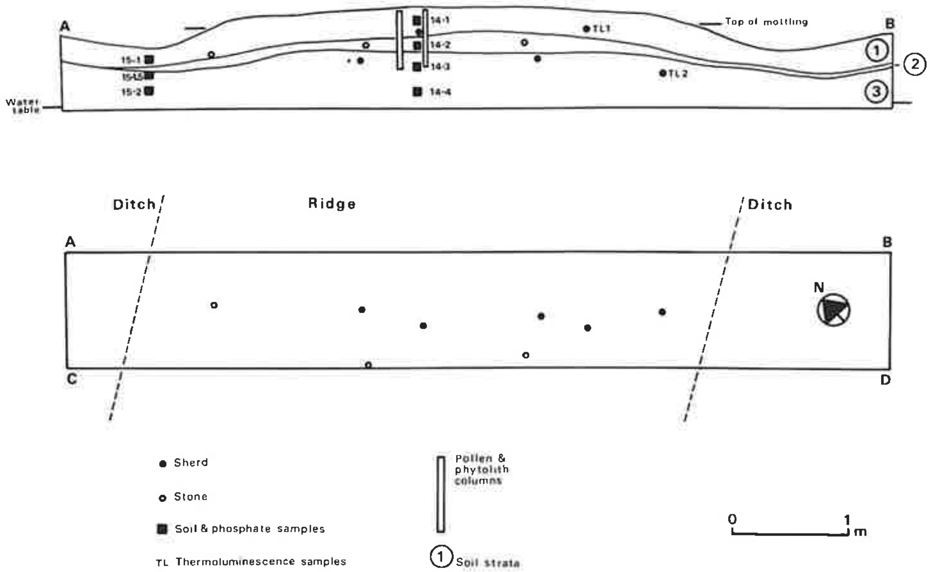


Fig. 42. Valley of El Dorado: section and plan of the raised field excavation. All archaeological material is projected in Profile A–B.

The lowest stratum (3) was a grey-coloured, gleyed soil with a high percentage of clay, mottled throughout. On the evidence of this mottling, Stratum 3 is below the water table for a large part of the year. On top of this was a poorly-defined, dark grey, mottled stratum (2), notably thicker on the ridge, and disappearing almost to nothing in the ditches at the sides. Stratum 2 is probably the original ground surface. Overlying this presumed land surface was a darker 'A Horizon', also a gleyed soil, which represents the earth mounded up for cultivation. The upper few cms. of Stratum 1 are not mottled, and the ridge top remains above flood level in a normal year. Thus, the raised field has a greater depth of soil (Strata 1 and 2), dries out sooner, and remains dry longer, than does the unmodified valley floor.

A few sherds and pieces of chipped stone were found in Strata 1 and 2, and in the upper part of 3. The soil contained occasional flecks of charcoal, but not in sufficient quantities for a radiocarbon sample. All the sherds were from coarse domestic vessels, and were stylistically undiagnostic. In an attempt to obtain a date for the construction of the field, two of these sherds (TL1 and TL2 in Fig. 42) were submitted for thermoluminescence dating at the Oxford Laboratory for Archaeology and the History of Art. Because of the unpredictable effect of wet conditions, and the difficulties of calculating environmental radioactivity, the margin of error is large. The results do, however, confirm the prehispanic age of the fields.

Mrs. Doreen Stoneham, of the Oxford Laboratory, reports that sample TL1 (from Stratum 1) was last fired beween 600 and 1000 years ago, and sample TL2 (stratigraphically the oldest sherd from the excavation) between 2000 and 3500 years ago. Sherd TL2, from Stratum 3, may perhaps pre-date the construction of the fields (though it was found close to the surface of the stratum, and some allowance may be made for downward movement of potsherds in swampy ground), but TL1 is clearly from the cultivation soil.

In summary, it appears that this particular raised field was constructed no later than the Sonso period, and might have been functioning at least a thousand years earlier than that.

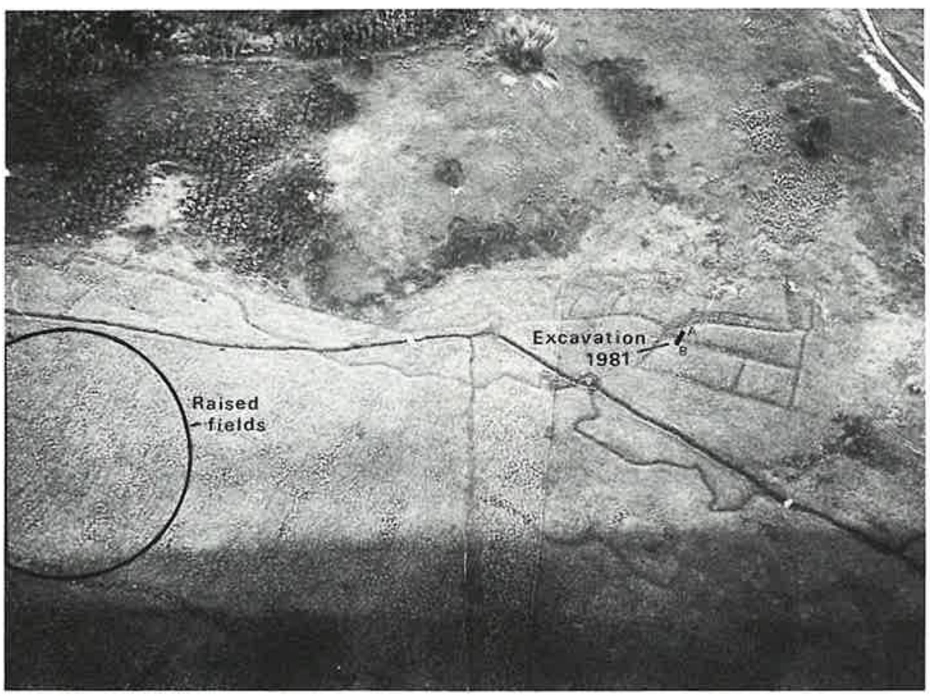


Fig. 43. Prehispanic drainage system on the swampy floor of the Valley of El Dorado. The dark, straight line is a modern ditch. The squareish group of ancient ditches has silted up, but its channels show up in the photograph as lines of darker vegetation. An exit channel links the drainage grid with an older stream, indicated by a dark, meandering line. The floor of the valley in the foreground is covered with faint parallel lines that mark the ditches separating long, narrow raised fields. These lines show most clearly in the circled area at the left of the photograph.

c) Excavation of drainage ditches:

As promised in last year's report (*Pro Calima* 2, p. 21), one of the test excavations in the valley bottom was at the site of a small group of drainage ditches discovered in 1980 (Fig. 43). The ditches enclose a quadrangular area 50 × 30 m. and are connected to a still existing stream by means of a silted-up exit channel, which once collected water from other extinct drains. The double line, which forms the northeast edge of the quadrangle, suggests that the ditch was recut at some time during its period of use. Augering in 1981 demonstrated that the fill of the ditches contained sherds and well-preserved organic matter. Subsequent analyses (by Professor van der Hammen and José Gregorio Monsalve) confirmed that the ditch sediments contain abundant pollen.

A 7×1 m. trench was opened at the close of the 1981 season, and the stratigraphy is shown in Fig. 44. Stratum 1 is a brown soil, which built up after the silting and abandonment of the ditch. Stratum 2, darker grey and more clayey, is a former cultivation soil, some of which washed down into, and eventually filled up, the drainage ditch. Stratum 3, a blackish silty clay loam, marks the position of the land surface at the time when the ditch was constructed. Stratum 4, a lighter-coloured, silty clay loam, is the lowest level with sherds, and it contains a lens (4a) of very sandy loam with some volcanic ash. Since Strata 3 and 4 show no evidence for the natural, in situ, development of a soil profile, it is possible that these two levels represent slopewash from the side of the valley. Stratum 5 is sticky, pale grey, has a high clay content, and apparently developed under conditions of very poor drainage. This stratum yielded no archaelogical material, and showed no evidence of human activity. In the floor of the trench, below the water table, was found the top of a substantial tree stump or branch, which continued downwards for more than 50 cms.

This stratigraphy allows the sequence of events to be reconstructed. After a time during which the valley bottom was well drained and forested, came a period of swampy conditions with the deposition of a clayey stratum (5). There is no evidence of human occupation during this period. With the drying out of the swamp, the valley floor became more attractive to cultivators, and there is proof (in Strata 4 and 3) of human settlement in the vicinity. Somewhat later there was a need to construct a drainage ditch, and this was excavated down to a level that corresponds with the present-day dry season water table. The ditch gradually silted up (Stratum 2) and

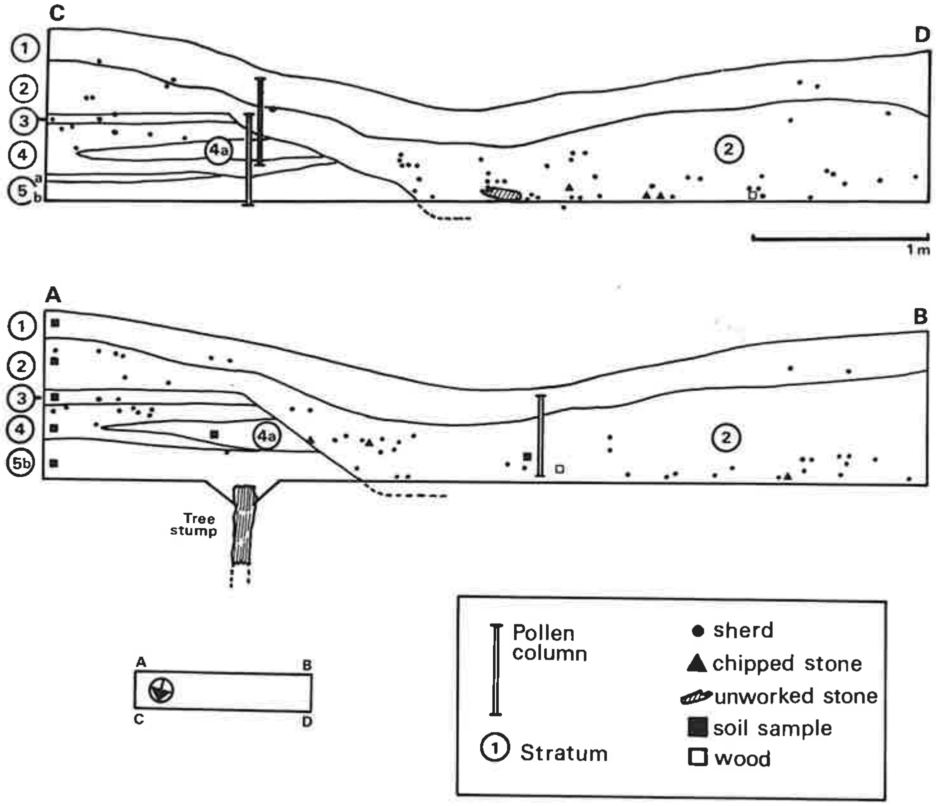


Fig. 44. Valley of El Dorado: profiles of the excavation in the pre-Spanish drainage ditch. All archaeological items found within 25 cms. of the walls of the trench have been projected onto the section drawings.

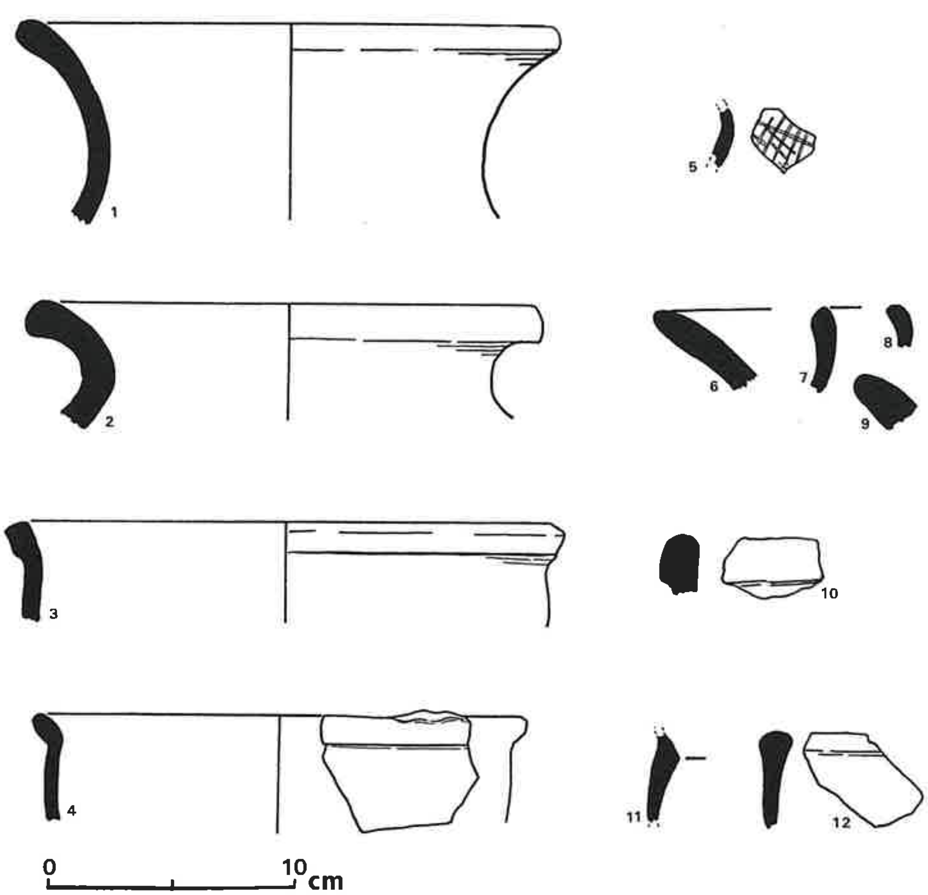


Fig. 45. Valley of El Dorado: sherds from the excavation in the drainage ditch (see Figs. 43 and 44). No. 5 is a Sonso incised sherd from the topsoil (Stratum 1); nos. 1–4 and 6–9 are Sonso sherds from the ditch fill; nos. 11–12 are Yotoco sherds from the old ground surface (Stratum 3).

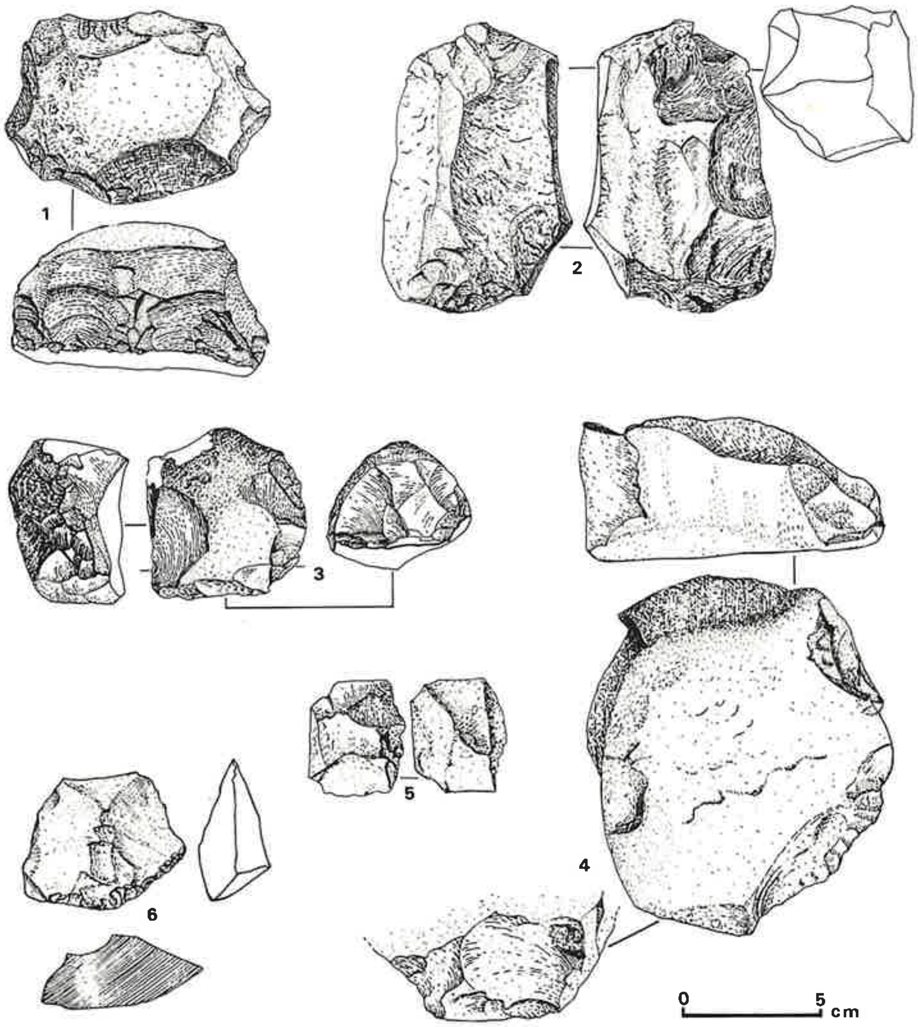


Fig. 46. Chipped stone from the fill of the drainage ditch, Valley of El Dorado.

Fig. 47. Valley of El Dorado: twigs and wood from the fill of the excavated ditch, showing the quality of organic preservation below the water table. Wood from this stratum gave a radiocarbon date of a. d. 1465 ± 65 years (Beta-4906), within the later part of the Sonso period.

was abandoned. Over the abandoned ditch and the surrounding cultivation plots a more recent soil developed (Stratum 1), leaving only a depression and a line of darker green vegetation to mark the former position of the ditch.

Archaelogical material was fairly abundant throughout the excavation. On the evidence of an atypically small sherd sample, Stratum 3 is provisionally dated to the Yotoco period (Fig. 45 nos. 11, 12). Stratum 2 can be correlated with the Sonso period. Sonso sherds were found right at the bottom of the ditch, throughout its fill, and also in the soil outside the ditch (Fig. 44). A diagnostic Sonso sherd, with criss-cross incisions, also came from Stratum 1 (Fig. 45,5). Chipped stone, including artifacts as well as debitage, was surprisingly common in the ditch fill (Fig. 46).

The final piece of chronological evidence comes from the bottom of the ditch, where (below the water table) the primary silt contained twigs, leaves, wood and well-preserved organic materials (Fig. 47). A piece of charred wood from just above the floor of the ditch gave a radiocarbon date of a.d. 1465 ± 65 (Beta-4906), which falls within the later part of the Sonso period. Perhaps, therefore, this little group of drainage ditches was abandoned at the time of the Spanish conquest.

It must be emphasized that neither the Sonso sherds nor the C14 figure necessarily give a date for the construction of the ditch. They refer only to its *abandonment.* Today's drainage ditches are periodically cleaned out, and the same thing must have happened in the past. Material found in the ditch fill – and especially in the upper parts of this fill – belongs therefore to the time when the system was no longer functioning, when maintenance had ceased, and the ditch was allowed to silt up.

On present evidence, then, the ditch can be no later than the Sonso period, but (given the Yotoco sherds in Stratum 3, i.e. the old ground surface into which the ditch was cut) the original construction may have been earlier. The balance of probabilities favours a Sonso date, but construction in the Yotoco period cannot be ruled out.

5. Recording of Collections

In 1981 a sizable amount of information was obtained about pottery in private collections, and we will briefly refer to some of the more important lots.

This year we had a unique opportunity of recording fresh information about a recently dug cemetery of the Ilama period, which contained a wide variety of plain and decorated pottery. Since Ilama domestic pots have little or no commercial value, they are often separated from the decorated pottery and are usually discarded. This has made it difficult to build up a corpus of the whole range of Ilama pottery and to recognize plain pottery in isolation, when not associated with the well known decorated vessels. In this instance, the cemetery yielded a considerable number of pots which added at least three new forms to our Ilama repertory (in Fig. 48 a double pot, a bowl and the snuff pipes). A charcoal sample collected for us from the chamber of one of the tombs gave a radiocarbon date of 80±90 b.c. (Beta-5100).

The cemetery is located at Finca Agualinda, near the town of Restrepo on the road that leads to the Hacienda La Suiza. A small hill with a wide and naturally flat top rises from the tiny valley formed by Quebrada Agualinda. The place must have been very attractive for settlement and it was subsequently used during Sonso times. The evidence also points to a reuse of Ilama tombs during the Sonso period.

About 20 tombs had been dug, some on the flat top and some on the southern slopes of the hill. They were generally shallow (1.50 m. or less) and cut into a subsoil with a high content of volcanic ash. Some were simple shafts of approximately rectangular plan, which widened towards the bottom and often contained only stones as the funerary offering. Others had either a niche or a wide but shallow chamber of roundish shape. Most of the pottery was found in these chambers. The tomb which yielded the charcoal sample was of the shaft and chamber type and contained only the lower part of a double-spouted vessel, undecorated but similar in paste and colour to the usual Ilama material. Other tombs yielded two or three pots, frequently with plain and decorated pottery in the same chamber.

Some 19 pottery vessels were collected, some of which are illustrated in Fig. 48, which shows the main range of shapes of the plain pottery. Of the decorated ware the most remarkable piece is the double-spouted vessel in the shape of an animal, illustrated in Fig. 49. Other decorated vessels include an anthropomorphic vase and two double-spouted vessels, one with a snake coiled around the body of the pot, another with a tiny animal modelled on one of the spouts.

Aside from the rough stones and pottery, the cemetery yielded some stone instruments: one damaged axe, one little axe or chisel, two small axes, and two stones of roundish form.

Although two of the vessels had characteristic Sonso decoration, the bulk of the material belongs to the Ilama period, with which it shows strong affinities in style and paste. The date, 80±90 b.c., is our second for the Ilama phase. Although it shows a difference of almost fifteen centuries from the first, obtained at La Iberia (1590±70 b.c.; Beta-2830), both figures appear to confirm an early date for Ilama pottery.

Unquestionably there is a need for more dates to establish the precise chronological range of Ilama ware and to clarify its relationship with the succeeding Yotoco style. So far, it can be said that the second date conforms better with our expectations about the age of Ilama, though it raises questions about the temporal links with Yotoco, for which we have five dates between the 4th century b.c. and the second century a.d. (v. *Pro Calima* 2, Fig. 2 and the new Yotoco date discussed below). Still older Yotoco dates (in the 9th century b.c.), from a site in the Cauca valley, are out of line with their corresponding thermoluminescence dates and are rejected as too old (v. *Archaeometry* 14 (1): 119–26).

As the figures stand, there is an overlap of a few centuries between the most recent C14 date for Ilama and the oldest dates for Yotoco. At the moment, two alternative interpretations suggest themselves: (a) that the dates are correct and that there was in fact a temporal overlap between the two styles; or (b) that one or more of the dates is inaccurate, and that Yotoco is absolutely later than Ilama.

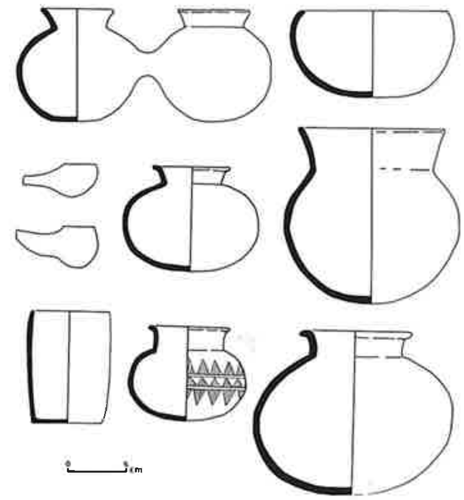


Fig. 48. Pottery in the Ilama style from a cemetery at Finca Agualinda.

Fig. 49. Ilama zoomorphic double-spouted vessel found at Finca Agualinda.

Fig. 50. Mouthpiece of a sheet gold trumpet from the Hacienda El Dorado. No other offerings came from this tomb, but charcoal gave a radiocarbon date of a. d. 210 ± 80 years (Beta-4908). Private collection.

Fig. 51. Three Sonso jars with modelled human faces and incised decoration on the cheeks. Private collection.

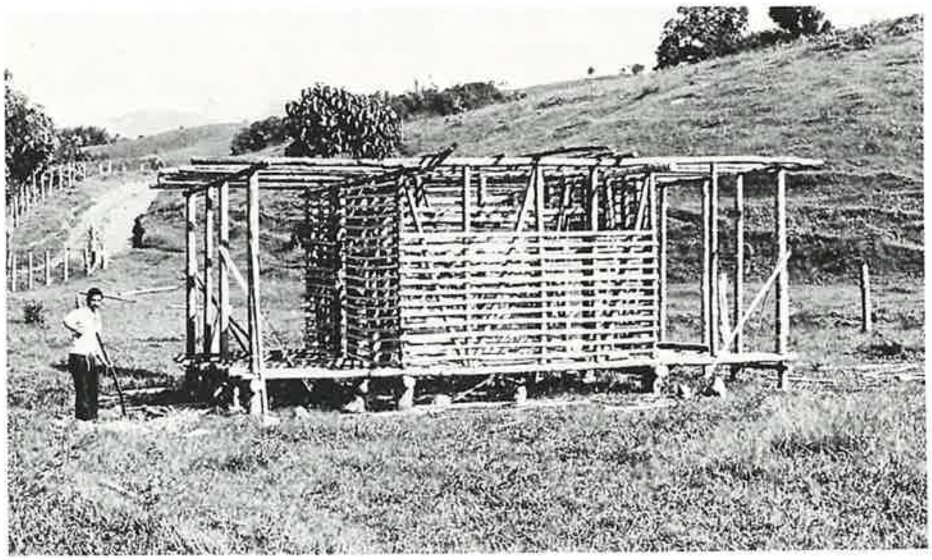


Fig. 52. Present day house construction in the Valley of El Dorado. Today's inhabitants are not the direct descendants of the Indian population, but the study of their technology is nevertheless interesting for archaeologists. The photograph shows how easy it is to construct a house from bamboo and mud plaster. The beams which carry the superstructure, and raise the floor above the ground, rest on boulders or segments of tree trunk, and a house of this kind would leave very little in the way of post holes.

Whatever the relationship between the two styles, there is a small group of pottery vessels which has elements of both and should therefore belong to this transitional period. Without further information and more radiocarbon dates, the precise nature of the Ilama-Yotoco transition remains a puzzle.

Besides the Ilama material, we continued to record items of the Yotoco and Sonso periods. Among the outstanding objects were part of a Yotoco gold trumpet with a radiocarbon date of a.d. 210 ± 80, Beta-4908 (Fig. 50), and the three Sonso figure jars illustrated in Fig. 51. Information was also gathered on modern farming practices and house-building techniques (Fig. 52).

6. Research in 1982

Since this report went to press after the completion of the 1982 season, we are able to include a brief summary of the results. Excavation was once again concentrated in the valley of El Dorado, in particular in the zone of large rectangular platforms close to the valley floor (v. Section 2). Excavations in raised fields and drainage ditches proved that the first agricultural works go back to the Yotoco period, and soil samples, pollen samples and phytolith samples were collected for analysis during 1983. Excavations on the large platforms demonstrated that these were constructed during the Sonso period, though an earlier Yotoco occupation was recognized in the dark soil underneath the Sonso fill. With the aid of a grant from FINARCO (Fundación de Investigaciones Arqueológicas Nacionales) Marianne Schrimpff continued her researches on the Ilama period, and the routine work of mapping the valley and recording collections went on as usual. In addition, Anne Legast (FINARCO) embarked on a study of the fauna of the Calima region as the first stage towards identifying the creatures represented on the pottery and goldwork.

7. Acknowledgements

Our thanks are due to many persons who in one way or another gave their time and attention when we were in need of help. In Bogotá we are indebted to Ivan Posada F., Roberto Pineda G., Elvira de Salamanca and Alvaro Ayala (all of the Instituto Colombiano de Antropología), to Luis Duque Gómez, Clemencia Plazas, Ana María Falchetti, Juanita Sáenz and Alec Bright (Museo del Oro), to Jaime Sarmiento, Victor Hugo Gaitan, Carlos Zárate and Alfonso Grisales (Federación Nacional de Cafeteros de Colombia), to Pedro Botero and Jack Khobzi (Centro Interamericano de Fotointerpretación), and to Byron López, Alberto López, Hernán Borrero, Camilo Rodríguez and Gonzalo Jara.

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Physiographical Background of the Calima Region, West-Central Colombia

By Robert Eidt

Rock Formations

The area of investigation belongs to the Calima Province, the geological zone west of Buga in the Cordillera Occidental of Colombia (Fig. 53). This geological Province has a rolling to mountainous terrain fashioned in Cretaceous materials of low relief rejuvenated by Tertiary and Quaternary uplift. Severe erosion periods characterize materials in nearly all layers, both past and present. The average elevation is 1500 metres above sea level, although the uppermost peaks reach 2000 metres. In the western part of the area elevations are nearly twice as high. The formations, described below, may be seen in road cuts, steep slopes (especially where slumping has occurred from overgrazing), and in occasional outcrops.

Formative geological processes consist of regional NE-SW faulting, folding, and metamorphism[1]. The latter process created grey slate and phyllite out of original biogenic, volcanic, and terrigenous materials. The slate and phyllite alternate with meta-chert and impure meta-limestone, and make up the so-called Cisneros Formation[2]. The impure limestone layers are generally grey and can be up to one metre thick. The colour of the chert varies from almost black to dark green, depending on the content of organic matter. The abundant green and red phyllites and slates formed from volcanic dust and ash[3].

Unmetamorphosed thin layers of chert, sandstone, shale, and some limestone form the thinner Espinal Formation to the east of the Cisneros Formation. Its greyish sandstone may be pebbly, and the black siliceous and carbonaceous shale layers probably contain plankton[4]. Whiteish limestone associated with aluminium silicate appears less frequently[5]. The Cisneros and Espinal formations together comprise the Dagua Group in western Colombia[6]. (Fig. 53). The former encompasses some 2000 metres and the latter about 900 metres in thickness. Both are clearly exposed along the Cali-Buenaventura highway.

Diabase sills and basaltic flows cut through Dagua Group materials. The diabase has a basic, submarine character. Its sills reach several hundred metres in thickness. They demonstrate a medium grain size in the centre, and grade towards finer basaltic material at the borders. They weather into red, spherical exfoliated forms, and often have black patches of manganese or white calcite in joints. The basaltic rocks have a low potassium level. These diabase formations may occupy nearly horizontal positions and give rise to the flattish hills upon which pre-Columbian people built dwellings and work areas. Sometimes, pillow lavas outcrop in the Diabase Group. These may be seen along the Buga-Buenaventura road, and are dark green in character. Columnar lavas are also formed in the region[7]. Plagioclase and magnetite, as well as quartz, lend yellow, dark brown, deep red, and white colour variations to the weathered landscape formed in the diabase and basalt (Fig. 54).

Igneous intrusives from magma reservoirs beneath basaltic volcanoes pushed into, and through, the Dagua and Diabase Groups. Associated grey olivine, gabbro, dark hornblende, and brown dunite add their colours to the region's outcrops.

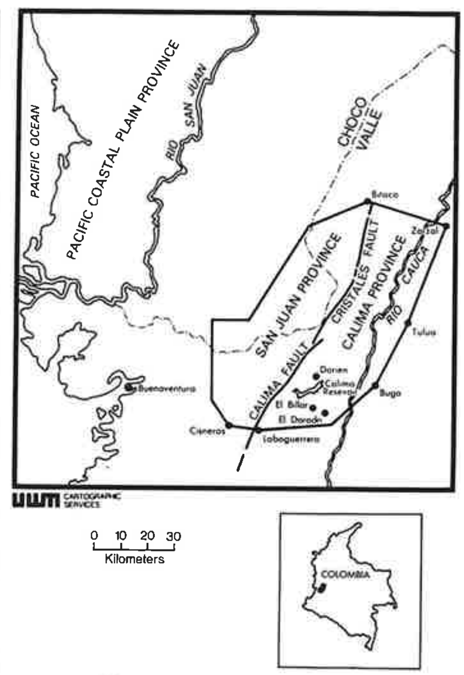

Fig. 53. Physiographic Provinces of the Central Western Cordillera (after Barrero-Lozano 1977).

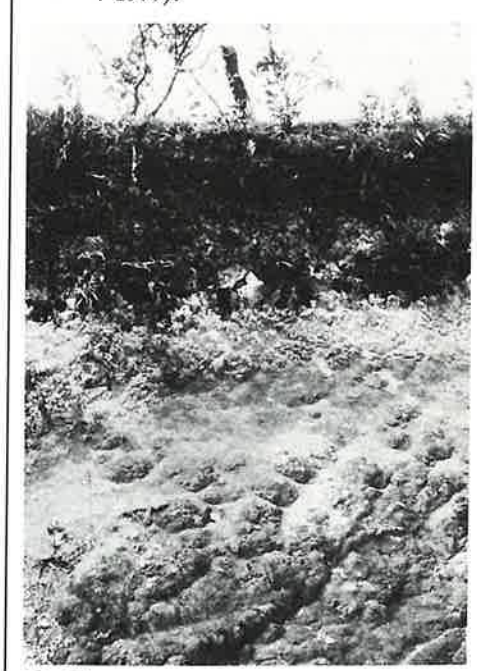

Fig. 54. Alterite formation, vicinity of El Billar.

Fig. 55. Near Lake Calima, view from the eastern side of the valley. Gentle terrain (with pre-Spanish sculptured stones) in the foreground, and the mountains of the San Juan Province in the distance across the Lake.

Above the Dagua and Diabase Groups, light-coloured Tertiary conglomerates, grey sandstones, and blueish claystones covered by brown-black Quaternary alluvium make up some of the present surface layers. The alluvium deposits contain well drained gravel and sand, and form the basis for present day urban settlements, such as Darién in the centre of the area investigated. The colours of these upper sediments give even more character to an already spectacular landscape. For purposes of this report, these materials are collectively called the Cauca Group[8].

Tectonic periods

In general, uplift and transformation processes took place during three main periods. The first caused concentric folding when low-grade metamorphism was well under way, and occurred in the Late Cretaceous-Early Paleocene. Overturning and folding accompanied uplift which, coupled with strong faulting, complicate the area's geology and soil formations. During this early period, volcanic centres formed on the east side of the region.

Following the first period of tectonic activity, the region was subjected to further uplift in Late Paleocene-Early Eocene times. Intensive erosion then smoothed out the topography and produced some of the gently rolling surfaces visible today. Subsidence followed, and marine conglomerates and limestone deposits unconformably covered the zone.

The third period of change brought further uplift and weathering during the late Tertiary period. Marine conglomerates, limestones, and other materials were deeply dissected. Diabase sills were exposed and weathered. Removal of less resistant materials exposed the smoother topography of the earlier erosion cycle beneath. This accounts for higher, and more abrupt, physiographic features here and there above the gently rolling terrain, giving the landscape a dual personality (Fig. 55). During this period, igneous intrusives and extrusives penetrated the region, while thin volcanic ash deposits settled from the atmosphere and mixed with weathering diabase and other materials, accounting for higher cation exchange capacities than would normally be expected in the resulting soil formations.

At the end of the Tertiary, the area west of Darién was uplifted some 1500 metres above the Calima Province along the Calima and Cristales faults. Westerly winds, which blow towards the higher physiographic region (the San Juan Province), now deposit much of their moisture on its slopes so that rainshadow parts of the Calima Province may be quite dry. This dryness is particularly marked in the Dagua valley.

Uplift in the region continued during the Quaternary. In fact, van der Hammen[9] considers that the principal rise to levels above the tropical forest climatic zone was established during the Pleistocene. At the same time a rain of volcanic ash settled over the area. On at least two occasions, yellow layers more than 20 cm. thick were deposited. Most contacts with weathered bedrock are clean, and possess very low organic matter, indicating that the ash fell on eroded surfaces free of vegetation. In summary, the recency of Quaternary uplift and its magnitude have created a rougher topography with sharper V-shaped valleys in the upper parts of the Calima Province, and deep canyons fronting the floor of the Cauca valley. At intermediate elevations, i.e. the area of investigation, smaller, rolling diabase hills with convex surfaces are interspersed with larger hills. The recent geomorphology also exhibits a great deal of accumulated material at the bases of hills and in valleys.

Climate and Vegetation Characteristics

The climate in the Calima area reflects the usual tropical elevation sequences. A humid subtropical forest, which now exists only in patches, probably covered the study region in early times from about 1000 to 2000 metres above sea level. On the windward slopes and in sheltered valleys, lower rainfall totals produce an almost arid vegetation, especially on well drained soils. Prevailing winds blow from the SW during February-July, and from the NW for the rest of the year. Thus, east-facing slopes tend to be drier.

Precipitation averages range from 500 to 2000 mm per year. Bimodal rainy seasons occur in April-May and October-November, as on the Sabana de Bogotá. October is the rainiest month, with an average of 190 mm[10]. The driest months average 62 mm, with a January value of 42 mm. At upper levels (approaching 2000 metres) wettest months average about 225 mm, and driest months about 110 mm.

Isothermal temperatures vary from about 25 °C at 1000 m, to 16 °C at 1400 m, and 10 °C at the higher altitudes west of the Calima Province.

Vegetation in the study area varies from forest to grassland, with or without shrub growth and/or drought resistant herbaceous species. The variability is associated with microclimatic changes, which in turn depend primarily on elevation, exposure, and degree of slope.

Burning, overgrazing, and cultivation have almost eliminated native species of plants in the study area, except for arboreal associations in isolated parts of deeper valleys. Tree species such as roble *(Miconia* sp.), laurel *(Nectandra* sp.), yarumo *(Cecropia* sp.), arrayán *(Myrcia popayanensis),* yolombó *(Panopsis rubra),* and cedars form major associations. Introduced grasses are now dominant, and include pará *(Panicum purpurascens),* guinea *(Panicum maximum),* yaraguá *(Melinis minutiflora),* uribe *(Hyparrhenia ruffa),* angletón *(Andropogan nodosus),* elefante *(Pennisetum purpureum)* and kikuyo *(Pennisetum clandestinum).*

Soils of the Calima Region

Soils in the Calima Province have formed under the primary influence of parent material, climate, organisms (including human), relief, and time. As parent materials vary considerably, they account for important short-distance alteration in soil characteristics. Of all the geologic materials previously discussed, the diabase is the most widespread in the area investigated. It weathers mainly by hydration, hydrolysis, solution, oxidation and reduction. These activities first break down the diabase into rounded forms some 20 cm to 100 cm in diameter. Later, smaller egg-sized rocks are left in a clayey matrix that often has the appearance of conglomerate. Finally, massive clayey formations (known as alterite) are left.

Different processes of matrix iron oxidization produce colours varying typically from deep red lateritic to yellow clay loams which may sometimes be bauxitic. In the moister localities, yellow dominates. These colours tend to appear with yellow over red but, because of the complex geology, may be found as red over yellow, or as red left or right of yellow. The combination occurrs on steep slopes and on the more level benches up to an elevation of about 2500 metres above sea level. The high content of iron permits mottling where redox reactions take place. In some places, the iron has formed broken or continuous hardpans, indicating a formerly cold, wet climate, probably during the middle Pleniglacial period[11].

Subsequent high temperatures and plenty of moisture caused extensive weathering and resulted in removal of soluble bases and salts. Normally, in such tropical conditions, the classification Oxisol would be appropriate for these deep, highly weathered soils. However, volcanic eruptions spread layers of yellowish ash which mixed with soils already formed, and in turn became soils in their own right. These are highly weathered, but nearly everywhere cation exchange capacities have increased beyond Oxisol limits of 16 meq/100 g.

Fig. 56. The ditched fields at Loma Larga, excavated in 1980.

Fig. 57. Hydromorphic soil, the Loma Larga field system.

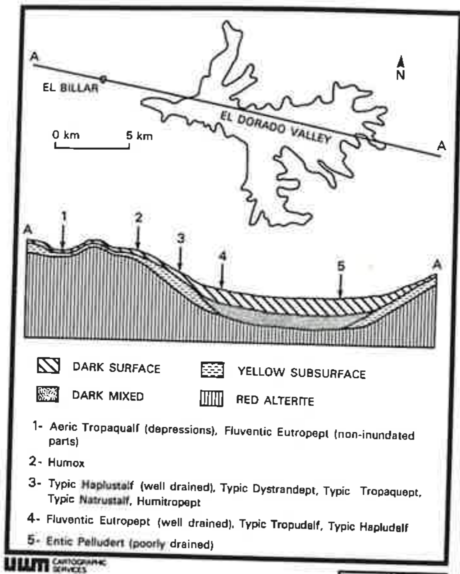

Fig. 58. Generalized soil profile; cross section through El Billar and the bottom of the El Dorado valley.

Another effect of fine ash and/or fine slopewash sediments is to clog pores and to create drainage problems. Although a silty clay loam characterizes the soil formed in ash, some of these soils have poor to very poor drainage from within the A_h layer downward, i.e. beginning about 30 cm below the surface. Possibly iron and/or siliceous cementing agents are responsible. As the red clayey horizon is approached, drainage becomes worse. The question as to how much the ash contributes to poor drainage, versus how much the poorly drained red alterite affects the soil near the interface, has not been resolved. The right combination results in development of hydromorphic soils in the region (Figs. 56 and 57).

Where these problems do not occur above the alterite level, non-hydromorphic soils appear[12]. These generally fall into the Inceptisol category, although a great deal of variety exists, depending on parent material, slope, drainage, and other factors. An idealized cross section through the El Dorado valley of the Calima area, showing major soil types, may be seen in Fig. 58 (see also Fig. 59).

Fig. 59. Alterite downwash covering paleosol overlying volcanic ash.

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Soil Phosphate Analysis at a Prehistoric Settlement (El Billar) in the Municipio of Restrepo, Valle del Cauca, Colombia

By Robert Eidt

The settlement complex at El Billar consists of three possible residential types, with adjacent field areas which also show variations (Figs. 7 and 9). The dwelling areas are: (1) the Billar itself, a 110 × 90 m. platform built on top of a ridge; (2) more than 20 'house platforms' *(tambos)*, i.e. flat artificial terraces or platforms dug into the hillslopes and measuring from a few metres to 35 m. along the contour. Some of these may have been work, rest or storage areas as well as dwelling sites. All appear to have been located on cultivated slopes; and (3) an extensive settlement area, some 300 m. × 400 m., densely covered with potsherds. The settlement lies on the relatively gentle backslope of a lower hill to the east and south east of the Billar. Finally, numerous cultivated slopes are characterized by downslope 'field lines' in the form of ditches which separate planting strips whose widths vary from 2 m. to 150 m.

Field tests on the Billar platform

In late summer 1981, the two-part method of abandoned settlement analysis developed in Wisconsin was applied to the platform of El Billar. The method consists first of field sampling 15 cm. below the present surface along transects radiating from a carefully selected point. At the Billar this point was chosen for its location near the edge of the platform, assuming that any activities would have been concentrated in full view of the agricultural fields being worked below in the Valley of El Dorado.

The map produced by the field method (the so-called ring test) illustrates the phosphate intensity numbers (Fig. 9). The test is made by placing a 50 mg. soil sample on a phosphate-free filter paper, followed by the addition of two drops of Solution A (35 ml. of 6N HCl + 5 g. ammonium molybdate dissolved in 100 ml. distilled H_2O), a pause of 30 seconds, then addition of two drops of Solution B (0.5 g. ascorbic acid dissolved in 100 ml. H_2O). Within a few seconds, if phosphate added to soil by human activities (garbage, elimination, burial etc.) is present, a blue ring develops, whose percentage of completeness, length of radiating lines, and colour intensity indicate settlement features. Intensities are relative, not precise, and therefore are recorded on a simple scale increasing from 0 to 5. Since phosphate does not migrate horizontally or vertically, because of instantaneous fixation by calcium-, iron-, or aluminium-retaining components in soil, the ring test can be used to map activity areas with considerable accuracy.

It should be pointed out that the acid used in this test has been developed especially for settlement phosphate extraction, and that it gives incomparably more reliable results than ordinary agricultural soil laboratory procedures. The latter have been developed for testing soil solution phosphate 'available' to plant roots. This phosphate represents only a minute amount of the total phosphate added by settlement activities, especially where low quantities are involved.

Although the first few radial lines tested on the Billar produced little or no positive results, the succeeding ones revealed the outline of an area with high values (Fig. 9). When this appeared, it was noticed that the soil colour within the high phosphate sector varied from medium brown (Munsell 10YR 3/4) to dark brown (10YR 3/1). Careful testing with a soil probe exposed a line of separation between these two soil types. It also became apparent that phosphate readings in the lighter-coloured zone had approximately twice the value of those in the darker part. A high degree of compaction characterized the lighter area, whereas friability marked the other part.

Examination of the phosphate intensities and soil differences between the two zones led to speculation of a possible residential area (higher phosphate, lighter, compacted) and an adjacent garden area (less intensive phosphate, darker, friable). After consultation, it was decided to excavate a trench (Trench IX) at the point where the transects started. The initial shovelful of soil produced the first diagnostic pottery to be found on top of the platform (Sonso period). A trench in the 'garden' area (Trench VIII) produced much less pottery, as might be expected from a cultivation zone. It was later decided to take samples from these two areas for the second part of the phosphate test.

Laboratory findings

The second part of settlement phosphate soil analysis is based on a laboratory method known as sequential soil phosphate fractionation. The method enables non-overlapping extraction of three known types of inorganic phosphate. The first (Fraction I), called the labile portion, is made up of phosphate loosely bound to soil particles and of phosphate already in the soil solution. The second (Fraction II) is occluded phosphate, i.e. phosphate gradually coated and recoated by oxides of iron and aluminium transported downward through the soil after rains. Since the Fraction II amount requires time to develop, its values can be used for relative dating. The third (Fraction III) is phosphate that has been occluded primarily by calcium. The extraction procedure for fractionation has been discussed in detail in *Science* vol. 197 (1977) pp. 1327–1333.

Once the three fractions are determined, they are added to give total inorganic phosphate. The percentage of each fraction is then calculated in order to eliminate variations in absolute amounts so as to facilitate comparison. Interpretation of results follows the principles that (1) fractionation percentages vary with different types of land use, and (2) total phosphate intensities vary directly with land use intensities, and reflect population densities.

It should be stressed at this point that although ring test values have sometimes been used to express phosphate in parts per million, only the fractionation method produces known values which can be accurately quantified. In addition, total phosphate must be evaluated along with fractionation percentages in order to make a careful interpretation of land use functions and intensities.

The platform top

Samples for fractionation were taken from the proposed garden area (Billar Sample no. 1) and from the proposed residential area (Billar Sample no. 2), as indicated:

Sample	% I	% II	% III	Total ppm
Billar 1 garden	81	11	8	110
Billar 2 (residential)	66	10	24	615

The percentage figures for Sample 1, the darker, more friable soil are so similar to others from various modern yuca (manioc) crop combinations in dooryard plots near Jiguales (Calima watershed) that the supposed garden function appears nicely corroborated:

Sample no.	Locality	% I	% II	% III	Total ppm
1a	Jiguales (yuca-maize)	83	12	5	116
2a	Jiguales (yuca-platano, some coffe)	80	14	6	115

The total phosphate value is also consistent with the figure from the Jiguales dooryard gardens, as the above Table demonstrates. These values suggest similar intensity levels of gardening at the ancient and modern sites. The fact that the middle fraction is slightly greater for the Jiguales soils probably reflects the slightly greater depth at which these samples were taken, rather than any significant age difference.

The only risk of distortion is that modern residents might once have cultivated maize and yuca on the Billar, and that the ancient samples might be contaminated by recent phosphate. Enquiries indicate that the Billar has been lightly ploughed in order to sow grass, but we have no record of any other modern cultivation. Since relatively long periods of time are required to establish the kind of signature revealed by the laboratory data, it seems reasonable to conclude that we are dealing with authentic ancient and modern field samples that can legitimately be compared.

Fractionation percentages derived from the supposed dwelling area (Billar Sample no. 2) show residential characteristics similar to those found in other parts of the world where ancient peoples have congregated at close quarters. Experience indicates that as population density increases the phosphate tends to become more evenly distributed among the three fractions, with allowances for age differences of Fraction II values. When the latter fraction declines, the phosphate is picked up by the iron- and aluminium-retaining components in the soil (Fraction I), or by calcium (Fraction III), depending on how much calcium residue is left behind from garbage, bones etc. Fraction II values may increase if there are fewer calcium-retainers present, as in exceptionally acid soils. In such cases adjustments must be made when interpreting relative age (Fraction II), as well as land use functions.

The total inorganic phosphate at the Billar 'residential area' is the highest encountered thus far, and represents intensity levels typical either of areas populated by few people over long time periods, or of areas populated by many people over a shorter time. Unfortunately, circumstances did not permit a complete vertical profile sample with fractionation in this dwelling area. Notwithstanding these problems, Billar Sample 2 may be interpreted as a residential zone which would compare favourably with the small settlements of pre-Columbian groups in the state of Wisconsin. Of further significance is the fact that the only other soil on the Billar platform with a 'residential' print is that of Trench IV (Fig. 9):

Locality	Sample no.	% I	% II	% III	Total ppm
Trench IV	12–1	69	20	11	155

Total phosphate is lower here, probably because of greater sample depth and because the trench is in an area of less intensive activity compared with Trench IX.

Finally, Fraction II values, which are time-related, indicate clearly that the 'garden' and 'residential' soils were contemporaneous.

The platform construction

The platform at the Billar was made by levelling the top of a ridge except for the unfinished hummocky zone (the 'Tumulus') at the north end. Overburden refuse from this operation was employed to extend the edges of the platform in order to increase its size. Ditched cultivation fields occur on the slopes of the ridge. An idealized sequence of strata, as revealed in the 16 trenches shown in Fig. 9, is given in Fig. 60.

Trenches on top of the platform

Trenches I–VI and VII–XI were excavated on the platform surface (Fig. 9), and Trenches XII–XIV in the 'Tumulus' area. Fractionation chemistry was obtained from Trenches I, II, III, IV, and VIII, X and XII. The data tell us something about the nature of each stratum, so that matching can be performed with layers in other Billar trenches and can assist in definition of land use functions.

The top stratum (i. e. the post-construction occupation, OS in Fig. 60) in Trenches I-III can be grouped as follows:

Trench	Sample no.	% I	% II	% III	Total ppm
I	9–1	69	28	3	70
II	11–1	78	13	9	110
III	13–1	80	10	10	172
	Ave.	76	17	7	117

Soil in Trench I appears older because of the larger Fraction II value, and was less intensively occupied (lower total phosphate). This soil is closer to the yellow ash (A) in the profile, and may demonstrate some degree of contamination. The three fractions would probably be the same had they all been taken from the same part of the profile.

Soils from Trenches II and III appear more youthful, and both of them overlie the yellow ash soil without any transitional material between the two, as in Trenches I and IV. Total phosphate values are also similar.

The yellow ash samples also reveal interesting diagnostic traits:

Trench	Sample no.	% I	% II	% III	Total ppm
I	10–2	66	27	7	35
II	11–2	64	13	23	34
III	13–2	73	5	22	45

Although positions in the profile vary somewhat, fractions tend to be significantly different within relatively short distances, though total phosphate values have roughly the same order of magnitude. This is a characteristic of volcanic ash and is consistent with variability in chemical composition of ash particles and their rate of weathering. The only other reading from this stratum on top of the Billar platform comes from Trench IV:

Trench	Sample no.	% I	% II	% III	Total ppm
IV	12–2	78	2	20	65

The same variability can be recognized in ash samples from the edge of the Billar (Trenches VII and X) and in the 'Tumulus' (Trench XII) to be considered on p. 38. Below this ash, the third stratum (equivalent to C in Fig. 60) consists of alterite, i. e. lateritic material derived from diabase, and offers the following values:

Trench	Sample no.	% I	% II	% III	Total ppm
II	11–3	46	52	2	39

These may be compared with the figures for this stratum in other Billar trenches:

Trench	Sample no.	% I	% II	% III	Total ppm
I	9–3	42	56	2	33
II	11–3	46	52	2	39
X	8–6	43	56	2	33
XIII	5–b_2	48	48	4	30

These samples compare reasonably well with the results from Trench II.

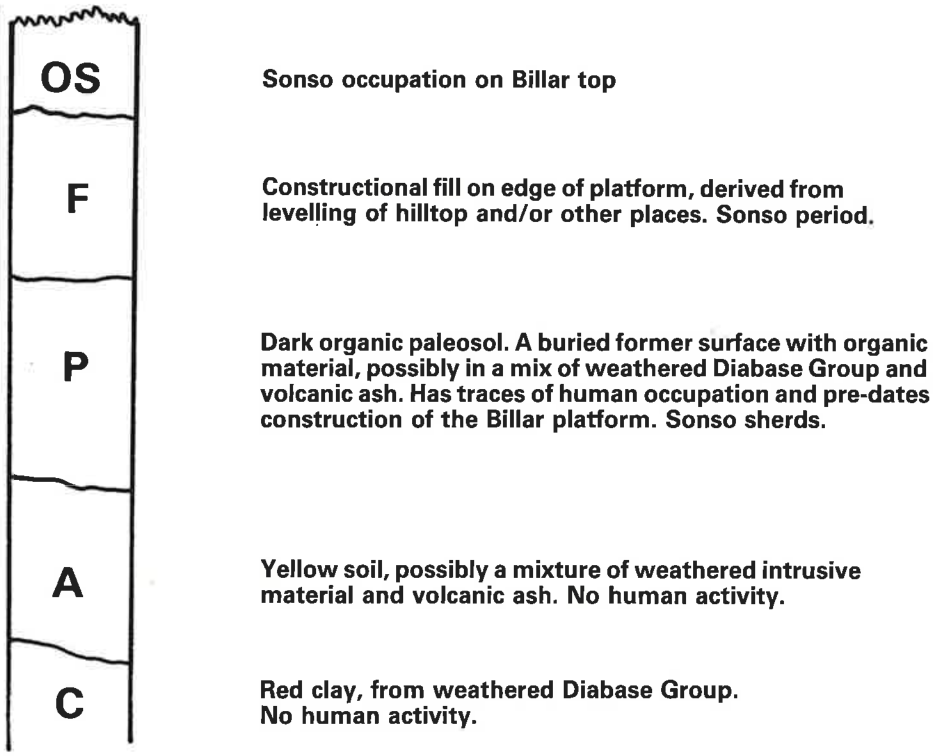

Fig. 60. Generalized sequence of strata at El Billar.

However, note the following two red alterite values, from localities within 20 cms. of the overlying ash (Fig. 16):

Trench	Sample no.	% I	% II	% III	Total ppm
X	8–5	52	46	2	63
X	3–6	69	30	1	52

We learn from this comparative series that red clay phosphate fractions from near the yellow ash layer are fairly similar, but are different from red clay fractions within uncontaminated parts of the stratum.

Interpretation of land use may be postulated by comparing values in the topsoil stratum with figures for the 'residential area' (Billar Sample 2) and the 'garden area' (Billar Sample 1). The Trench II and Trench III fractions are similar enough to Billar 1 that, in spite of a slight difference in sample depth within the profile, we conclude that similar but less intensive (lower total phosphate) agricultural tasks were carried out beyond the previously identified garden zone.

Summarizing from the above data, which are corroborated by experience in other parts of the world, we may state: (1) surface activity strata are most consistent if land use has been the same; (2) uncontaminated material from the red clay demonstrates consistency; but (3) the figures from ashy layers reflect the inconsistency of the original ash. It should be added that surface, clay, and other strata in close contact with ash materials are strongly influenced, and do not show 'normal' or expected fractions.

Trenches in the 'Tumulus' area

Trenches XII and XIII are in the 'Tumulus' area at the north east end of the Billar platform. Again, phosphate fractions represent the main soil strata (Fig. 12), with only minor alterations. From the humus layer we have the following fractionation figures:

Trench	Sample no.	% I	% II	% III	Total ppm
XII	4–1	83	11	6	137
XIII	5–a	65	32	3	65

Sample 4–1, from Trench XII, comes from the top of the 'Tumulus' and represents the natural soil developed on the ridge top (with some human occupation), unaffected by the construction of the Billar platform. The fractions are similar to those from paleosol soils, though the layer in Trench XII is thin and near enough to the ash horizon to be somewhat contaminated. Sample

5–a, from Trench XIII, comes from a soil which formed after the construction of the Billar platform, and lies directly on top of the red alterite material (Fig. 12).

Several centimetres beneath the surface occupation level, the ashy stratum from Trench XII shows:

Trench	Sample no.	% I	% II	% III	Total ppm
XII	$4{-}2_a$	80	0	20	47
XII	$4{-}2_b$	74	0	26	41

These are similar to the ash stratum values on the main platform surface and in the trenches at its edge (see below).

Red clay in the 'Tumulus' area gives the following values:

Trench	Sample no.	% I	% II	% III	Total ppm
XII	4–3	77	24	5	72
XIII	$5{-}b_1$	49	40	11	24
XIII	$5{-}b_2$	48	48	4	30

The sample from Trench XII compares with other red clay samples taken several cms. below an ash layer, and it represents mixed soil. The samples from Trench XIII come from an area where the construction of the Billar platform has removed the ash layer (Fig. 12); they too appear to be unmistakably non-contaminated clay, as seen elsewhere at the Billar.

Trenches on the platform edge

Trenches VII (Fig. 13) and X (Figs. 15 and 16) from the east edge of the platform have the following phosphate fractions from the surface occupation:

Trench	Sample no.	% I	% II	% III	Total ppm
X	8–1	76	12	12	107
X	3–1	76	14	10	129
VII	6–1	77	16	7	78
	Ave.	76	14	9	105

It is at once apparent that these values match those of Trenches I–III and that we are dealing with the same material in both places.

The next stratum in Trenches VII and X consists of constructional fill (F in Fig. 60) and demonstrates phosphate values which are predictably variable but which can be distinguished from those of the ash layer.

Below the fill, a dark, organic paleosol (P) appears:

Trench	Sample no.	% I	% II	% III	Total ppm
X	8–3	78	12	10	111
X	8–4	69	22	9	71
X	3–4	82	10	8	98
VII	6–5	78	14	8	87
VII	6–6	74	17	9	89
VII	6–7	74	19	7	62
VII	7–1	72	17	11	93
VII	7–2	72	11	17	67
	Ave.	75	15	10	85

It is interesting to note the close match between these paleosols and the surface occupation level. The conclusion is that land use in both activity strata was the same, i. e. that in both cases we are dealing with a land surface, or else that the Sonso people used the topsoil from the platform area as fill when extending the edges of the Billar.

Below the paleosol is the usual yellow ash (A):

Trench	Sample no.	% I	% II	% III	Total ppm
X	8–7	63	30	7	54
X	3–5	9	10	81	51
VII	7–3	82	2	16	52

As before, this ash retains its erratic personality except for the total phosphate. All samples come from the middle of the ash layers.

Below the ash lies the red alterite (C) for which we have one other sample not mentioned previously.

Trench	Sample no.	% I	% II	% III	Total ppm
VII	6–8	35	61	4	42

It was taken just below the paleosol and less than one metre downslope from yellow ash. In spite of probable contamination, this sample shows considerable similarity with the other pure red alterite values.

The house platform

One house platform (or *tambo*) on the south east side of the platform was excavated (Trench XVI, see Figs. 19 and 20). Soil samples were taken from the outer edge of the occupation floor near the surface. Another sample was removed from the base of the occupation layer, on the transition to alterite. At the outer end of the trench, the presumed occupation level was sampled again. The results are:

Trench	Sample no.	% I	% II	% III	Total ppm
XVI	18–1	69	26	5	97
XVI	18–2	69	24	7	69
XVI	19–1	69	24	7	79

These samples are somewhat like the residential signature found in the less intensively occupied platform top, but the 'balance' of the fractions is not even enough to be certain. Perhaps the evidence supports the conclusion of the archaeologists who excavated the *tambo* and report that the surface was already eroded after abandonment. Nevertheless, as the second fraction is slightly higher than that from the main Billar platform, we would tentatively assign a greater age to the *tambo.* Total phosphate levels are considerably less than those in the residential areas of the Billar top, and suggest much less intensive activity.

Another sample was taken from a pit in the *tambo* (Fig. 20). Its phosphate percentages are like those on the floor, so we are left in doubt as to the nature of the pit:

Trench	Sample no.	% I	% II	% III	Total ppm
XVI	18–3	69	21	10	50

The last sample comes from the buried soil below the fill at the outer edge of the *tambo:*

Trench	Sample no.	% I	% II	% III	Total ppm
XVI	19–2	72	24	4	98

The fractions are similar to two others: (1) the best fit is an identical signature from the alterite within the 'Tumulus' mound in Trench XII (Sample no. 4–3), and (2) there is a reasonable similarity to the surface occupation level percentages, although, again, these appear older than their equivalents on the main Billar platform. Further testing would help to determine which of the two comparisons is correct.

The 'field line'

Trench XVII cuts one of the downslope ditches in the zone of ancient cultivation on the south west slope of the Billar ridge some 120 m. from the edge of the platform (Fig. 7). Five soil samples were taken from a vertical profile within the 'field line', extending from the surface down to the red clay. The excavation profile and the sampling points are shown in Fig. 23. Resulting values from laboratory analysis appear below:

Trench	Sample no.	% I	% II	% III	Total ppm
XVII	1e	55	20	25	25
XVII	1d	96	1	3	221
XVII	1c	69	20	11	42
XVII	1b	83	2	15	28
XVII	1a	46	45	9	22

These fractions show a great deal of mixing, just as might be expected from a ditch partially filled over the years by random erosional action. The fractionation in the uppermost sample (1e) displays a residential distribution. Not much total phosphate is present, but this soil may well have washed down from the main Billar platform above. Sample 1d appears to be an unweathered soil derived from intrusive parent material, not an anthrosol, since most of the phosphate is concentrated in one fraction. It may be compared with the profile from the same depth in a remnant forest at the northern edge of the Billar:

Forest Sample	% I	% II	% III	Total ppm
	89	7	4	75

Sample no. 1c, from the channel fill, has the look of a paleosol (see previous comments), though it is clearly not in its original position and has presumably washed in from above. Sample 1b practically duplicates values from the yellow ash elsewhere at the Billar. The lowest sample (1a) reflects alterite with fractions like those in other Billar trenches.

The function of the 'field lines'

Soil scientists recommend artificial drainage of these soils, with canals dug into the poorly drained stratum so that the water layer is not thicker than the first stratum. It is useful to note that this is exactly what the Sonso people appear to have done. Percolation tests will be made in a later field season to verify depths at which poor drainage starts. If rains are heavy in the area, as during the two rainy seasons, it would seem probable that a waterlogged zone would develop close to crop roots, causing root rot, denitrification etc. The fact that no mottling was observed in Trench XVII may not necessesarily indicate lack of a high water table. If the ash type does not possess sufficient iron, then even strong reducing conditions would not cause mottling of the common type. The problem of the ash in this region is further complicated by the fact that it textures as a silty clay loam. Ordinarily, loamy soils are well enough drained. These are not, and the problem may result from cementation in the loamy layers by silica derived from vitreous forms of ash. That vitreous forms may be present in the region is corroborated by negative results for the sodium fluoride test for ash in places where its presence is strongly suspected. A great deal of mixing of colluvium on these slopes adds to soil complexity because of dilution or concentration of various materials.

Since the distance separating these 'field lines' varies from 1 or 2 metres to as much as 150 m., the question arises as to why the variation. We feel there may be an answer to this question in the depth of the poorly drained soil. Observation of the Loma Larga zone (Figs. 56 and 57), where separation of field lines is minimal, reveals ditches which penetrate a perched water table about 20 cm. below the surface *(Pro Calima* 2). The terrain is gently sloping. However, on the south west side of the Billar, the planting areas are some 4 to 5 m. apart on equally gentle terrain. The difference is that at the Billar the depth below surface of the poorly drained stratum is clearly lower. Thus, depth to the zone of bad drainage seems to be an important criterion for the spacing of ditches.

On much steeper slopes on the south east side of the Billar ridge, only two 'field lines' separate a cultivation area some 150 m. wide. Here the poorly drained stratum is much further below the surface, judging from trenches dug nearby, and the gravity effect of a steep slope undoubtedly assists removal of excess water during rains. Thus, the factor of slope can be eliminated in the search for explanations of ditch separation. It seems reasonable to conclude, therefore, that ditch spacing depends on the depth at which poor drainage begins. One might even expect to find no correlation between the angle of slope and the distance between the ditches upon it. On the other hand, if our interpretation is correct, the closer the stratum of poor drainage to the surface, the smaller the distance between the ditches, and *vice versa.* This proposition can be tested by field observation.

There remains the possibility that these ditches could have served to prevent slumping, as suggested by Botero in his contribution to this volume. To date we have no corroborative field evidence, although slumping predictably occurs from severe modern overgrazing on steep slopes. These studies will also be continued in future field seasons.

Physical geofactors are important in the explanation presented above, but human geofactors should be observed as well in any thorough investigation of the 'field line' problem, including the possibility that the ditches may also have served as property boundaries or to separate differing crop combinations.

Acknowledgments

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A pre-Spanish Technique for the Prevention of Mass Movements of Soils

By Pedro Botero

In the course of discussions about the 'field lines' in Calima, Dr. Botero suggested that the primary function of the ditches was to prevent slumps and land-slips in a region subject to heavy tropical storms. The Editors invited him to present his case in a short note, and he offers the following arguments in support of his view.

(a) Superficial water erosion is not a problem on the volcanic ashes of the Calima zone. These ashes are very stable, except for mass movement and slumping. It is therefore possible to construct downslope drainage ditches without great risk of erosion in this kind of ash.
(b) In fields with drainage lines we have not observed slumps or mud flows of the kind which are so common in these hilly, ash-covered zones.
(c) These ashes are very permeable and have a great capacity for water-retention. They rest on red clays derived from diabases, and these clays are of low permeability. This creates an unconformity, with the consequence that rain water does not penetrate into the clay, though it supersaturates the ash layer, giving rise to conditions that encourage mass movement of the ash.

Conclusions

The ditches were not primarily constructed to prevent the crops from suffering lack of oxygen because of waterlogging, for on slopes like those of Calima (which range from 12% to more than 50%) the water drains from the surface, and from the subsurface clays, fairly rapidly, especially when the form of the slope is convex, as is the general case in this area. One must keep in mind that, for supersaturation to have an effect on crop plants, the porous spaces in the soil must be kept filled with water for continuous periods of several days. On the other hand, a few minutes of supersaturation are enough to produce mass movement of the ash layer, with catastrophic consequences for the inhabitants of the area, since these slumps can demolish fields, houses etc. The risk becomes more serious if one imagines the zone with a greater density of population than it has today.

Clearly, the ditches serve for the drainage of the area. They are indeed designed to prevent the waterlogging of the ash layer – not because such short term episodes of saturation cause problems to the crops, but rather because they produce catastrophic movements of the soil.

Gold objects from Primavera: links between Calima, San Agustín and the Cauca Valley

By Clemencia Plazas

At the locality of Primavera (situated in the municipio of Bolívar, department of Valle del Cauca (Fig. 1) at 2000 m. on the slopes of the Cordillera Occidental overlooking the river Cauca) was found a group of gold objects which show many similarities with items from the Calima region and San Agustín. The objects are illustrated in Figs. 61–63. Partial details about the discovery were obtained from an intermediary who visited the site in order to buy the recently discovered grave group. Of the 21 objects that were saved, it is known that they were found in a tomb together with a pottery vessel in the form of a frog surmounted by two spouts joined by a bridge handle. The form of this vessel is characteristic of the Yotoco style already well known from the Calima region *(Pro Calima* No. 2) and from various sites in the Cauca valley.

Six of the pieces are figurines made of repoussé gold sheets joined together so as to cover a wooden core, of which only carbonized fragments remain. The separate pieces of gold are joined by pins of the same metal.

With the figurines were found two pairs of ear pendants, a nose-ornament and a necklace, all of them miniature objects that were undoubtedly once attached to the figurines. Six nose-ornaments of spirally twisted bar metal, and the same number of flat disc-shaped pectorals made of gold were also part of the tomb offering, together with three solid gold, penannular, nose-ornaments.

Of the six figurines in hieratic attitudes, four represent seated or squatting male personages, one (smaller than the others) is a standing female, and one is an animal figure resting on a circular base with holes for the pins that must certainly have attached it to a larger object. The craftsmen gave much importance to the heads, both in size and in decorative detail. The figures wear tall coiffures held in place by bands or woven strips which fix the hair in two plaits at the back.

In the collection of the Museo del Oro, Bogotá, are human and feline figurines, assembled in the same way, found at localities in the Calima and Cauca valleys. Some of these figurines served as containers for the lime that was used in coca chewing (Fig. 64). The figures which adorn sheet metal jewellery, including the large, heart-shaped Calima pectorals (v. *Pro Calima* No. 1, Fig. 5), are also similar in their features, attitudes and ornaments to the figurines from Primavera (Figs. 65–66).

The distribution of gold objects in the so-called Calima style goes

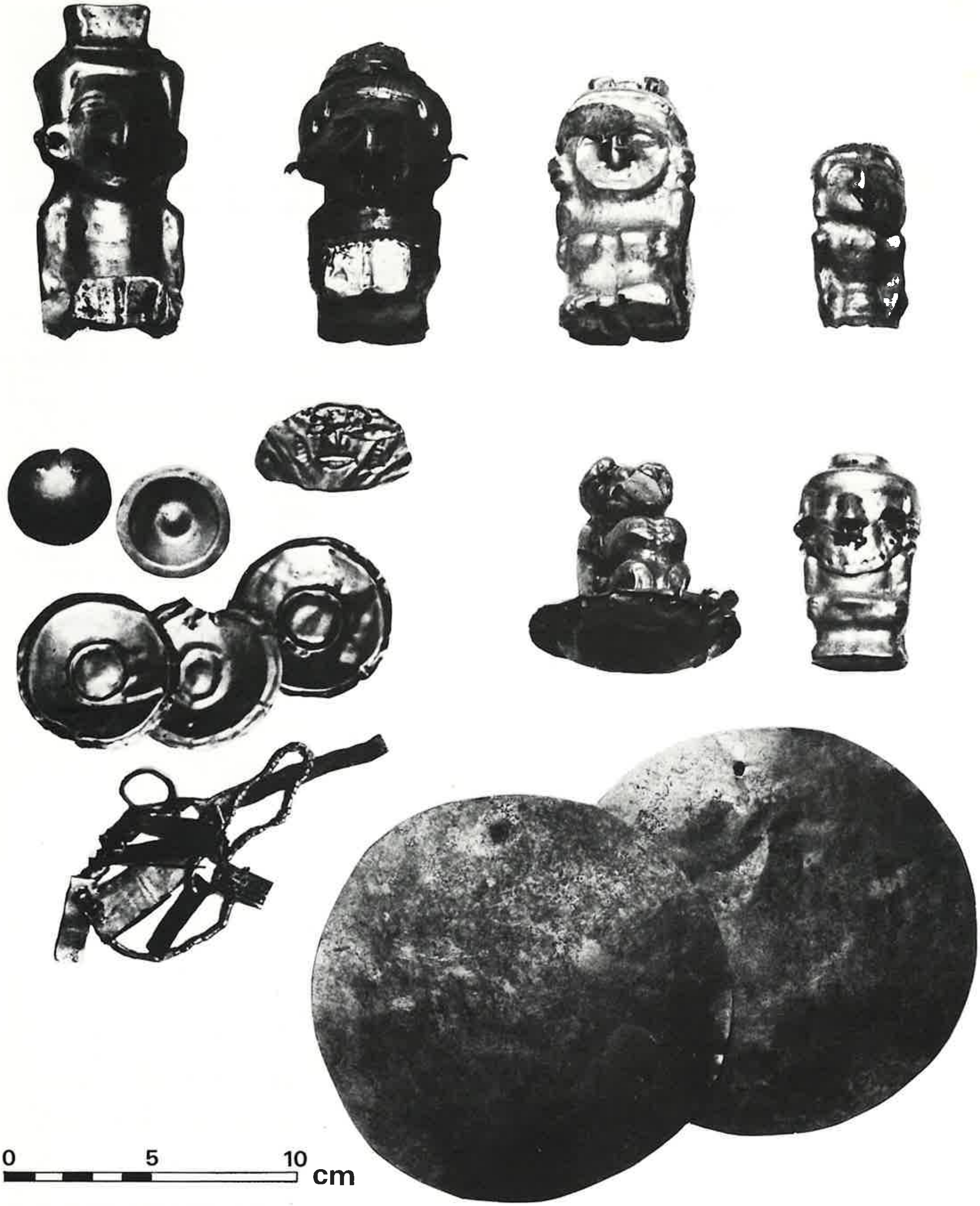

Fig. 61. Gold items from Primavera.

beyond the traditional boundaries of the 'Calima archaeological zone', and pectorals, tweezers and pins in this style have been found throughout a large part of southwestern Colombia. The present note considers only the metallurgical aspects of this question, though there are many shared characteristics in other cultural manifestations within this wide area.

The hypothesis of a cultural horizon extending from the valleys of the Dagua and Calima rivers as far as the Colombian Massif by way of the Cauca and Magdalena valleys, between 500 B. C. and A. D. 700–1000, is reinforced by finds like the one from Primavera.

Fig. 62. Sheet gold figurines from Primavera.

0 5 cm

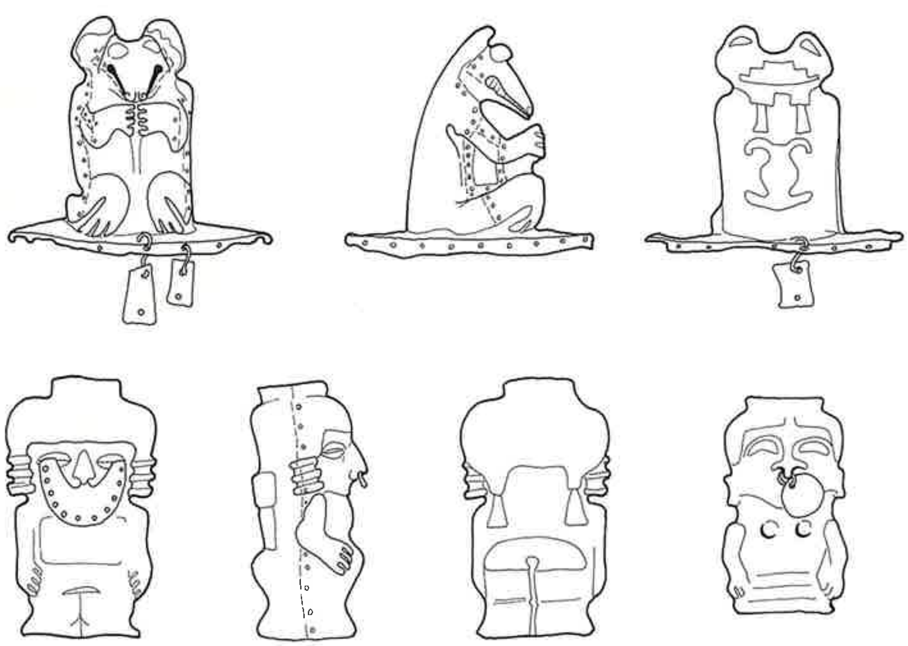

Fig. 63. Sheet gold figurines from Primavera.

0 5 cm

Fig. 64. Lime flask of sheet gold, in the form of an animal. From Restrepo, Valle del Cauca, in the Calima zone. Length 13.3 cm. Museo del Oro No. 29.

Fig. 65. Anthropomorphic figurine from the municipio of Betania, San Agustin, department of Huila. Height 2.5 cm. Museo del Oro No. 24.251.

Fig. 66. Pectoral ornament of sheet gold with a repoussé human figure. From Supía, department of Caldas. Height 20.3 cm. Museo del Oro No. 416.

Preliminary reconnaissance in the Pavas-La Cumbre Area

By Theres Gähwiler

1. Introduction

In October 1981, in continuation of the field season of the Pro Calima group, I explored the area of La Cumbre-Pavas-Bitaco, which forms part of the municipio of La Cumbre. La Cumbre lies northwest of Cali, in the Western Cordillera between 1400 and 1600 m. above sea level, and borders on the Restrepo region where most of the activities of the Calima Project have been concentrated (Fig. 1).

Archaeological work has previously been conducted by the Pro Calima team in the area between Restrepo and La Cumbre, and some of the results (i.e. the Montecito excavation) were published in *Pro Calima* No. 2.

To archaeologists and collectors alike, the area is notable as one of the principal sources of the large burial urns which are generally known as 'Pavas urns'. The opportunity to continue archaeological work in the La Cumbre region appeared particularly attractive because we are trying to investigate the relationship between the makers of Pavas urns and the inhabitants of the adjacent areas. The pottery shares certain features with that of the Restrepo region. In particular, a number of decorative attributes are common to the Sonso style and to the material found in Pavas and La Cumbre. To explore the geographical distribution of these Pavas urns, and to establish a chronological sequence for the area, are among the long term objectives of this investigation.

2. Problems of chronology

In a study made by Bray and Moseley in 1969–70 (see *Ñawpa Pacha* 7–8: 85–104), an archaeological sequence was set up to serve as the basis for an investigation of chronological ordering in the Calima area. It is therefore of interest to find out the degree to which the chronological sequence for the Calima area applies also to the region of La Cumbre. Prior to 1981, three radiocarbon dates had been obtained for Pavas urn burials (see *Pro Calima* No. 2, p. 2):

305 ± 110 b.c. (Beta-1500) from Montañitas
610 ± 75 a.d. (Beta-1501) from La Virginia
765 ± 75 a.d. (Beta-1835) from Tres Esquinas.

To these, two more C^{14} dates can be added this year:

1050 ± 90 a.d. (B-4030) from La Sofía
1140 ± 50 a.d. (B-4031) from Ocache.

The new dates conform reasonably well with the expected recent age for Pavas urns, but there are still problems of chronological alignment. In terms of the Calima sequence, the dates for La Sofia and Ocache fall within the later part of the Yotoco period, although (on stylistic grounds) the majority of the pottery found in the La Cumbre area has its closest links with the Sonso style, which follows directly after Yotoco and belongs to the final centuries before the Spanish Conquest.

3. Surface survey

Archaeological features such as house platforms, tombs, field lines, petroglyphs are present throughout the area of Pavas – La Cumbre – Bitaco. Since the survey had as one of its purposes the determination of localities for more intensive work in the future, it seemed logical to begin with a survey to locate suitable sites and to obtain sherd collections for comparative analysis. The following sites yielded significant collections of diagnostic artifacts, which are still under study.

La Florida (La Ventura)

A refuse deposit was shown to me by Rodrigo Solarte. It covered an area of ca. 6 m × 6 m on a slope. The surface was slightly disturbed. A test pit (30 cm × 30 cm) revealed a cultural deposit 40 cm deep. Among the diagnostic sherds were rims of bowls whose diameter tended to cluster around 24 cm. In addition there was a large amount of black and red painted pottery, rather fine and polished.

La Selva (Agua Clara)

On the way from La Cumbre to Ocache lies the Hacienda La Selva. On a sloping hill, where house platforms were visible, a small refuse deposit was detected in a newly cleared field. Examination of the sherds showed a variety of both coarse and fine ware with no distinctive features.

Ocache

In Ocache, sherds were scattered in a newly planted yuca field. The bulk of the fragments had decoration, mainly appliqué, including representations of zoomorphic figures.

Mozambique

Numerous potsherds, stone artifacts and some debitage lay on the surface over an area of more than a hundred square meters, cut by arroyos formed during periods of heavy rain. The badly eroded sherds showed a predominance of incised decoration.

On the whole, the pottery shows a remarkable similarity with that of the Restrepo region. In particular a number of decorative attributes are common to the Sonso style and to the material found in Pavas and La Cumbre. An in-depth analysis should reveal the extent to which it differs from the Sonso style. No Yotoco and Ilama pottery was represented in these surface collections.

4. Excavations

Arboledas

A typical tomb was recorded in Arboledas (La Ventura) a few hundred metres beyond the junction for Guaduales, where the road from Pavas to La Cumbre branches off to Bitaco. This tomb was of the shaft and chamber variety (Fig. 67). The fill of the shaft was not easily distinguishable because of the equally reddish colour of all the strata.

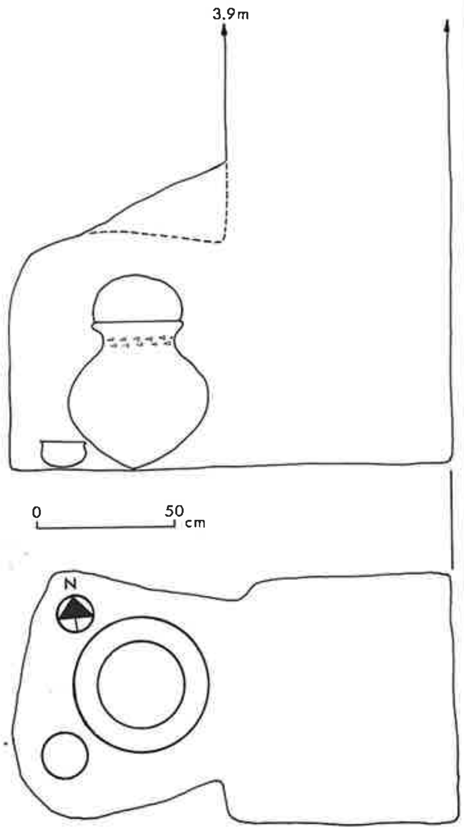

Fig. 67. Plan and section, Tomb at Arboledas.

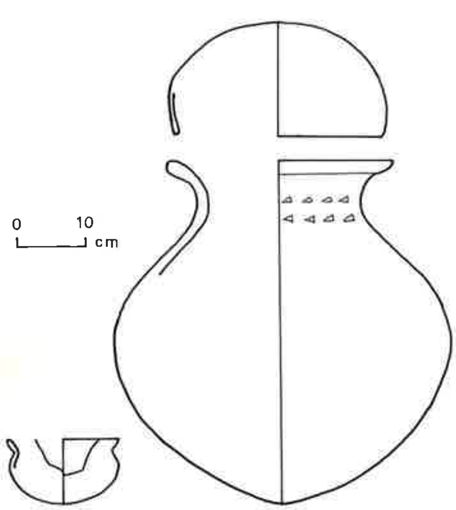

Fig. 68. Pavas urn and vessel from the Tomb at Arboledas (La Ventura).

The rectangular shaft (90 × 80 cm.) reached a depth of 3.90 m. and produced no sherds. The entrance to the chamber was not blocked by stones and had therefore filled up with debris. The chamber was oriented to the west and measured 90 cm. in width, 80 cm. in length, and had a maximum height of 83 cm. It contained one urn, partly damaged and with pieces missing from the rim (Fig. 68). Decoration consisted of two horizontal rows of triangular impressions around the neck. The urn was covered by a plain open bowl and contained human skeletal remains, presumably of one young adult, in a poor state of preservation. Only a few bones were identifiable; some of them showed cracks and were shrunken, possibly a result of exposure to heat. To the west of the urn stood a small vessel (9.5 cm. high), partly broken. Its content awaits analysis, but included a few specks of charcoal and an unidentified leaf, which was photographed through a stereomicroscope and is illustrated in Fig. 69.

Bitaco

With the collaboration of Ricardo Llano a grave was excavated on the Hacienda La Sofía, which belongs to the Llano family. The tomb was located on a sloping hill and was of the common shaft and chamber type. The shaft was 7.45 m. deep, with a few sherds in the fill. On the right hand side of the entrance to the chamber appeared sherds with bone meal clinging to them. The ceiling of the chamber was vaulted to accomodate the height of the three urns (Fig. 70). In the middle stood a cylindrical urn, locally known as a 'velero', 125 cm. high and with traces

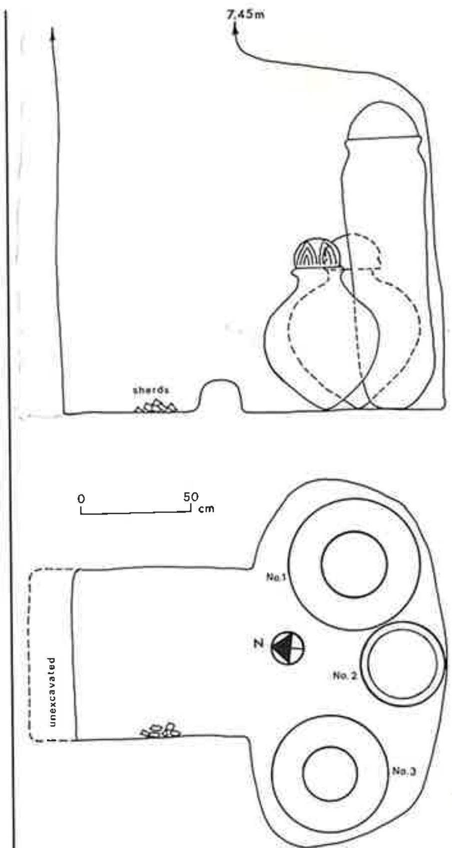

Fig. 70. Plan and section of Tomb at La Sofía (Bitaco).

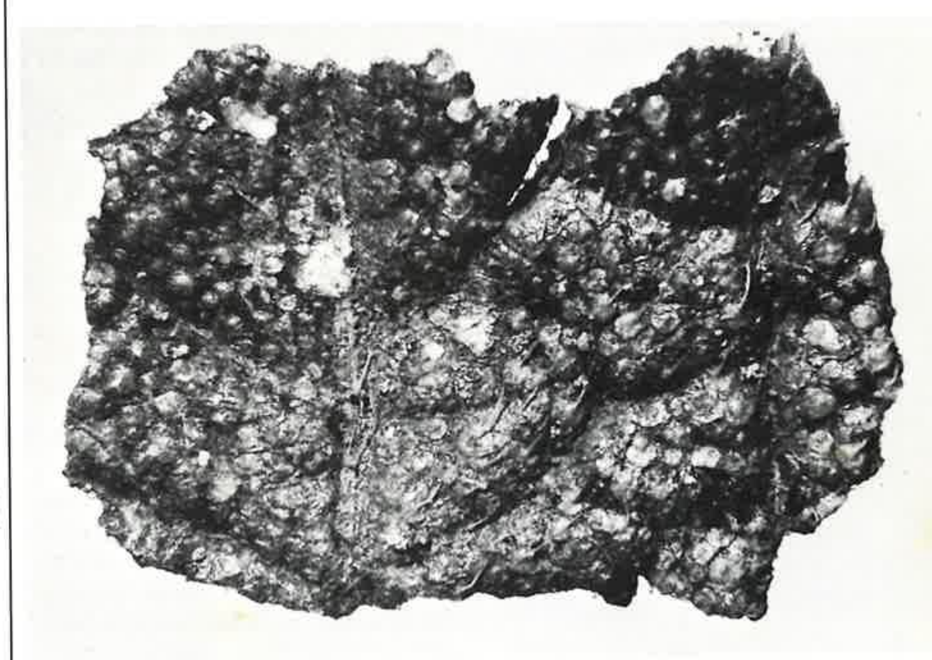

Fig. 69. Fragment of leaf, found in the small vessel in the Tomb at Arboledas. 12 times natural size.

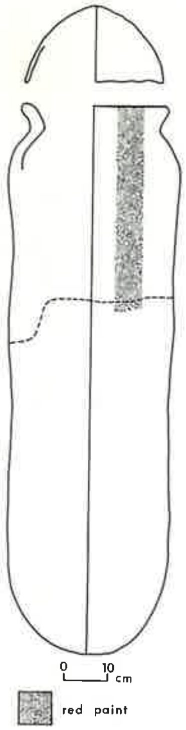

Fig. 71. Urn of the form known as velero, from the Tomb at La Sofía (Bitaco).

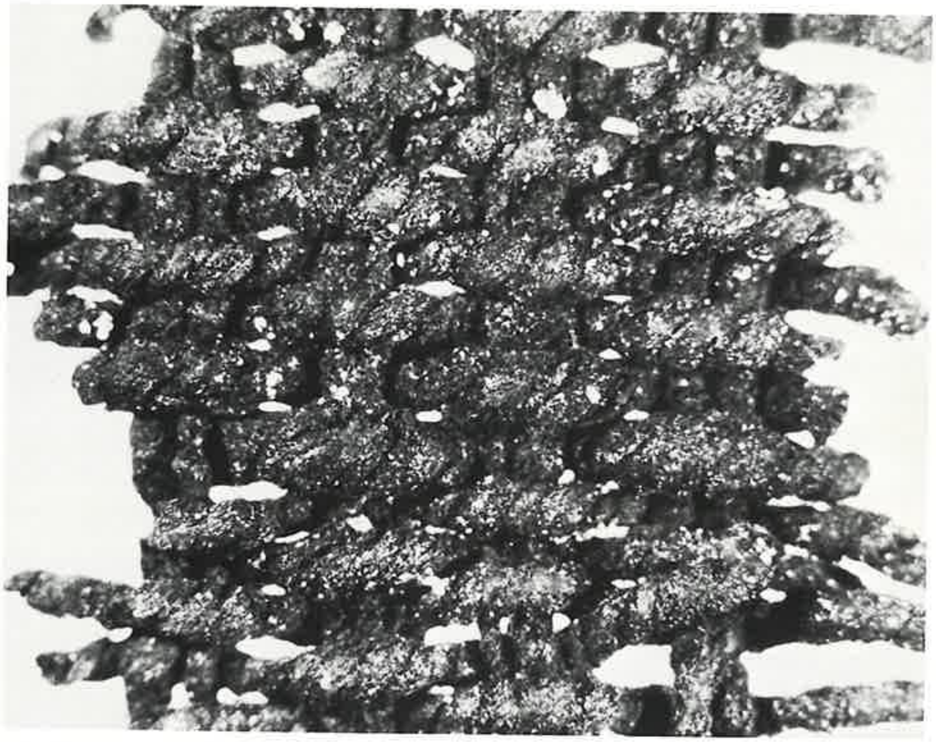

Fig. 72. Fragment of textile from the velero, La Sofía (Bitaco). 12 times natural size.

of red paint in vertical stripes 5 cm. wide (Fig. 71). This urn was covered by an open bowl, and was filled up to 70 cm. with skeletal remains of an undeterminable number of people. The bone material was badly preserved, and some of the bones showed traces of burning. Within the bone meal a few specks of charcoal were detected, together with small fragments of textiles (Fig. 72). These are of plain weave with either warps or wefts used in pairs. Since no borders of the textiles were preserved, it was not possible to determine warp and weft.

The urn No. 1 (to the left) was 66 cm. high, with a pointed bottom and a damaged rim. Decoration consisted of three vertical appliqué cordons at the neck. This urn was sealed with a lid (Fig. 73), was half full of bones, and yielded enough charcoal to give a radiocarbon date of a.d. 1050 ± 90 (B-4030). In addition, the contents included small fragments of textiles (Fig. 74).

Urn No. 3 (to the right) had, as its only decoration, triangular impressions on the outer side of the rim. It was covered by the inevitable adjunct, an open bowl, which was painted with a black, geometrical, linear design over a red base (Fig. 75). Within the urn were bones, including four femora arranged in a

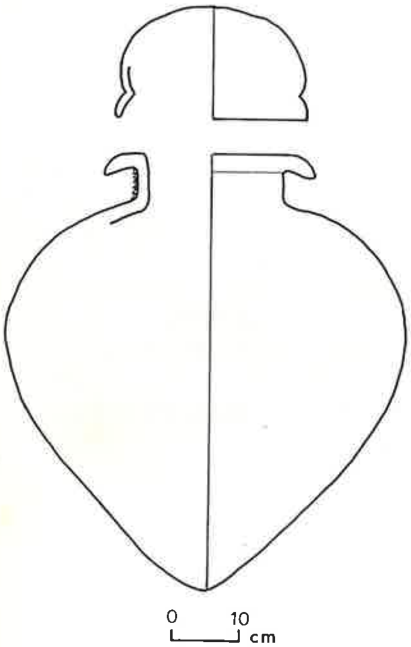

Fig. 73. Pavas urn No. 1, from the Tomb at La Sofía (Bitaco).

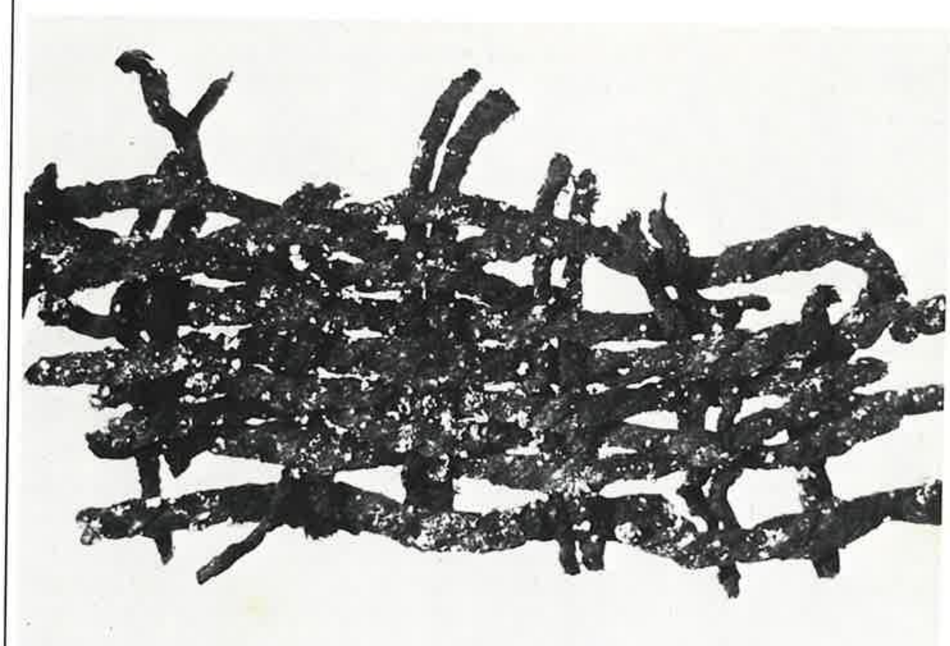

Fig. 74. Textile fragment from urn No. 1, Tomb at La Sofía. 8 times natural size.

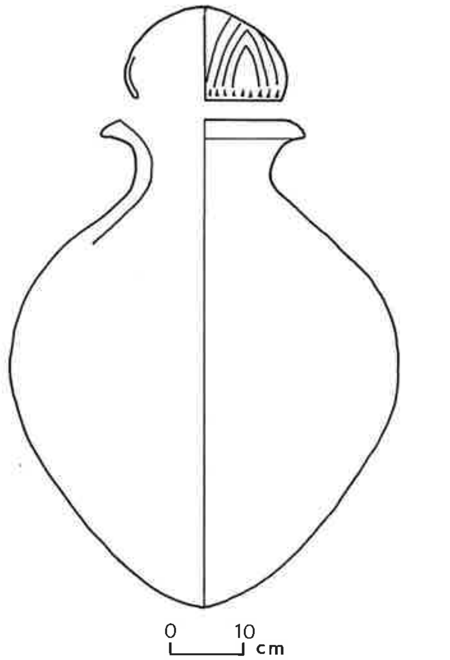

Fig. 75. Pavas urn No. 3, found with a velero; Tomb at La Sofía (Bitaco). The lid shows a black, linear design over a red base.

Fig. 76. Fragment of cord from urn No. 3, Tomb at La Sofía. 20 times natural size.

row alongside the inner side of the vessel and fragments of textile (Fig. 76).

Ocache

A burial complex was located on a steep slope high up on a ridge in the hills of Ocache. The four tombs were all of the shaft type with side

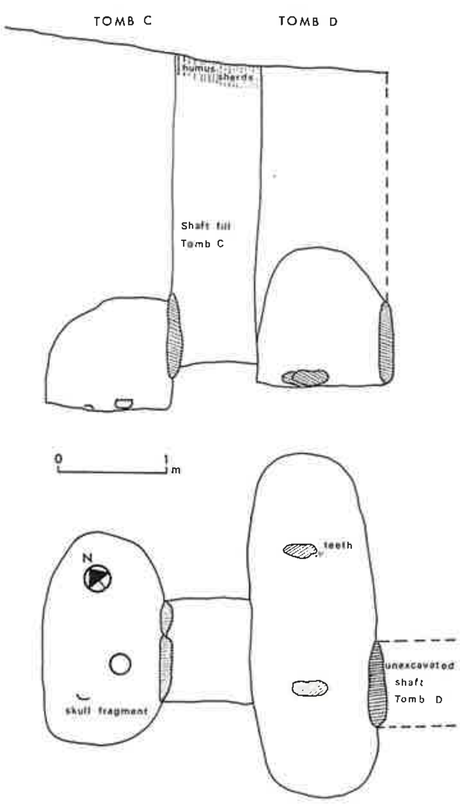

Fig. 77. Tombs C and D at Ocache.

chamber, and had contained primary burials. One of the tombs had previously been disturbed. The shafts were rectangular and ranged from 2.90 to 3.37 m. in depth. The vaults were oval in ground plan. Owing to the poor state of preservation, the burial position could be determined in only two instances.

The most interesting of the four structures was Tomb C (Fig. 77). The first 20 cm. of the shaft fill contained a few sherds. At a depth of 2.25 m. in the shaft, a large and a smaller stone slab appeared, sealing the entrance to the chamber, which was oriented to the northwest. On the floor lay a fragment from a skull, and at the presumed height of the breast was a bowl (Fig. 78). A piece of the bowl was missing, and the rim of the vessel showed irregular impressions. The bowl contained powdery material, teeth fragments and objects which under microscopic examination showed a leaflike structure (Fig. 79). There was sufficient charcoal for a radiocarbon sample, which gave a date of a.d. 1140 ± 50 (B-4031).

The shaft of Tomb C touched the rear wall of the chamber of another grave, allowing access to the chamber of Tomb D without opening the shaft (Fig. 77). There is evidence that we are dealing with two separate structures, since Tomb D has its own independent entrance shaft. The chamber revealed two stones. Some teeth were found immediately beside one of the stones, and may indicate the position of the body.

5. Petroglyphs

Finally, we can add to the known distribution of petroglyphs. As in the adjacent area of Restrepo, there are engraved boulders in the region of La Cumbre-Pavas-Bitaco with a similar variety of motives. We intend to make an inventory of these.

In La Cumbre a boulder showing concentric circles was already registered in previous years by the Calima Project. A huge engraved rock (9.50 m. long and 4 m. high) with mostly geometric signs, but also figures with bent arms and legs, was discovered in Mozambique on the banks of the Rio Tambor. Another petroglyph was brought to our attention by Ricardo Llano on the Hacienda La Sofía in Bitaco, rather hidden in dense tropical vegetation on the banks of the small river Madrid. A closer examination revealed figures, a possible battle scene, and a series of hands (Fig. 80).

In one of the future seasons we plan to make a visual record of the designs by means of a new technique

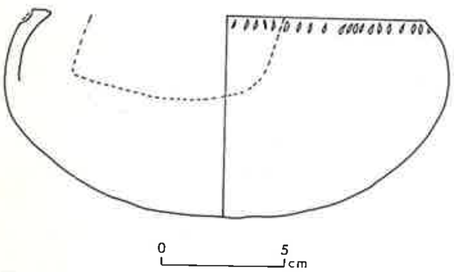

Fig. 78. Bowl from Tomb C at Ocache, containing powdery material and teeth fragments.

in order to provide a maximum of objective evaluation of the motifs. The technique consists in rubbing first with a plant wad which brings out the more visible lines of the design. A second rubbing with carbon paper enhances the pattern by emphazising the contrast and revealing the less visible part of the pattern (Fig. 81).

6. Conclusion

This field study must be considered merely as a beginning, which may serve towards orienting future work. The data obtained suggest that we are dealing with an interesting archaeological zone, in which there are both urn burials and primary burials. It is important to discover whether these burial practices reflect the customs of different groups of people or different time periods, or whether the mode of burial bears a relation to the social status of the deceased. Furthermore it appears that the content of the urns is sometimes well protected from detrimental environmental influences. We expect that closer analysis of the grave goods (such as textile and food samples) may provide additional information about the life of pre-Columbian peoples in this area.

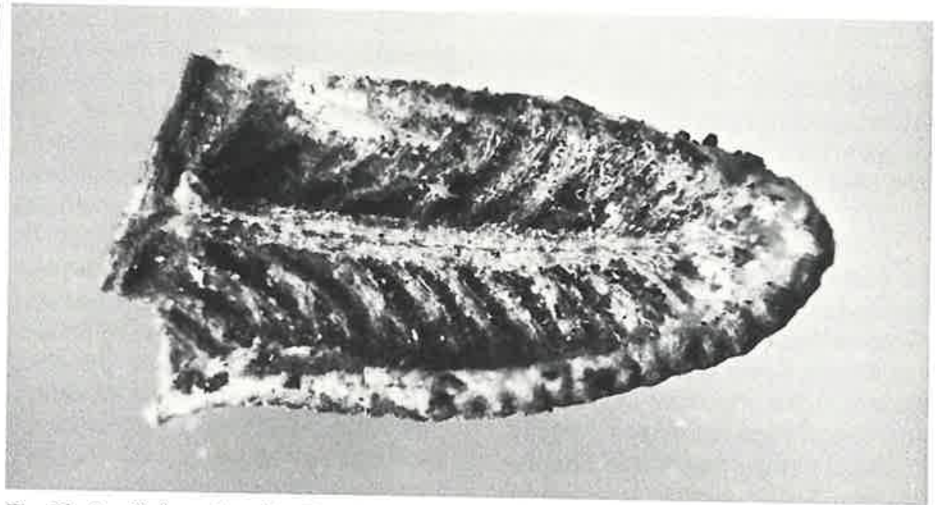

Fig. 79. Leaf? from bowl in Tomb C at Ocache. 20 times natural size.

Fig. 80. Petroglyph in Bitaco (Hacienda La Sofía).

Fig. 81. Rubbing from petroglyph at Mozambique.

Zusammenfassung

Bericht über die Grabungskampagne 1981 von Warwick Bray, Leonor Herrera und Marianne Cardale Schrimpff

1. Einleitung

Im Mai erkundeten L. Herrera und M. Cardale Schrimpff während zwei Wochen das El-Dorado-Tal. Die eigentliche Grabungskampagne, an der sich kolumbianische Studenten und Spezialisten beteiligten, begann im Juli und dauerte bis Ende September.

2. Luftbildauswertung, Rekognoszierung und Kartierung

Ziel der Untersuchung ist es, eine archäologische Bestandesaufnahme eines Teils des alten Calima-Gebietes durchzuführen. Archäologische Spuren, die auf grossformatigen Luftbildaufnahmen (ca. 24 km² der El-Dorado-Region) zu erkennen waren, wurden im Gelände aufgesucht und nachgeprüft. Alle positiven Befunde wurden auf einer Karte im Massstab 1:5000 eingetragen. Ein Ausschnitt dieser Karte ist in Abb. 3 zu sehen. Neben geplünderten Gräberfeldern, alten Wegen, Feldmarkierungen und Petroglyphen konnten durch die Begehung mehr als 600 kleine und mehrere sehr grosse Siedlungsterrassen erfasst werden. Einige dieser sehr grossen Siedlungsterrassen (über 100 m breit) besassen einen T-förmigen Grundriss oder «Pseudo-Tumuli». An einer dieser Terrassen (El Billar) wurden Ausgrabungen durchgeführt.

3. Ausgrabungen auf der Hacienda La Suiza

Das Gebiet, das im Jahre 1981 genau erforscht wurde, gehört zur Hacienda La Suiza und ist in Abb. 7 zu sehen.

a) El Billar (Abb. 8–17)

Diese Fundstelle ist in der Gegend unter dem Namen «El Billar» bekannt. Es handelt sich um eine künstlich geschaffene, ebene Fläche von 100 × 90 m. Dazu war die Kuppe des Hügels bis auf einen kleinen Tumulus abgetragen und das Material zur Vergrösserung der Fläche an den Rändern deponiert worden. Durch 52 in 6 Transversalen angelegte Sondierbohrungen (Abb. 11) liess sich berechnen, dass bei der Terrassierung mindestens 3600 m³ Erde verschoben worden waren. Durch Phosphatproben, wie sie im Artikel von R. Eidt näher beschrieben werden, ermittelte man mögliche Wohn- und Anbauzonen, doch scheinen auch grosse Freiräume ohne Spuren menschlicher Tätigkeit existiert zu haben. Die Phosphatwerte und die Stelle der Entnahme in den Schnitten sind in Abb. 9 zu sehen.

Die Errichtung und Besiedlung der Terrasse fällt in die Sonso-Zeit. Sonso-Scherben wurden in den oberen Schichten des Billars sowohl in den Aufschüttungen am Rande der Terrasse wie auch in der darunterliegenden dunklen Schicht geborgen (Abb. 17). Es ist allerdings nicht klar, ob es sich bei dieser dunklen Schicht um die ursprüngliche Begehungsfläche handelt oder ob diese ebenfalls aufgeschüttet ist. Es fanden sich Spuren menschlicher Aktivität im obersten Teil dieser Schicht, die ein 14C-Datum von 1190 ± 60 n. Chr. (Beta-4907) lieferten. Das gelegentliche Vorkommen von Yotoco-Scherben in allen Horizonten, auch in der dunklen Schicht, mag ein Hinweis darauf sein, dass eine Yotoco-Siedlung auf dem Hügel oder in der Nähe der Randzone existiert hatte.

b) Ausgrabung einer Hausplattform: Schnitt XVI (Abb. 18–21)

Es handelte sich hier um eine typische Siedlungsterrasse, wie sie schon in vergangenen Jahren ausgegraben worden waren. Ungewöhnlich war jedoch das Vorhandensein einer Grube in der Mitte der Terrasse. Das Material aus den Kulturschichten ist dem Sonso-Typ zuzuweisen. Eidt bemerkt, dass die Phosphatwerte auf keine sehr intensive Nutzung schliessen lassen. Auch scheint diese Siedlungsterrasse etwas älter zu sein als der Billar, doch gibt es keine stratigraphischen Anhaltspunkte, die Aufschluss über das zeitliche Verhältnis zwischen der kleinen Terrasse und der grossen Hauptstruktur geben könnten.

c) Feldmarkierungen an den Hängen des Billars (Abb. 22–24)

Einer der talwärts laufenden Kanäle (Schnitt XVII in Abb. 7) wurde ausgegraben. Der untere Teil der Rinne war ziemlich erodiert und die Aufschüttung, die anscheinend sehr rasch erfolgt war, enthielt ebenso Sonso-Scherben wie auch die darüberliegende Schicht, die die Rinne zudeckte (Abb. 24). Diese Linien müssen irgendeine Bewandtnis mit dem Anbau haben, doch bleibt ihre exakte Funktion ein Rätsel. Als mögliche Erklärung können Entwässerung (vgl. Eidts Artikel) oder das Verhindern von Erdrutschen (vgl. Boteros Argumentation) in Frage kommen. Möglicherweise handelt es sich auch um Grenzlinien, die ein Feld vom andern abtrennten. Eine solche Anwendung von Rinnen existiert noch heute bei den Guambiano-Indianern im Cauca-Departement.

d) Ausgrabung von Gräbern auf der Hacienda La Suiza

Es handelt sich um ein Gräberfeld aus der Sonso-Periode (Grab 1–4) und um zwei Gräber aus der Yotoco-Zeit (Grab 5 und 6). Die Lage der Gräber kann der Karte (Abb. 7) entnommen werden, und die Pläne und Beigaben sind in Abb. 25–30 abgebildet. Das nicht abgebildete Grab (T2) wies einen rechteckigen Schacht auf, der einige Sonso-Tonscherben enthielt. Der Eingang zu den Grabkammern von Grab 1, 3 und 4 war mit Pfählen verbarrikadiert, die an der Schwelle zum Kammereingang eingerammt worden waren. Die Holzpfähle selbst waren zwar zerfallen, aber der Abdruck war im verfestigten Einfüllungsmaterial von Grab 4 sehr gut sichtbar (Abb. 28).

e) Oberflächenfunde im Siedlungsgebiet (Abb. 31–37)

Östlich des Billars befand sich ein besiedeltes Gebiet mit Tonscherben und Steinen, die über eine Fläche von mindestens 8 Hektaren verstreut waren. Es handelt sich hier um die grösste bekannte Siedlungszone in El Dorado. Die Stratigraphie ist an der Stelle der Strassenböschung, die von Dr. E. Müller freigelegt worden war, deutlich ersichtlich. Die aus dem unteren Teil der Kulturschicht, unmittelbar über der vulkanischen Aschenschicht stammende Holzkohle lieferte ein 14C-Datum von 1280 ± 80 n. Chr. (Beta-3509) (Abb. 33).
Eine systematische Sammlung von Oberflächenfunden wurde in den

Zonen C1–C5 (Abb. 32) vorgenommen. Das Fundmaterial aller 5 Zonen ist zur Hauptsache der Sonso-Periode zuweisbar, mit einem ganz geringen Anteil an Yotoco-Material. In Zone C5 wurde eine Fläche von 100×75 m in Felder von 5×5 m aufgeteilt. 12 dieser Quadrate wurden im Detail abgesucht, wobei jeder Fund gezählt und kartiert wurde. Das Resultat ist in Abb. 34–36 illustriert. Das Fundgut war ziemlich gleichmässig über die ganze Fläche verteilt und zeigte keineswegs eine Häufung etwa in der Nähe der Siedlungsterrassen. Dieses Experiment zeigt, wie sehr das Erkennen von archäologischen Fundstellen von der Art des Bodenbewuchses abhängt, denn die Felder mit dichtem Grasbewuchs erbrachten fast kein Material, und deshalb bleibt auch eine Anzahl von archäologischen Fundstellen unentdeckt. Siedlungsstruktur und soziopolitische Organisation können deshalb nicht unbefangen aus einer Verbreitungskarte der Siedlungsterrassen rekonstruiert werden, ebenso wie die Bevölkerungsdichte aufgrund der Anzahl der Siedlungsterrassen viel zu niedrig ausfallen würde.

4. Ausgrabungen im Talboden der Hacienda El Dorado

Diese Ausgrabungen dienten vor allem zur Abklärung der Frage, ob sich dieses Gelände für eine grossangelegte Grabungskampagne im Jahre 1983 eignen würde.

a) Ausgrabung einer erhöhten Plattform (Abb. 39–40)

Die Fundstelle bestand aus einer Fläche von eingeebnetem, verdichtetem Boden, der kreisförmig von einer grabenartigen Vertiefung umgeben war (Abb. 39). In der obersten Kulturschicht kam neuzeitliches Material zutage, und im darunterliegenden Lehm fanden sich vier atypische Scherben. Es ist nicht klar, ob diese Plattform natürlichen oder künstlichen Ursprungs ist, denn die Funde erlauben keine eindeutige Bestimmung.

b) Ausgrabung von erhöhten Feldern (Abb. 41–42)

Im Talboden fand sich eine Anzahl stark verwitterter Feldmarkierungen, die aus langen, parallelen, ca. 5 m breiten Streifen bestehen, die durch wenig tiefe Rinnen voneinander getrennt sind. Einer dieser Streifen samt Rinne wurde versuchsweise ausgegraben. Zuunterst lag die natürliche graue, lehmige Schicht, die überall im Talboden anzutreffen ist und auf eine Periode der Versumpfung oder auf stehendes Wasser hinweist. Darauf folgten Spuren der ursprünglichen Bodenoberfläche, die ihrerseits überdeckt worden war durch die für den Anbau angehäufte Erde. Diese Aufhäufung ergibt eine grössere Tiefe der landwirtschaftlich nutzbaren Schicht, und ausserdem bleibt das Land in einem normalen Jahr vor Überflutung bewahrt. Die Thermolumineszenzanalyse einer Scherbe aus der Humusschicht datiert diese in die Zeit zwischen 1000 und 1400 n. Chr., eine Scherbe aus der grauen Lehmschicht, die älter sein mag als die erhöhten Felder, in die Zeit von 1500 v. Chr. bis 50 n. Chr.

c) Ausgrabung von Entwässerungsgräben (Abb. 43–47)

Einer der Gräben einer Serie von Entwässerungsrinnen wurde freigelegt (Abb. 43, 44). In der Aufschüttung fanden sich Sonso-Scherben, Steinartefakte und Absplisse (Abb. 45, 46). Die Basis des Grabens lag unter dem Grundwasserspiegel und enthielt Äste und anderes organisches Material (Abb. 47). Ein Stück verkohltes Holz aus dem untersten Teil der Aufschüttung ergab ein 14C-Datum von 1465±65 n. Chr. (Beta-4906). Dieses Datum mag in die Zeit fallen, als die Entwässerungsgräben ausser Gebrauch kamen und zu verschlammen begannen. Einige Yotoco-Scherben stammen aus der ursprünglichen Bodenoberfläche, durch die der Graben schnitt. Schicht 5 bestand aus grauem Lehm, der schon unter der angehäuften Erhöhung zu erkennen war. Ein ziemlich grosser Baumstrunk oder Ast durchdrang diese Schicht von unten her, und dies weist darauf hin, dass der Zeit der schlechten Entwässerung eine Periode vorausging, wo Wald auf dem Talboden wuchs.

5. Inventarisierung von Sammlungen

Unter den in diesem Jahr aufgenommenen Gegenständen befanden sich Gefässe aus einem Ilama-(Frühes Calima-)Fundkomplex, der aus einem Gräberfeld der Finca Agualinda bei Restrepo stammt. Neben verzierter Keramik (Abb. 49) kam auch eine grössere Anzahl von gewöhnlicher Keramik (Abb. 48) zum Vorschein, was die Kenntnisse in bezug auf Gebrauchskeramik dieser Periode beträchtlich erweiterte. Eines der Agualinda-Gräber ergab ein 14C-Datum von 80±90 v. Chr. (Beta-5100). Dieses Datum ist viel jünger als erwartet und ebenfalls viel jünger als das andere vorhandene Datum für die Ilama-Periode: 1590±70 v. Chr. (Beta-2830) von La Iberia. Das Datum für Agualinda überschneidet sich mit den frühesten Daten für die Yotoco-Periode, und es stellt sich deshalb erneut die Frage des Übergangs von der Ilama- zur Yotoco-Periode. Es gibt zwei mögliche Interpretationen: erstens, die 14C-Daten stimmen, und es bestand eine zeitliche Überlappung zwischen beiden Stilen. Zweitens, eines oder mehrere Daten stimmen nicht, und Yotoco ist absolut später als Ilama. Nur weitere Untersuchungen können zur Klärung dieses Problems beitragen.

Unter anderen bemerkenswerten Objekten, die im Jahre 1981 dokumentiert worden sind, befinden sich drei figurative Gefässe (Abb. 51) und das Fragment einer Goldtrompete aus El Dorado (Abb. 50), die ins Jahr 210±80 n. Chr. (Beta-4908) datiert wurde.

6. Untersuchungen im Jahre 1982

Die Arbeiten von 1982 konzentrierten sich noch einmal auf das El-Dorado-Tal. Ausgrabungen an erhöhten Feldern und Entwässerungsgräben haben ergeben, dass die ersten landwirtschaftlichen Tätigkeiten in die Yotoco-Periode reichen. Pollen-, Phytolithen- und Bodenanalysen wurden zwecks weiterer Bearbeitung im Laufe des Jahres 1983 entnommen. Durch Ausgrabungen an einer Gruppe von grösseren Siedlungsterrassen konnte gezeigt werden, dass diese wie der Billar während der Sonso-Periode errichtet worden sind, obwohl eine frühere Yotoco-Okkupation in der dunklen Schicht unter der Sonso-Aufschüttung nachgewiesen werden konnte.

Geomorphologische Gegebenheiten des Calima-Gebietes in Westkolumbien

Von Robert Eidt

In diesem Artikel wird die Geomorphologie des Calima-Gebietes, seine Geologie und Gesteinsgliederung, die Auswirkungen der tektonischen Vorgänge, das gegenwärtige Klima, die Vegetation, die Beschaffenheit der Böden und die verschiedenen Prozesse, durch die diese entstanden sind, geschildert. Die meisten Böden entstanden aus Gesteinen der Diabasit-Gruppe. Daneben hatte auch die Ablagerung von vulkanischer Asche einen Anteil an der Bodenbildung, wobei gerade durch diese Aschenschicht die Entwässerungsprobleme entstanden sein könnten (vgl. Abb. 53–59).

Phosphatanalysen in einer präkolumbischen Siedlung im Distrikt Restrepo

Von Robert Eidt

Menschliche Aktivität (besonders Abfallbeseitigung) vergrössert den Anteil von Phosphaten im Boden. Der sogenannte Ringtest ist ein Schnellverfahren, das die Konzentration des Phosphats in der Nähe der Bodenoberfläche zu erfassen vermag. An vielen Stellen der Billar-Siedlungsterrasse konnten nur geringe Hinweise auf eine frühere Besiedlung nachgewiesen werden. Eine Kombination von Phosphatbestimmung und Erhebung von Bodenproben ermöglichte es jedoch, eine mögliche Wohnzone mit hohem Phosphatanteil und brauner, kompakter Erde von einer Anbauzone mit weniger Phosphat und dunklerer, bröckeliger Erde zu unterscheiden (Abb. 9). Die zweite Stufe der Analyse basiert auf einer Labormethode, welche unter dem Namen sequentielle Bodenphosphat-Fraktionierung (vgl. *Science* vol. 197 (1977), S. 1327–1333) bekannt ist. Für jede Probe werden Messungen an drei Arten von anorganischen Phosphaten ausgeführt und die Resultate als Prozente des totalen Phosphatgehaltes der Probe ausgedrückt. Die Interpretation der Resultate beruht auf der Tatsache, dass erstens die Prozentwerte der einzelnen Fraktionen mit den verschiedenen Typen der Landnutzung variieren und zweitens die totale Phosphatkonzentration mit der Intensität der Landnutzung sich ändert und somit ein Mass für die Bevölkerungsdichte ergibt.

Im Billar schien diese Methode die schon früher getroffene Unterscheidung in sogenannte Wohn- und Anbauzonen zu bestätigen und deutete darauf hin, dass die beiden Bodenarten gleich alt sind. Fraktionierungsproben wurden sowohl von Kultur- wie auch von natürlichen Schichten in den verschiedenen Schnitten der Billar-Plattform erhoben. Die vulkanischen Aschenschichten variierten stark, doch die darunterliegende Lehmschicht war ziemlich einheitlich. Das Aufschüttungsmaterial war wie erwartet sehr variabel. Der überdeckte, dunkle Paleoboden entsprach in etwa dem Boden an der Oberfläche der Plattform, der der Sonso-Zeit zuweisbar ist und somit auf eine ähnliche Nutzung schliessen lässt. Zusätzlich wurden Proben von einer Hausplattform (Schnitt XVI) am Abhang des Hügels entnommen. Der gesamte Phosphatanteil lag beträchtlich unter demjenigen der sogenannten Wohnzonen auf der Billar-Plattform. Die Siedlungsterrasse mag wenig älter sein als die Hauptwohnzone auf dem Billar selbst.

Proben von Schnitt XVII in einer der Feldmarkierungen an den Abhängen des Billars zeigten eine Vermischung und konnten nicht zur Bestimmung der Funktion dieser Rinnen herangezogen werden. Es ist denkbar, dass diese Kanäle dazu bestimmt waren, die Entwässerung zu regulieren, und dass der Abstand der Gräben mit der Tiefe der schwach entwässerten Schichten korreliert war.

Präkolumbische Techniken zur Verhinderung von Erdrutschen

Von Pedro Botero

In den vulkanischen Aschenerden von Calima ist nicht die Entwässerung der Wurzelzonen das Hauptproblem, sondern das Abrutschen der Erde. Die oberste Aschenschicht ist sehr durchlässig und hat eine grosse Aufnahmefähigkeit für Wasser. Diese Asche ruht auf rotem Lehm mit schwacher Permeabilität, was bewirkt, dass das Regenwasser die Aschenschicht rasch sättigt, aber die Lehmschicht nicht durchdringt. Unter diesen Bedingungen neigt nun die Aschenschicht dazu, von der Lehmschicht wegzugleiten. Indem das Wasser nun in talwärts laufenden Rinnen abgeführt wird, können Erdrutsche verhindert werden.

Goldobjekte von Primavera. Beziehungen zwischen Calima, San Agustin und dem Cauca-Tal

Von Clemencia Plazas

In Primavera (Distrikt Bolivar, Cauca-Tal) wurde ein Grab mit einem Yotoco-Gefäss und den in Abb. 61–63 abgebildeten Goldobjekten entdeckt. Figurinen, u. a. auch Kalkbehälter, die die gleichen stilistischen Merkmale aufweisen und in der gleichen Technik angefertigt sind, sind auch aus mehreren Fundkomplexen im Calima-Gebiet und Cauca-Tal bekannt (Abb. 64, 66). Brustschmuck, Pinzetten, Figurinen und Nadeln in diesem Stil wurden auch in San Agustin (Abb. 65) und anderen Orten im Südwesten Kolumbiens gefunden, was auf enge Kontakte zwischen diesen Gebieten in der Zeit von 500 v. Chr. bis 700–1000 n. Chr. schliessen lässt.

Erkundung im Pavas-La Cumbre-Gebiet

Von Theres Gähwiler

Im Anschluss an die Grabungskampagne 1981 wurde eine kurze Erkundung im Pavas-La Cumbre-Gebiet durchgeführt, das für seine grossen Urnen (Abb. 68, 73, 75) bekannt ist. Wie in der benachbarten Calima-Region finden sich auch in diesem Gebiet archäologische Spuren wie Siedlungsterrassen, Gräberfelder, Feldmarkierungen und Petroglyphen.

Die Sammlung von Oberflächenfunden an verschiedenen Orten ergab eine Menge bestimmbarer Tonscherben, die im allgemeinen die stilistischen Merkmale von Sonso-Keramik aufwiesen. Unter dem aufgesammelten Material war keine Yotoco- oder Ilama-Keramik vorhanden.

Eines der langfristigen Ziele dieser Untersuchung besteht darin, die zeitliche und kulturelle Stellung des Pavas-La Cumbre-Gebietes genauer zu definieren. Bis anhin standen drei 14C-Daten zur Verfügung: 305 ± 110 v. Chr. Montañitas (Beta-1500), 610 ± 75 n. Chr. La Virginia (Beta-1501) und 765 ± 75 n. Chr. Tres Esquinas (Beta-1835). Diesen konnten im Jahre 1981 zwei weitere hinzugefügt werden: 1050 ± 90 n. Chr. La Sofía (B-4030), 1140 ± 50 n. Chr. Ocache (B-4031). Diese Daten stimmen zwar mit dem erwarteten jungen Alter der Pavas-Urnen überein, aber die chronologische Einordnung ist trotzdem noch nicht geklärt. Die Daten für La Sofía und Ocache fallen nämlich in die späte Yotoco-Zeit, obwohl der Hauptanteil der Oberflächenfunde und der Grabfunde die stilistischen Merkmale der Sonso-Zeit aufweist.

Die obenerwähnten datierten Grabkomplexe waren Schachtgräber, wie sie in diesem Gebiet häufig vorkommen (Abb. 67, 70, 77). Zwei der Gräber enthielten Pavas-Urnen (Abb. 67 und 70). Die drei Urnen aus Bitaco waren in der Hinsicht bemerkenswert, als sie neben menschlichen Überresten auch Textilfragmente enthielten (Abb. 71–76).

Bei der Erkundung wurden auch drei Petroglyphen erfasst. Die Gravierungen in Mozambique wurden mit Hilfe der Abreibetechnik aufgenommen (Abb. 81). Ein weiterer Petroglyph fand sich inmitten einer dichten tropischen Vegetation und zeigte kämpferische Szenen und Hände (Abb. 80).

Calima-Résumé

Rapport de la saison 1981 sur le terrain à Calima

Par Warwick Bray, Leonor Herrera et Marianne Cardale Schrimpff

1. Introduction

En mai, Herrera et Schrimpff ont fait une reconnaissance de deux semaines dans la vallée d'El Dorado. Le gros des activités de terrain auxquelles participèrent des étudiants colombiens et des spécialistes de passage se déroula de juillet à fin septembre.

2. Interprétation photographique, reconnaissance et établissement d'une carte

Le but de cette étude était d'établir une carte d'une partie de l'ancien paysage de Calima, aussi exhaustive que possible. Les éléments visibles sur les photographies aériennes à grande échelle (couvrant 24 km² de la région d'El Dorado) ont été repérés sur place et les informations corrigées ont été reportées sur une carte de base à l'échelle 1/5000. Un fragment de cette carte se trouve en fig. 3.

En plus de cimetières pillés, de routes anciennes, de systèmes agraires et de pétroglyphes, cette investigation permit d'identifier plus de 600 petites et quelques très grandes plates-formes d'habitation. Quelques-unes de ces dernières, mesurant 100 m ou plus de largeur, formaient un T. D'autres comportaient des «pseudo-tumulus». Une de ces grandes plates-formes «tumulus» (El Billar) a été fouillée.

3. Fouilles de l'Hacienda La Suiza

La surface étudiée en détail en 1981 forme une partie de la Hacienda La Suiza (fig. 7).

a) Le Billar (fig. 8–17)

Le monument connu localement sous le nom de El Billar est le sommet d'une arête modifiée afin d'y aménager une plate-forme mesurant 100 m × 90 m. A l'exception d'une éminence résiduelle (le «tumulus») (fig. 8, 12), la crête a été rasée, et les déblais déposés à la périphérie de la plate-forme afin d'en agrandir la surface. Des calculs basés sur des échantillonnages prélevés sur 6 coupes transversales du Billar (fig. 11) montrent qu'au moins 3600 m³ de terre ont été mus durant la construction de ce monument. Des analyses de phosphates ont permis d'identifier d'éventuelles zones d'habitat et de «jardins» au sommet du Billar. D'après des analyses, il semblerait d'autre part que la plate-forme était un espace libre pauvre en traces d'habitats ou d'activités humaines. La répartition des prélèvements de phosphate et la position des tranchées de fouilles sont données en fig. 9.

La construction et la majeure partie de l'occupation du Billar ont pu être situées dans la période de Sonso. Des tessons de cette période ont été mis au jour au sommet du Billar, dans le remblai de ses bords et dans le sédiment noir sous-jacent aux remblais (fig. 17). La nature de ce sédiment noir, à savoir s'il s'agit d'un sol ancien ou d'un remplissage, n'est pas éclaircie. Cependant, on relève des indices d'occupation humaine à sa surface, avec une date C14 de 1190 ± 60 ap. J.-C. (Beta-4907). La présence sporadique de tessons Yotoco dans toutes les couches y compris dans le sédiment noir, suggère qu'une occupation a eu lieu pendant cette période sur le Billar, ou à sa proximité.

b) Fouilles de la plate-forme d'habitation: Tranchée XVI (fig. 18–21)

Celle-ci s'est révélée être une typique plate-forme de maison, comme celles fouillées auparavant, avec comme singularité la présence d'une fosse près de son centre. Les tessons de la couche d'occupation étaient de type Sonso. Eidt fait observer que les analyses de phosphates n'indiquent pas une occupation très intense, et que la plate-forme pourrait être légèrement plus ancienne que le Billar. La stratigraphie ne permet malheureusement pas de situer chronologiquement la plate-forme par rapport à la structure principale.

c) Les «sillons» sur les pentes du Billar (fig. 22–24)

Une de ces lignes de champs descendantes a été fouillée (tranchée XVII, fig. 7). Son fond porte les traces d'une corrosion considérable et son remplissage (qui semble s'être déposé rapidement) contenait des tessons de la période de Sonso. Il en est de même de la couche qui scelle le fossé (fig. 24). Même si elle semble se rapporter à l'agriculture, la fonction exacte de ces lignes de champs reste énigmatique. Le drainage serait une fonction possible (voir le rapport de Eidt dans ce volume). La prévention de glissements de terrain en serait une autre (comme Botero le développe dans sa note). Une troisième interprétation en ferait des limites séparant les cultures. Une utilisation assez semblable de ces canaux comme lignes de séparation a été observée chez les indiens Guambiano du département de Cauca.

d) Fouilles de sépultures dans la Hacienda la Suiza

Six tombes ont été fouillées: un cimetière de la période de Sonso (tombes 1–4) et deux autres de la période de Yotoco (tombes 5 et 6). Leur localisation est donnée en fig. 7, et leur architecture et leur mobilier en fig. 25–30. La tombe non représentée était un simple puits rectangulaire contenant quelques tessons de Sonso. L'accès aux chambres funéraires des tombes 1, 3 et 4 était fermé par des pieux placés dans une tranchée peu profonde pratiquée au seuil. Les pieux se sont décomposés, mais leur empreinte était bien préservée dans le remplissage consolidé du puits de la tombe 4 (fig. 28).

e) Ramassages en surface dans l'aire d'habitat (fig. 31–37)

A l'est du Billar se trouve une zone d'habitation comportant des poteries et des pierres éparpillées sur au moins 8 hectares. C'est à ce jour le plus grand site d'habitat découvert en El Dorado. La stratigraphie est visible au bord de la route, dans le talus et elle a été fouillée en un endroit par Ernst Müller (P1, fig. 32). Des charbons de bois trouvés près de la base de la couche d'habitat et juste au-dessus de la cendre volcanique ont donné une date C14 de 1280 ± 80 av. J.-C. (Beta-3509) (fig. 33).

Des ramassages systématiques de surface ont été effectués dans les surfaces C1 à C5 (fig. 32). Pour ces