CHAPTER 4

SITE FORMATION PROCESSES AND THE RECONSTRUCTION OF HOUSE P46.33

by

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4.1 Introduction

It is all too easy to treat excavated ancient buildings as two-dimensional entities, consisting of a ground plan and a record of the objects found scattered through its various areas. The modern interest in studying the distribution of different types of object across an archaeological site (where buildings partition the living and working spaces) in the hope of reconstructing patterns of ancient life and activity, is fed largely by an assumption of interrelationship between plan and artefact. The ideal is to find undisturbed activity areas (aptly termed *Marie Celeste* samples by Rowley-Conwy 1994) in which, from the debris left behind by the last users, human behaviour can be be read directly. The studies of the various categories of material from house P46.33 have themselves drawn much stimulus from the thought that we might learn thereby something about what actually went on in and around the house. Indeed, it is this which largely justifies further excavation at Amarna.

The reality of archaeological sites, however, is that they are three-dimensional, and, in our case, within that third dimension of depth lies a record of what happened to our house over the subsequent two millennia and a half. There are two reasons for taking a serious look at this. The first arises from the fact that much of the material removed during excavation derives from the slow collapse of the building. This ought to contain clues to its original appearance, and might perhaps help to elucidate the single most important architectural question: did it have an upper floor? As for the second reason, an innocent view of the archaeology of the house might be to think that it is composed of two parts: a fill of rubble and sand largely devoid of interesting material, and a series of floors and ground surfaces on which the interesting material will lie, although, obviously, objects of any height or thickness will protrude into the lowest overlying layer of debris. It is disconcerting to find that this is not the case. Whether we look at pottery, small finds, or bones, the picture is the same: it is spread through the fill (Table 4.3, Figure 4.10). If this were a multi-period site, occupied in subsequent periods by people who left their own debris superimposed, one would perhaps worry less, content to separate each period into its stratigraphic band, and recognising in the frequent blurring of the record the factor of residuality, the effects of people digging pits and trenches and moving earth about, and so bringing older material to the surface again. At Amarna one needs to think about this more carefully, not least in order to gauge how much faith to put into the record of the distribution of finds. The issue is also closely connected to the way we reconstruct the original appearance of the house, since part of what we have to do is to imagine it falling down. We will concentrate on this aspect first.

4.2 The conventional reconstruction of the Amarna house

Reconstruction of the elevations of buildings when only the foundations, or lowest sections of wall, are preserved is a common problem in archaeology. For Amarna houses there has been a strong tradition of minimal upwards reconstruction of walls which has produced houses which are basically bungalows. The one serious modification to this has been to allow the existence, in the case of larger houses, of a room located above the antechamber or Front Hall, tucked in beside the additional roof height over the Central Hall. Previous commentators have based this on evidence that was hard to interpret otherwise, namely the presence of column bases in the rubble fill of houses which had a smaller diameter than those which rested on the ground floor (*COA* I: 8–9; *COA* II: 6–7, Pl. XVI are the principal expositions). The addition of even this single upper room has had an interesting effect on the reconstruction of the adjacent Central Room, for it has then been assumed that the Central Room had to rise to the same double-floor height to allow for one of the basic rules in reconstructing New-Kingdom houses: that the Central Room must be sufficiently high to allow for the insertion of grille-windows high in the wall, above the roof height of most of the surrounding rooms. From the point of view of the mass of the building, which is of great interest to us in considering how they collapse, this is virtually the same as actually having an upper floor over the Central Room, as can be appreciated when it is realised that the restored height of the Central Room in the standard reconstruction drawing of an Amarna house (*COA* II: Pl. XVI) is no less than 5.60 m (somewhat less in Tietze 1985: 81, Abb. 18)!

The provision of a single upper room and greatly elevated ceiling over the Central Hall has been seen as the privilege of only the largest houses (cf. the very negative comments in *COA* I: 41; it is a possibility ignored in reconstructions of Tietze 1985). On this view house P46.33 would be excluded since its Central Room was small and unpretentious enough to dispense with the need for a column for roof support. It still might have possessed a raised roof over the Central Room to accommodate clerestory windows around the sides, although the extra roof height required is not likely to have been much, perhaps a metre or less (cf. the drawings by Tietze 1985, 69–70, Abb. 10b, 11b; 81, Abb. 17. House P46.33 belongs to his category 2d or 2e). That fairly modest houses used window grilles in the middle of the house is shown from the central room of P46.11 (*COA* I: 32, Pl. II), in which both a column base and fragments of four stone grille window frames were found, although, with dimensions of 4 x 4.50 m, this room was not much larger than its counterpart in P46.33. Even so, by the conventional view, the ruins of our house should be those of a single-storied building, although one with access to the roof and, therefore, one where objects and even livestock could have been kept there, with an obvious complicating effect on the archaeological record.

Although this stereotype must be given due weight, its existence should not preclude an open-ninded consideration of the field evidence and other observations.

4.3 Upstairs in mud-brick houses

Figure 4.1. The "experimental house" at Amarna, photographed in 1992 from the south-east.

Figure 4.2. The interior of the "experimental house" at Amarna, from the north-west.

It is important to realise at the outset that, although upwards reconstruction carries great implications for modern interpretations and perhaps seems a daring thing to contemplate, it would, in terms of ancient reality, have been a straightforward matter to add a second storey by anyone possessed of simple building skills and even of limited means. A second storey is not a challenge in practical terms. This is brought home by looking at houses built in traditional style in modern villages.

The example that I will use (Figures 4.1 and 4.2), which also illustrates the processes of decay of mud-brick buildings, is provided by a small ruined house which stands 150 m to the south of the present EES expedition house, thus east of the modern village of el-Hagg Qandil. It seems to have belonged to the expedition house in the early 1920s and was perhaps used to accommodate some of the Egyptian dependants (guards or Qufti workmen, although some, at least, of the latter were probably housed in a separate and larger line of huts, now vanished, lying to the west of it). For convenience I will refer to it as the experimental house, since we have occasionally used it for this purpose. Photographs of the walls appear in *AR* V, in Chapters 11 and 12, as background to pictures of archaeological experiments conducted in the house in 1987. The nucleus appears in photographs taken in 1923, and by 1932 (the date of an oblique aerial photograph) it had taken on the shape still visible in its present ruined condition: a single line of three rooms, 10 m long in total, with a little enclosure on east and north. An upper room had been built over the middle one and was reached by an external brick staircase on the north side. Whoever built this little house used bricks of similar composition and size to those used in the ancient city, made from desert clay mixed with gravel; indeed, they may well be ancient bricks reused. Apart from a somewhat greater tendency to lay header bricks on their edge, the structure of the building is very similar to that of the smaller houses at Amarna (including P46.33), with the more important walls having the thickness of one brick's length, and the lesser walls having the thickness of one brick's width. Its subsequent history is not clear, but a none-too-distinct aerial photograph of 1947 seems to show it as a roofless shell.

The interest of this house lies especially in its upper room. The ground floor walls rise to a height, measured externally, of c. 2.20 m. The upper room had been built on top of this using smaller bricks, only 24 cm long as distinct from 30–35 cm. At its highest the remaining south wall is, at the time of writing, still preserved up to c. 3.80 m, implying an original height to the whole building of around four metres. By 1977 the east and west walls of the upper room had fallen, leaving half of the north and the whole of the south upper walls free-standing, both of them containing a small window set in the middle at the top edge. The north wall came down at some time around the summer of 1990; the south wall still stands. This is a remarkable demonstration of the stability of even thin mud-brick walls, for the house stands isolated on flat ground, exposed to the full force of the sand-laden winds which blow both from the north/north-west and the south, thus directly on to the face of the wall.

We can proceed to consider the archaeological evidence, therefore, secure in our minds that the walls of P46.33 were sufficient to take an upper storey, if we choose to reconstruct in this way. Indeed, the effort of building upwards by one floor would not have been much greater than adding rooms at ground level. With a solidly constructed staircase already built in as a standard feature, and strictly limited surrounding space for expansion once the neighbourhood was fully developed, building upwards would seem a very natural thing to do were it not for the problem that we perceive in the lighting of the downstairs central room.

What archaeological evidence for an upper storey, however, should we look for? As well as focusing on individual points, there is much to be gained by examining the gross character of the archaeological deposits in relation to processes of decay and site formation. We need to consider how Amarna houses might have fallen into ruin. In this connection the experimental house again provides a helpful visual aid. Its most vulnerable element has been its roof. The construction of the downstairs roof is still visible from traces adhering to the walls. It had been of closely set wooden poles, 2–3 cm in diameter, tied together with ropes and then covered with mud or perhaps a single layer of bricks. It was thus of similar construction to ancient roofs. The Amarna desert is home to small subterranean termite nests, ancient examples of which are often encountered during excavation when probing beneath the ancient desert surface. Termites migrate upwards through a building via wooden door frames, interstices in the walls themselves, and mud plaster which has been enriched with chopped straw, eventually reaching the roof. As they go they establish colonies in any suitable organic material. Once this has been done the cellulose is replaced with weakly bonded sand grains which offer no structural support. In the case of roofs, the weight of the mud layer brings them down. The volume of solid debris which finishes up on the floor from roof fall is not, however, very great. Once down it lies protected from wind erosion by the surrounding walls, but is vulnerable to two agencies. One is the showers of rain which, at least in the present-day climate, occur a few times during each winter; the other is trampling by humans or animals. The result is to turn the mud debris, which would have broken on falling into a mixture of fragments and dust, into a kind of dry mulch. The roofless interior of the experimental house is covered in just such a deposit, seemingly up to 30 cm thick, although it is hard to tell if the original floor was at the desert level. If it were raised slightly the thickness of the deposit would be less.

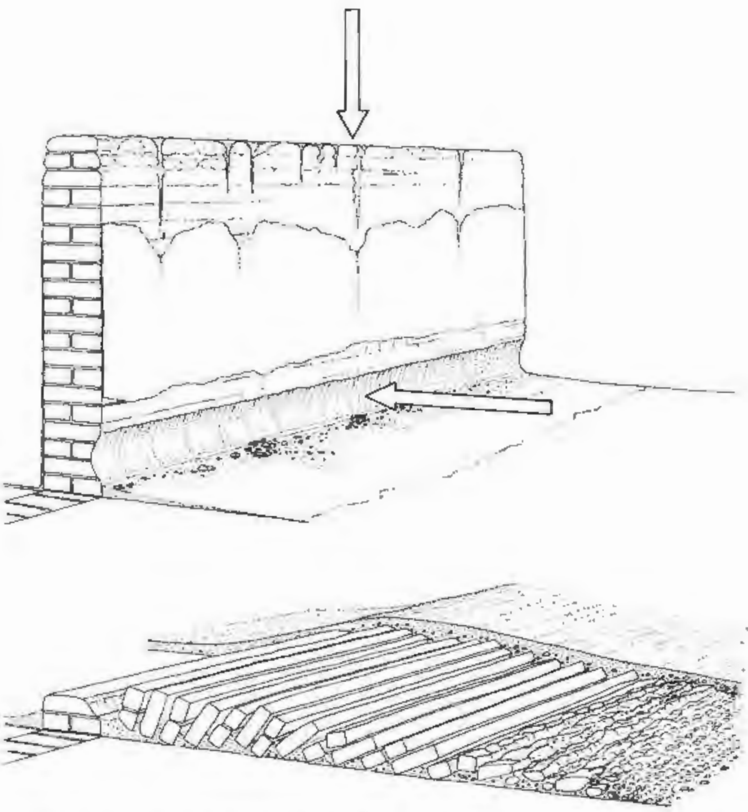

Figure 4.3. Diagram illustrating the process of sheet collapse of a mud-brick wall. The arrows mark the principal lines of attack by weather.

4.4 How mud-brick constructions decay

The decay of walls is a complex process. They are exposed to winds laden with sand and dust which blow from the north and north-west in the winter/spring period, and from the south in early summer. These are, however, the dominant directions. The presence of walls and heaps of rubble creates local turbulence so that the interaction of wind, sand, and walls becomes a complex system. The experimental house, which is a simple case because it stands on its own, has been affected differentially. On the south side the wind has scoured off much of the cover of mud plaster on the ground floor (but not the first floor), and has gone on to open up the joints between bricks. North-facing walls, by contrast, have kept much more of their plaster, including at first-floor level, but have been attacked along a thin band at ground level on the outer face. This is particularly noticeable in the case of the north wall of the eastern room. In time this form of attack produces a groove at just above ground level which eats into the wall until it is undermined and the wall falls outwards. Sometimes the collapse comes in one sheet of brickwork, but the shock of impact can then break the mortar joints, and the wall finishes lying in a fully disarticulated or only partially articulated sheet (Figure 4.3). Examples of walls which have suffered from sheet collapse and are found in this condition have been common in the excavations, but the example illustrated here (Figure 4.4) is derived from another modern but abandoned building at Amarna, a guards' house which lies west of the South Tombs. Here both the south and west walls of a single-chambered hut have succumbed in this way, although they were built on a foundation course of stones set in mud mortar. Some of the ground-floor walls of the experimental house near the expedition house have also come down, but the pattern of collapse is less visible. This is owing partly to weathering and trampling, but also partly to removal of loose bricks for re-use (the expedition, in using this house for a time as an

Figure 4.4. A modern example of sheet collapse, at abandoned huts west of the South Tombs at Amarna.

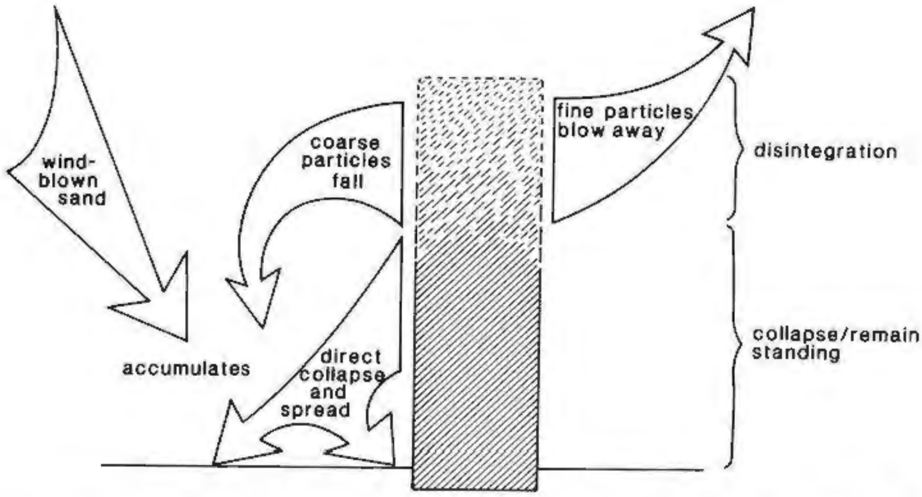

Figure 4.5. Diagram showing the processes of dispersal and deposition at work on the walls of an abandoned mud-brick building.

experimental base, is partly to blame here).

Sheet collapse is a dramatic event, but not all walls are brought to this state. Indeed, where walls form a complex plan it is not common, for the rubble from one wall or a bank of sand laid down by the wind will protect the base of other walls still standing. What happens then depends upon the interplay of the two opposing forces of erosion and deposition (Figure 4.5). Wind and rain have a gradual degrading effect on walls, especially along their tops. Patches of bricks and mortar are reduced to dust and gravel, often along the linear joints between bricks. The lighter particles either blow away altogether or are washed down by rain, whilst the heavier material drops out. As a result blocks of bricks become isolated, and also fall. In the earlier stages of decay, material which falls comes to rest in spaces surrounded by wall stumps and none of its mass is subsequently lost. As the rooms fill up, however, and the top of the fallen debris comes closer to the exposed surface of the ruin, wind and rain start to be effective again. Rain washes material down to a lower level towards the edges of the ruin.

Concomitant to these processes which work on the constituents of the building fabric, sand is blown in from outside. In particular places the effect can be very noticeable, in the form of long banks against walls, or deep drifts inside rooms. In general, however, spaces which are enclosed to any height — like the rooms of our experimental house (Figure 4.2) — attract remarkably little sand at Amarna. In assessing the processes of decay which were at work on ancient houses, this is a particularly important observation. Another is the obvious fact that initially, when walls and roofs collapse, the volume of rubble is greater than that of the original structural mass, on account of the cavities created between fragments and particles which, in time, become filled with dust and sand.

4.5 The evidence for wall height at house P46.33

As house P46.33 was excavated, plans were made at one or two stages during the removal of the fill with the intention of recording how rubble lay (Figures 1.21 and 1.22). The history of decay sometimes involved many more events, but the expedition resources available were not sufficient to record more than the main ones. Moreover, weathering often reduces some phases of collapse to almost unrecognizable deposits of dust in which most of the structure is not visible. In looking at the plans one should also realize that not all of the deposits on the same plan are necessarily contemporaneous; indeed, they will mostly not be, but where they are separated by standing walls it is virtually impossible to make a stratigraphic correlation.

With all of these factors in mind, the three-dimensional record of house P46.33 needs to be considered with a view to answering two questions: can direct estimates be made of wall heights from places where sheet collapse has occurred; and is the volume of rubble, in respect of the enclosing walls of individual rooms, and its composition and the spread of roofing fragments through it, consistent with a house of one storey (2 m high, perhaps 2.50 or even 2.70 in the case of the Central Room), or of two storeys (4 m)? Figure 4.6 both marks in which areas roofing-fragments were found and attempts to summarise in which directions rubble from the walls probably mainly fell.

The outside walls of the house were properly freed only on the north and east sides. On the north some part of the outer wall [3231] had fallen outwards, represented by units [3034] and [3035]. The maximum area exposed by the excavation is in square L16, opposite **area 7**, where the collapse reaches probably eighteen courses of bricks across a width of 2.50 m, representing about 2 m of original wall height. The north wall of the house [3231] had a clean hinge fracture at the east end, probably corresponding to a place where an inserted wooden beam had been eaten away (Figure 1.15C). Here the fracture was more or less at the floor level of the room, although the stump of the wall rose to about 50 cm above floor level at the west end of the room. In the adjacent **area 6** (where the floor is lower) the preserved wall height was up to about 80 cm above the floor. If the spread of sheet collapse continues to run past here at constant width, a wall height of at least 2.80 m is implied. However, without further excavation to the north, this cannot be taken for granted. It should also be remembered that, according to the position of the Late-Period sherds, the collapse which formed unit [3754] took place several hundred years after the end of the Amarna Period. It is reasonable to think that, by then, some of the upper part of the wall would have been lost. Whilst it is suggestive, however, this line of argument is far from conclusive.

On the east side of the house there were also the remains of a spread of brickwork (part of [3067]), primarily in square L15 and opposite **areas 2** and **4/5**. In places it lay on top of a bank of sand and had been very exposed to erosion, so as to have lost most of its articulation. It very likely represents the remains of the outward collapse of the east wall [3080] of the house, but it

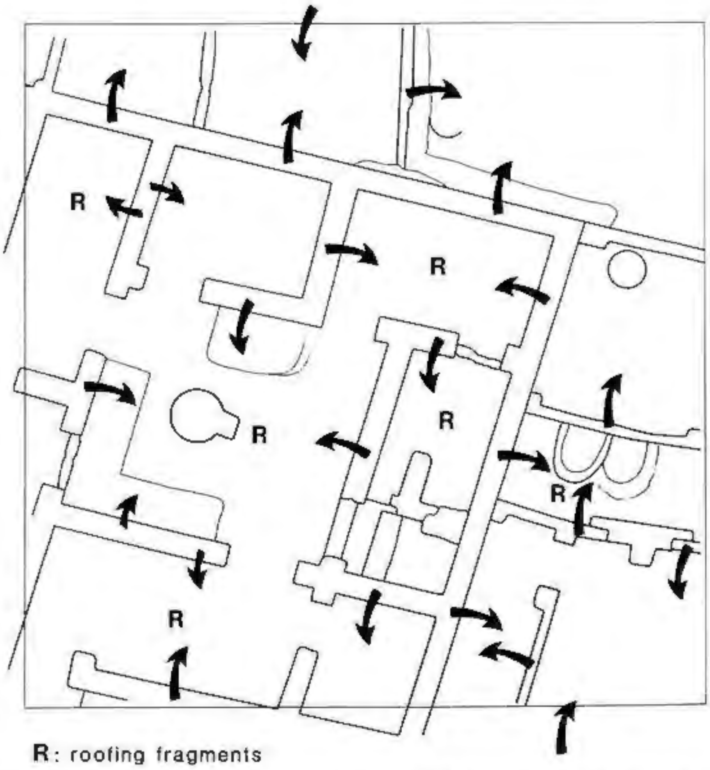

Figure 4.6. Outline plan of house P46.33, indicating likely principal directions of wall collapse, and those areas in which roofing fragments were found.

is likely to have lost much of its volume through erosion and through pieces rolling down the sand slope. It contributes nothing to this particular discussion, therefore.

Given the greater attack on exposed outer wall surfaces and the internal support provided by the dividing walls it is entirely natural to expect that house outer walls tend to collapse outwards. Inside a house the situation is more complicated. Once the outer walls have fallen the internal walls become exposed to sand blasting, but not at ground level, for the brickwork that has already collapsed will deflect the wind. Sheet collapse of whole internal walls is then less likely to happen, especially if the house is of only a single storey. Decay takes place through slow weathering and the fall of irregular chunks of brickwork. On the plan of fill units, Figure 1.21, examples of identifiable fallen chunks are in **area 10** (part of [3172]) and in **area 1** (part of [3690]).

The second question posed above concerns the volume of rubble fill within rooms. This is clearly going to be determined by the directions in which structural elements collapsed, although, where a roof was present, the direction of fall can scarcely have been other than downwards on to the floor. In house P46.33 the deposits within the adjacent rooms, **areas 6** and **7**, provide a strong contrast in this respect. Within the first almost the sole rubble deposit is from a late collapse of part of the west wall; the lack of material from a fallen roof has already been remarked on, and points unmistakably to the room having been open to the sky. **Area 7**, on the other hand, was filled with a rubble deposit which retained a considerable degree of articulation, showing that it consisted largely of collapse from the west wall and probahly also of some from the east wall. The north wall had fallen outwards in sheet collapse and so has to be excluded from consideration. The fate of the south wall is not clear, though some seems to have fallen to the south. The following table (Table 4.1) attempts, for **area 7**, to compare the volume of rubble fill removed during excavation with the volume of missing material, comprising the roof and the lost parts of the walls, assuming a single storey two metres high. Thus, for the three walls that mostly fell inwards, the elements of each calculation are the wall length, its thickness, and the difference between its preserved height and its presumed original height.

volume of fill when excavated: 1.75 x 2.90 x av. depth of .60	3.045 cu m
west wall: 1.75 x .32 x missing height of 1.40	0.784 cu m
east wall: 1.75 x .32 x missing height of 1.80	1.008 cu m (prob. some fell to east)
south wall: 1.20 x .32 x missing height of 1.20	0.461 cu m (prob. some fell to south)
volume of roof: 1.75 x 2.90 x .15	0.103 cu m
total of missing material	2.356 cu m (or less)

Table 4.1. Volume calculations for **area 7**.

By this calculation it would appear that there is 23% more rubble present than would have been lost from a single-storey building. Two factors of uncertain magnitude are the extent to which the rubble will have expanded through sand filling cavities in the collapsed masonry, and the amount of loss from standing walls through wind erosion. These factors will have tended to cancel one another out, although losses from erosion, especially on standing stumps of outer walls, are likely to have been quite significant over three millennia.

The room where we have greatest control over the evidence is the central room, **area 3**. It is likely that a good deal of the masonry from all four sides fell inwards, although some of the south wall, around the doorway, could have fallen southwards to become part of unit [3323] and even, over more of its length, unit [3690]. Table 4.2 repeats the calculations of Table 4.1, using figures for **area 3**, but assuming a roof height of 2.50 m.

volume of fill when excavated: 3.35 x 3.85 x av. depth of .70	9.028 cu m
west wall: 2.25 x .32 x missing height of 1.80	1.296 cu m
east wall: 2.30 x .32 x missing height of 1.50	1.104 cu m
north wall: 1.85 x .32 x missing height of 1.90	1.125 cu m
south wall: 2.50 x .32 x missing height of 1.75	1.40 cu m
volume of roof: 3.35 x 3.85 x .15	1.935 cu m
total of missing material	6.86 cu m

Table 4.2. Volume calculations for **area 3**.

Again there appears to be more rubble than expected, by 24% (it would be 40% if a roof height of only two metres were assumed).

It was pointed out for **area 7** that one unknown element is the extent to which standing walls have simply vanished through wind erosion. If rubble fill properly equated with wall loss one

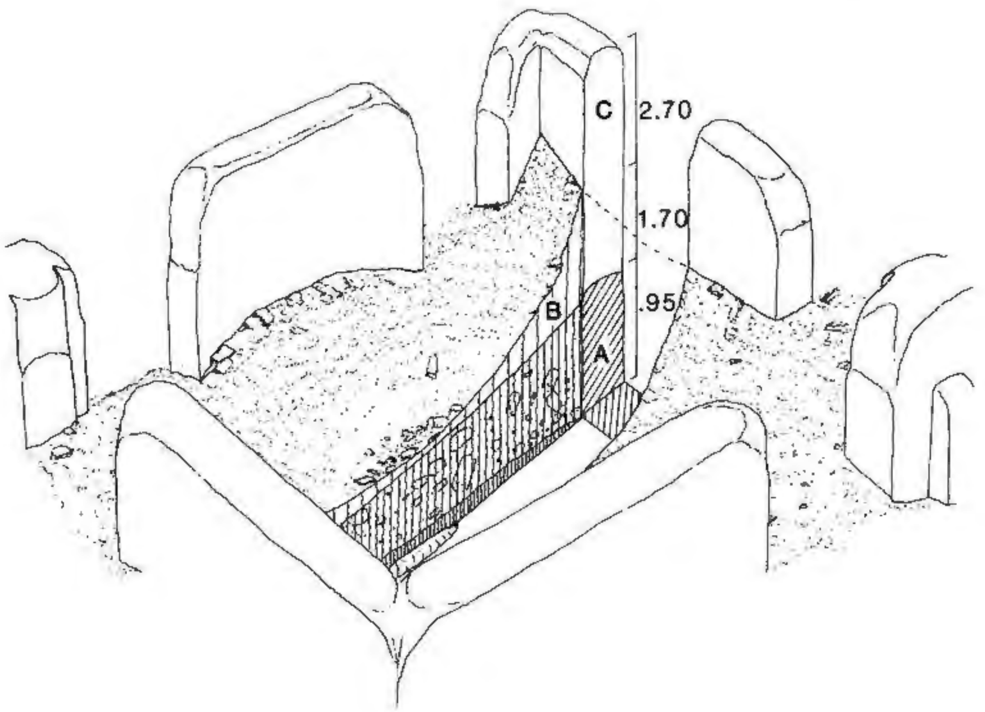

Figure 4.7. A visualization of the Central Room of house P46.33 at a moment during its decay. The section line is that of the drawn section, Figure 1.17. A: surviving wall and rubble fill. B: estimate of the rubble lost to erosion which would have been sufficient (together with A) to have filled the middle of the room. C: estimated height of the wall of the central room according to the conventional restoration, i.e. with added height for clerestory lighting. This seems to be insufficient to have produced A + B + an unknown amount lost to particle dispersal during weathering. Thus the depth of rubble towards the middle of the room implies an original banking of rubble against walls which still stood much higher, with the implication that much of the rubble had fallen from an even greater height. Note the absence of obvious dipping in the surface of the rubble where doorways occur.

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would have to envisage hinge fractures running round the walls at the level of the top of the rubble fill, in other words, that the surrounding walls of the room had folded in at this very level. The drawn section (Figure 1.17), however, implies an irregular history of masonry falls. This would leave rubble banked against the standing wall stumps, sloping down to a low point in the middle of the room. Yet by modern times the top of the mound over house P46.33, comprising both rubble fill and standing walls, had become relatively flat. Figure 4.7 is an attempt to visualise the Central Room at a time when the rubble fill had built up to slightly more than the present thickness as recorded in the middle of the drawn section (the line of which was off-centre). From the low mid-point the rubble forms a sloping deposit banked against the standing walls, the covered parts of which were thus protected from further collapse and are unlikely to be represented within the rubble deposit itself. I am encouraged to think that this visualisation is realistic by considering the effect, or rather lack of it, of the presence of the five doorways which lead off the central room. There was obviously much less rubble to fall down at these locations, yet the rubble fill, as excavated, did not dip in the vicinity of the doorways.

A fairly shallow slope of rubble banked against the east wall would take its height up to around two metres. That would mean that most of the rubble that has survived and was excavated came from even higher up. This would point to a very considerable loss indeed from erosion of both rubble and wall height, and would make the case for there having been a second storey overwhelming. It is also as well to remember that, although it is not possible to provide quantification, roofing fragments occurred with some frequency more or less throughout the fill units of this room. The overall record in the central room is consistent with an initial fall of the lower ceiling to create unit [3349], and then a piecemeal fall of parts of the upper roof and patches of brickwork along the tops of walls where the roof was already missing. A late stage of rubble formation, when all the roof was down and only brickwork was falling, has been lost through erosion.

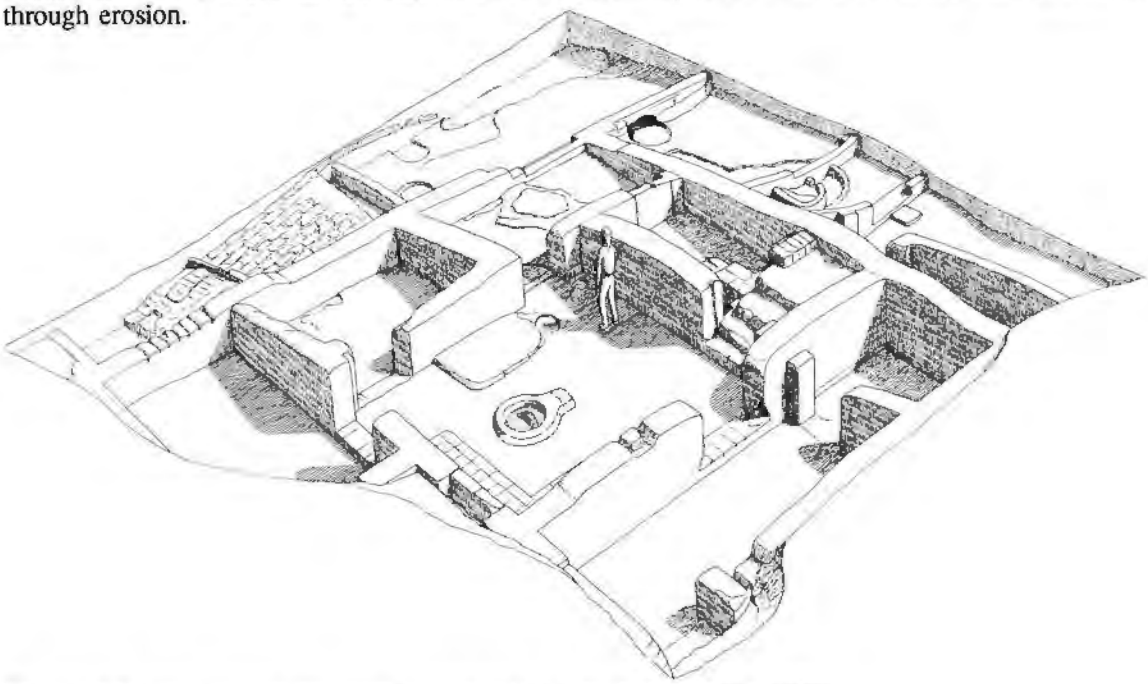
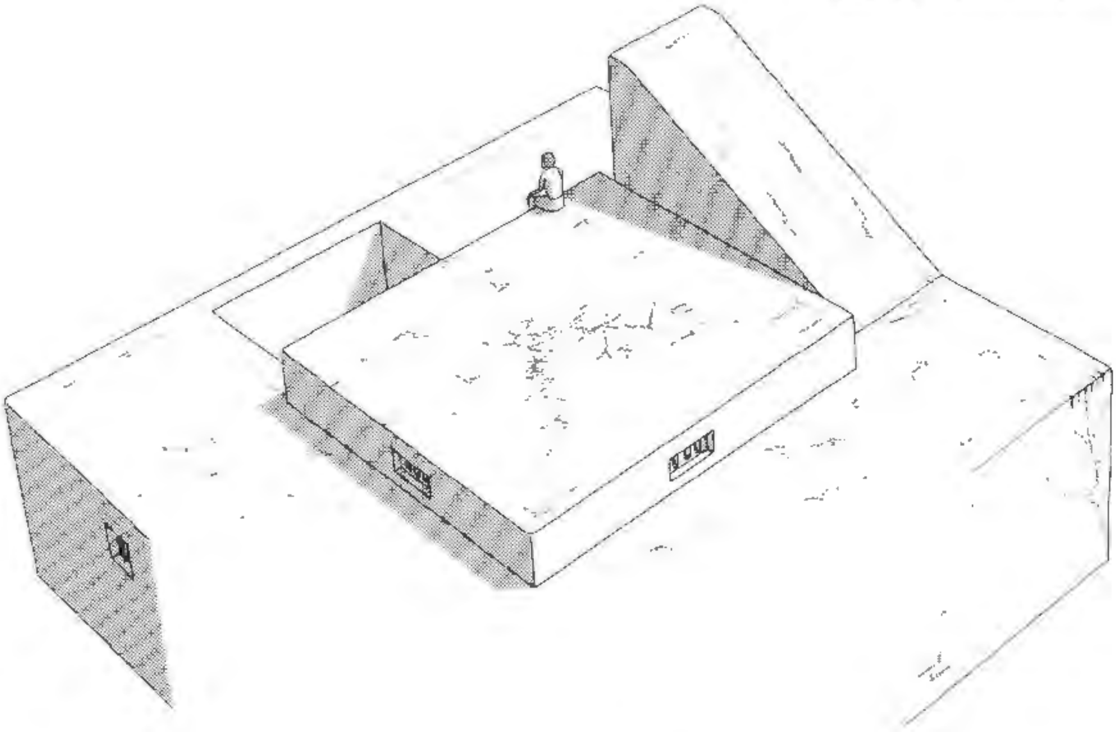


Figure 4.8. Perspective drawing of house P46.33 as uncovered in 1987.

Figures 4.8 and 4.9 offer a further series of perspective drawings from the same viewpoint as Figure 4.7. First (Figure 4.8) is a rendering of the house as actually found during the excavation of 1987; then (Figure 4.9) a reconstruction has been attempted which places a second storey on house P46.33, and this is set beneath a conventional reconstruction where the roof height above a single storey has been increased by a small amount to allow for grille windows. Strictly speaking, this last element is not justified. No trace of window grilles was actually recovered, although, since examples have been found by previous excavators made from mud (as well as from stone), this is not a critical objection, for mud structures easily decay. In any case, for this house, the question of how the Central Room (and its upstairs equivalent) received daylight is easily solved for both reconstructions, by accepting the field evidence that **area 6** was unroofed. It would then have served as a light well, illuminating the central room either through an open door or a window in wall [3237].

There is probably no means of knowing whether any of the rooms in other Amarna houses excavated in the past could have been roofless, nor need this have been the only solution to internal lighting. Furthermore, the lighting requirement itself might not have been very great. We do not know how much time the occupants would have spent in this part of the house during the daytime, and they might, in any case, have been used to a very low level of light entering through open doors from the surrounding rooms which could have possessed small windows. Another solution was suggested by a discovery in one of the houses excavated in 1921 (N49.10) where the collapsed outer wall of the front hall bore traces which suggested that it had contained a long window (*COA* I: 20, Pl. VII.30). This would have given a veranda-like appearance to this room, and have provided a direct source of light to the Central Room. We cannot, of course, ignore the grille windows that have occasionally been found in the debris of Amarna houses, including within the central room. A clerestory to contain them, however, could as easily have



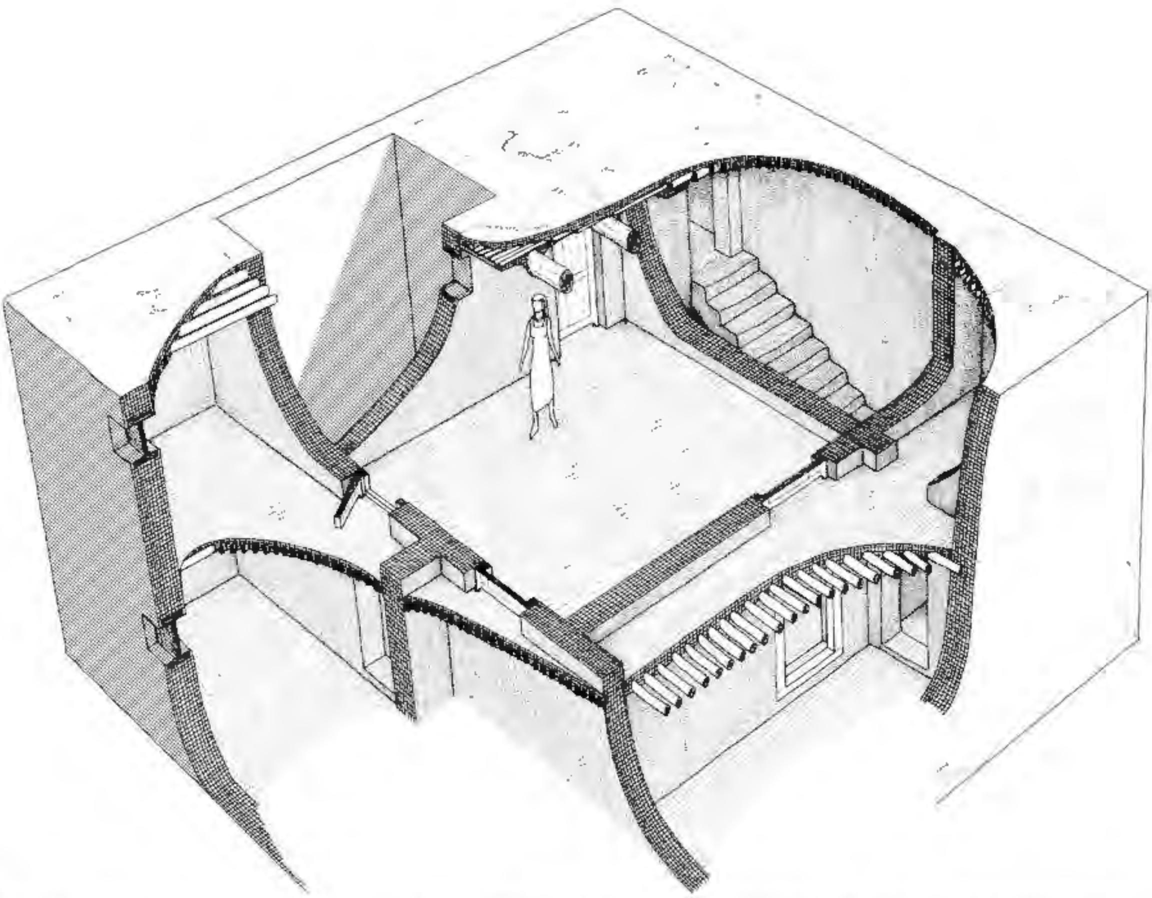


Figure 4.9. Two reconstructions of house P46.33 (above) conventional, (below) with upper storey.

been built over the central room at second-floor level as at first floor. I have not placed one here in the reconstruction of P46.33 as a two-storey building since no window fragments were found, nor was it necessary.

The implications of the general interpretation advanced here, that even a relatively small house possessed an upper storey, are of considerable consequence, for visual recreations of the city, for interpreting the spread of artefacts and other kinds of debris in and around houses, for reconstructing the pattern of family life which was lived out within them, and for modelling the micro-climate of houses (as attempted by Tietze 1985: 76–82, and Endruweit 1994). It also brings Amarna houses more into line with the artistic evidence (mostly from Thebes) for two-storey houses which have usually been seen as characteristic of a city of a different kind, one in which ground space was less available (e.g. Davies 1929; Badawy 1968: 15–21, Col. Pl. IV). It does, of course, depend upon a correct understanding of the processes of decay and an accurate assessment, therefore, of the record of the rubble fill in the house, and so relies, as far as Amarna is concerned, upon a kind of recording not practised in the older excavations. It is of great importance to broaden the base of discussion by accumulating observations on how other buildings at Amarna have collapsed so that a comparative element becomes available.

We have the record of the excavation of four houses at the Workmen's Village, where an upper storey over some of the houses is a strong possibility (cf. *AR* III: 21–7), but the conditions at the site are somewhat different from those in the main city. Building Q48.4, dug in 1987 and published in *AR* V: Chapter 2, contained the record of decay of what was almost certainly a single-storey building. A further comparison is available in the excavated record of a group of house-like buildings in the south-east corner of Kom el-Nana which will be published in the next volume of *Amarna Reports*. They are of interest here because, although with solidly built walls, they possessed no staircases and must therefore have been of only a single storey. The amount of rubble lying on the floors was relatively little and provides, therefore, a supporting contrast to our interpretation of house P46.33. A wider investigation, however, can also take into consideration the structure, including preserved wall heights, of many of the houses excavated in the past, even though no formal record was made during excavation of the nature of the fill. There is, in short, already the basis for a wider discussion which I hope to be able to present in due course.

4.6 The vertical distribution of finds in house P46.33

Having considered the architecture of the house, it is time to turn to the way that artefacts and organic material were spread through the archaeological deposits. Table 4.3 and the summary diagram Figure 4.10 illustrate the distribution, area by area, of three classes of material: pottery, other artefacts, and bones (and also roofing fragments). In the case of the non-pottery artefacts, a separate notation is given for the heavier pieces, made of stone. The superficial deposits have been ignored. **Area 12** approaches closest to the "ideal" distribution where virtually everything was either incorporated into a hard floor layer or lay within the lowest deposit of the fill and so could readily be imagined as having been on the final floor surface when the house was abandoned, but even here the sherd distribution fails to conform. Elsewhere the material is distributed with varying degrees of irregularity through the middle and even the upper layers of the fill. The most striking case is the Central Room, **Area 3**, where 59% of the bones (84% by weight), 56% of the sherds, and 66% of the small finds occur in the upper fill of rubble and sand. This pattern of distribution affects some of the heavier pieces, made of stone, as well as small items.

The first possibility to consider, in respect to how this could have come about, is recent human disturbance. Large parts of Amarna have been turned over or pitted by villagers in modern times looking for treasure. The expedition gained much experience of dealing with the archaeological signs of this at the Workmen's Village. Where deposits had been turned over or dumped they tended to be loose and dusty and with little visible internal structure; where pits had been dug it was usually not difficult to isolate them, and then to remove the fill, leaving the surrounding undisturbed deposits to be excavated separately. The excavation of P46.33, however, encountered neither of these two conditions. Before excavation began the surface of the mound was, for the most part, smoothly weathered and gravelly (cf. Figure 1.3), with scarcely any sherds visible, as was demonstrated by the sample sherd circle no. 26 (*AR* V: 104–5). This is significant

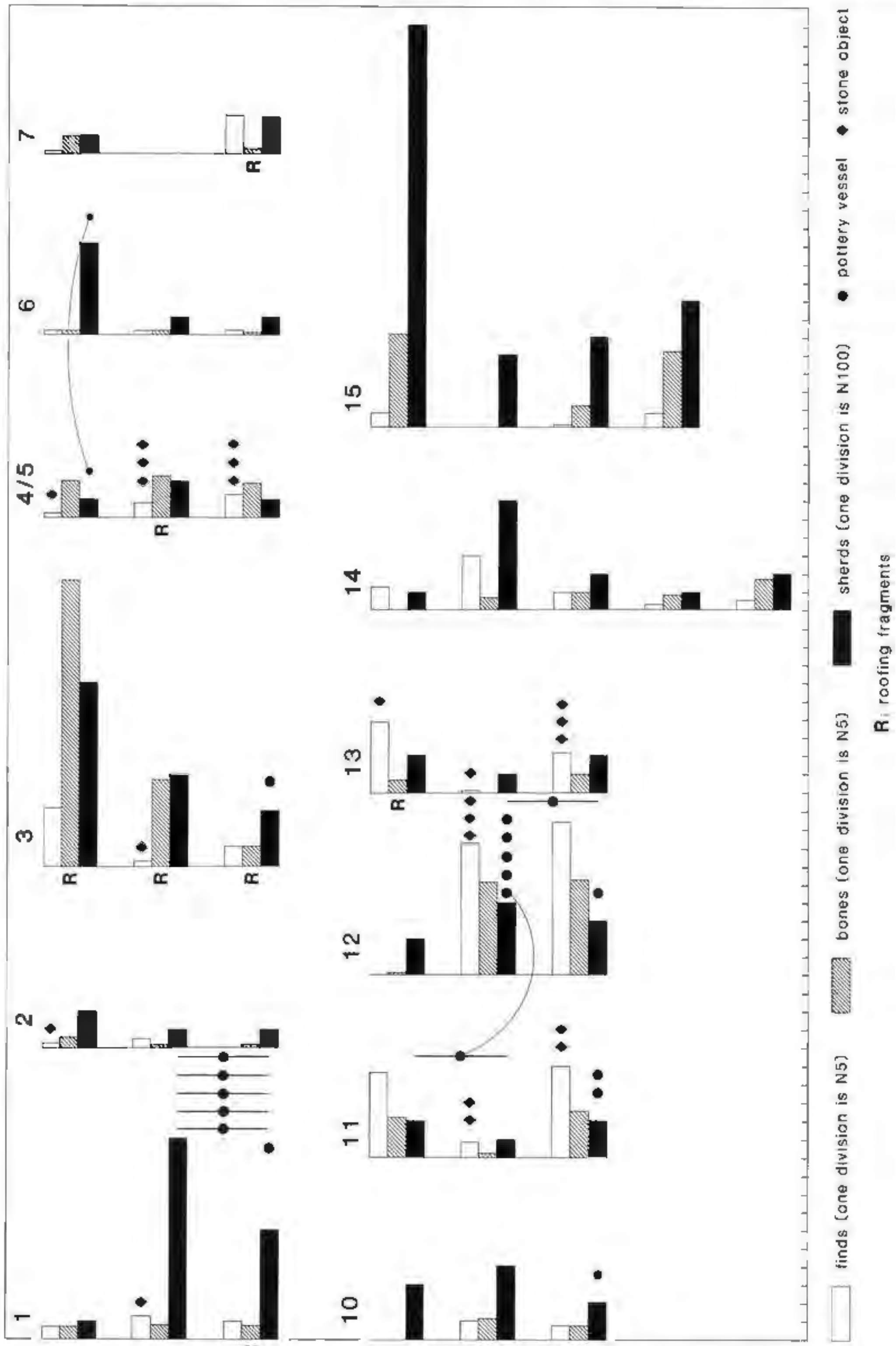


Figure 4.10. Summary diagram of the vertical distribution of finds in house P46.33. For details, see Table 4.3 (end of chapter). The thickness of deposits varies greatly but this is not reflected in the way that the diagram is laid out.

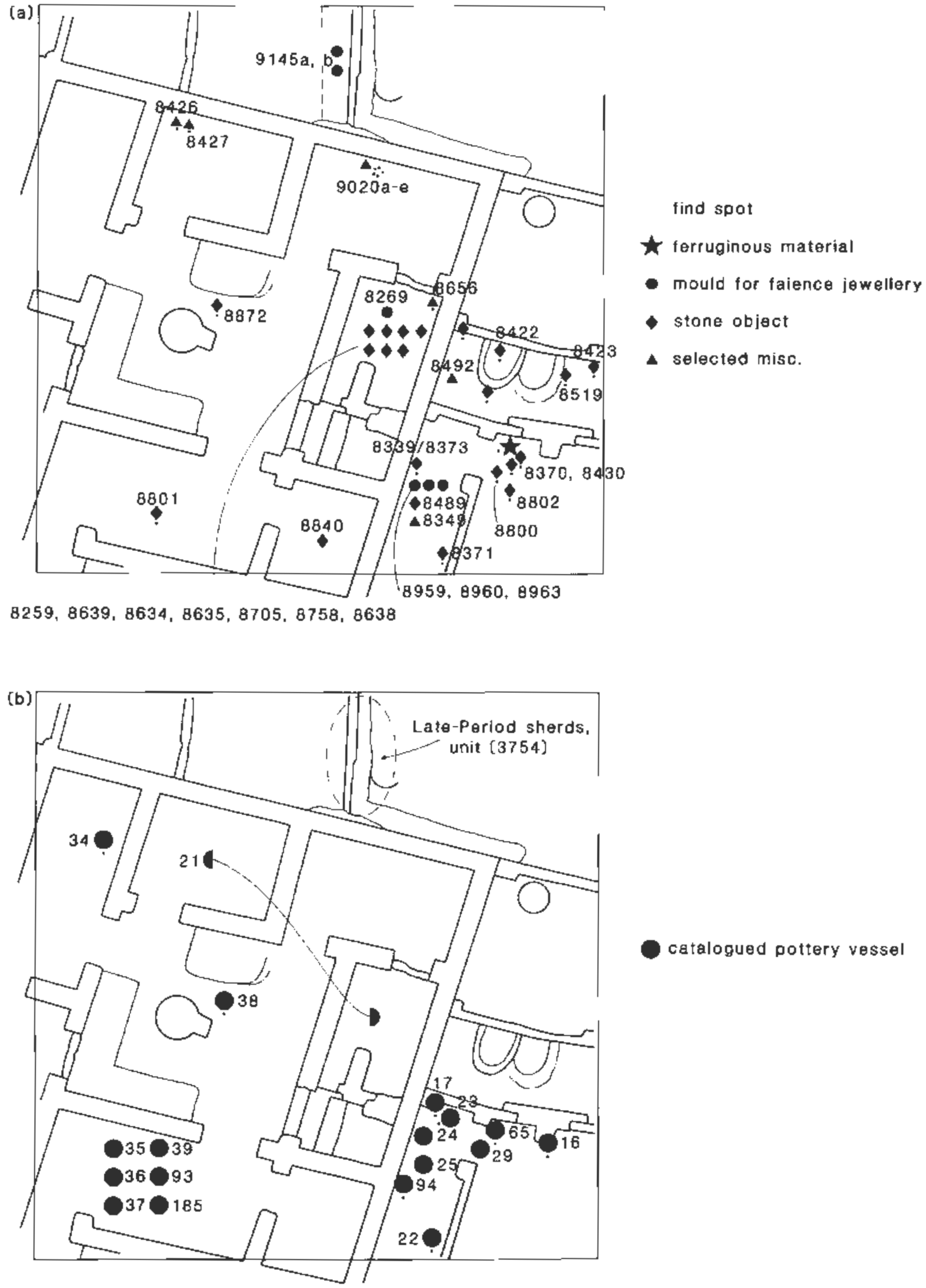


Figure 4.11. Outline plans of house P46.33, showing the distribution of (a) "significant" finds, principally stone objects and moulds (compare with Figure 2.41, which shows the overall distribution of finds of all kinds); (b) the complete or near-complete pottery vessels of Chapter 3.

in view of the subsequent discovery of sherds high up in the fill of the mound, which would have been easily brought to the surface by digging. On the top of the mound there was a shallow elongated sand-filled pit straddling the line between squares K15 and K16, and a smaller one in the north-west corner of square L15. On removal of the surface cover, however, these pits vanished and failed to show up on the rubble surface then exposed. The conclusion has to be accepted, therefore, that the house mound had seen no significant disturbance in modern times.

4.7 The ancient abandonment of Amarna and the effect of site-formation processes on the distribution of finds

From what little we know of the way that the Amarna Period ended we have to surmise that the city as a whole was abandoned by its inhabitants in a fairly orderly way. We have no real grounds for thinking that they fled precipitously and certainly no evidence for the city having been overwhelmed in a cataclysm. We thus have to consider that one of the processes of site formation was families and individuals packing their belongings ready for transportation to another home. Not only will this have led to a great deal of material being carried off from the site permanently, the process of gathering and packing is likely to have involved a general disturbance of material in a house and its ancillary buildings. We cannot assume that people suddenly abandoned the tasks that they were doing and walked out of their front door, never to return (the *Marie Celeste* effect). Such material that they did leave behind might therefore display an atypical distribution pattern, one created, in part, by the act of moving house.

The abandonment must have left most of the house walls standing, probably, for the most part, with their ceilings and roofs in place and their interiors accessible. (The extent to which wooden architectural elements, such as doors and windows, were taken by the inhabitants is hard to assess). It must have been a remarkable and eerie sight. The remains of light walls inserted into the rooms of houses have sometimes been recorded in the past and interpreted as signs of squatter occupation. It is tempting to connect these remains with an obvious feature of Amarna, the way in which, when floors were not yet buried in debris, much of the site was thoroughly picked over for useful or valuable material, including stone architectural elements and even sometimes the bricks from floors. This could have been done on a casual personal basis, but the scope was surely there for groups of people to make a living from camping in the houses whilst rescuing material for sale (it must not be forgotten that a village or small town continued to exist at Amarna on the site of the misnamed "River Temple" beneath the modern village of el-Hagg Qandil, see Chapter 15, section 15.8). Scavenging is, therefore, another likely site-formation process.

House P46.33 shows no clear signs of near-contemporary disturbance to its fabric; the brick floor and daises in the Central Room, for example, have not been deliberately damaged. It had, however, been visited much later, for five sherds of white marl ribbed ware (four of them joined and had fresh breaks) were recovered from unit [3754] in square L16, a deposit described at the time of excavation as "brick tumble and mulched mud". Other sherds of this kind, sometimes with rounded edges from having been used as digging tools (and hence termed "spade sherds"), have been picked up across the surface of the Main City during the sherd survey. The ware in question is usually ascribed to the "Late Period", and has been dated to between c. 750 BC and the end of the Persian Period (Aston 1990). This means that, at the earliest, it is six centuries later than the Amarna Period. It is hard to imagine the site being other than partially buried by this time, with the implication that they are unconnected with the "squatter occupation" which must surely have been closer in time to the end of the Amarna Period. This points to a further source of disturbance.

The position in which this group of five sherds was found is, unfortunately, ambiguous. Unit [3754], about 25 cm thick, lay in the north-west corner of square L16 and straddled wall [3892] which divided areas 15 and 16. It is not possible, therefore, to be sure from which side of the wall line the sherds come. Part of it looks as though it is derived from the eastwards collapse of wall [3892]. Since this was a thin partition wall it is scarcely credible that it should have stood so long and to think that the sherds were lying on the surface before it fell and thereby became incorporated into it. It is preferable to see them having been trampled into the surface. Even then, however, it remained for the deposit to be sealed by a further layer of collapse [3335], which lay close beneath the modern surface. This layer is almost certainly the remains of the middle-to-upper part of the north wall of the house [3231] which had fallen outwards. However surprising, it seems an inescapable conclusion that this particular piece of wall stood for at least six hundred years before falling. One has to envisage Amarna standing as a half-visible ruined city for a very long time, open to the curious and to those hoping to find something of value.

The protracted period of decay amply allows for damage to structure and loss of material, but the same considerations must apply to the effects of actual ancient digging into deposits as apply to modern digging: it will have been highly destructive of the structure which most rubble deposits and those laid down by natural processes possess. Ancient digging and turning over should, therefore, be detectable. A lesser process of this kind is digging by animals, especially foxes, which is often started at the base of a wall or other vertical or sloping surface. One would expect this to be less detectable after a very long period.

A few anomalies noted during the course of excavation could be the result of disturbance in antiquity, before the house reached its present stabilized condition. The principal one was in **area 1**. As noted in Section 1.4, a group of bricks in the south-east corner (Figure 1.8b) might have been put there as a makeshift step down when the room was already partly buried in rubble. If this were the case, however, it seems not to have led to serious digging in the room, for over the middle of the room the lower fill deposits, which included roofing fragments, seemed to lie undisturbed. Even the sandier patch in the south-east corner, which one might interpret as the remains of a hole, is not matched underneath by a break in the floor. If someone had been using or foraging in this part it might explain a New-Kingdom amphora base and animal-bone deposit which had been laid down at two slightly different stages of the filling up of **area 3**. They lay towards the north-west corner of the room, in units [3324] and [3332] respectively. One fill sequence which stands out as different from the others is that from within **area 6**, where the greater part of the floor area lay beneath a deposit of sand. Instead of taking this as evidence that the room had been originally roofless, we could ask if the fill been emptied out in antiquity? If this were the case, the emptying would have been very careful, not leaving material in the corners of the room, and it would have had to have taken place before the collapse into the room of part of wall [3235] which created unit [3171]. At this time it was likely that the north wall of the room was also standing, and this would have made access difficult, through the ruined main part of the house. Deliberate removal of the fill in **area 6** thus looks very unlikely.

Within the house the fills of **areas 3, 4/5** and **7** were basically of undisturbed rubble from bottom to top; the fill in **area 10** was similar but was separated from the modern surface by a layer of sand. All contained large pieces of decayed brick and roofing fragments, whilst, as the section (Figure 1.17) shows, the fill in **area 3** contained undisturbed sand layers as well. All of these features point to no human disturbance having taken place subsequent to the formation of the fill. A similar conclusion can be drawn for several of the areas outside the house, on east and north, namely **areas 11–13, 15**, and **16**, simply on account of the degree of articulation still possessed by the rubble when uncovered.

If human disturbance can be largely discounted during the centuries that house P46.33 was turning into an archaeological site, what explanation can we give to the vertical distribution of finds? It might be thought that the explanation lies in the likelihood that the debris derives from a two-storey building, but, on reflection, this does not provide such an easy solution. The part of a house most vulnerable to early collapse is the roof, when made with wooden elements, and the fall of the ceiling above the ground floor would bring down the objects standing on the upstairs' floor, so concentrating them in the lowest layers. To account for a distribution of material higher up in the fill, caused by collapse from above, it would be necessary to assume that there was access to the roof above the second floor and that objects were stored there, as well. Parts of this roof, still bearing objects, could have survived long after the fall of the first-floor ceiling and during the time that pieces from the walls were falling, so delaying the final descent of all material into the rubble below. This possibility should not be wholly discounted for, in the case of **area 3**, roofing fragments were also found in the upper rubble layers (Table 4.3, Figure 4.10). If areas of roofing persisted for a long time, perhaps providing shelter for people and wild animals in a room already part-filled with rubble, the presence of roofing fragments would not then be a guide to which parts of the fill formed quickly. This factor cannot, however, be invoked to explain the large number of sherds found in the upper rubble of **area 15**, a part of the site which is likely to have been an unroofed courtyard.

One thing to note is the lack of correspondence between the overall distribution of sherds and the places where the catalogued pottery vessels were found. Let us divide the area excavated into two parts, **areas 1, 11, 12** (which produced most of the pots) and the remainder. The sherd figures are 3167 for the former, and 10123 for the latter. If we take the house itself and divide it into two groups of rooms according to the distribution of pots and heavier objects, thus: **areas 1, 2, 4/5** and **areas 3, 6, 7, 10**, the sherd figures are 2541 and 3571, respectively (for comparison, the figure for **areas 11–13** is 1874). If sherds mainly derived from vessels broken on the spot, then the reverse of the picture illustrated here should have occurred. We should also expect to find joins between sherds from different levels. The considerable task of looking for joins in the sherds has not yet been tackled, but in the preliminary handling of the material no groups of similar sherds were noticed, such as one would expect if vessels had broken in the vicinity (P. Rose, personal communication). The conclusion to be drawn is that a large proportion of the sherds does not derive from the breakage of vessels left behind when the house was evacuated. Where then do they come from?

It can be seen that, during the time that the house was occupied, sherds were already a significant part of the soil which surrounded the house. They had become incorporated into floors of **areas 12–16**, which had probably formed or been built up through trampling of debris and had an organic content. Loose organic rubbish lay in **area 14** (unit [3893]) and this produced 205 sherds. The rubble deposit [3073/3751] immediately above produced a further 591 sherds, and these might be thought to have worked their way up from it. In the north-east corner of the excavated area (**area 15**) lay a pit filled with rubbish, of which only the top part was removed during excavation. The largest number of sherds lay over it (2216 in the medium fill of rubble, the bulk of them in unit [3336], only 11 cm thick). Here one might consider another possible factor at work which has altered the structure of deposits. To what extent have rubbish deposits, perhaps with a high organic content originally, compressed over time and actually lost material to erosion? If sherds were a component of a rubbish heap, compression and especially the loss of fine material would presumably lead to a concentration of sherds towards the top. This might explain the sherd deposit in **area 15**.

The same difficulty of explanation applies to the distribution of animal bones (the following notes derive from a study by Dr Rosemary Luff). The total quantity is not large for an archaeological site and, perhaps like sherds, bone fragments might have formed part of a general rubbish element that lay around houses and was easily spread. In **area 12**, for example, 27 bone fragments (249 grammes) were recovered from the organic floor deposit [3230], along with 332 sherds. However, a significant collection of fragments (78 and predominantly cattle, weighing 1443 grammes) also came from the upper fill units of **area 3**, and some were in the rubble of the collapsed staircase. Amongst the former group were two cow femurs from unit [3332] which lay not far from a large fragment of amphora base (in unit [3324]). These three pieces were too large to have been incorporated as debris in brick or mud plaster. Had they, too, as rubbish, been lying on the top of the roof of the upper floor (the same upper fill layers produced 1035 sherds), or were they brought in from somewhere else by someone visiting the ruined building?

It has often been a matter of observation at several Amarna buildings that sherds had become incorporated into mud bricks at the time that they were made, and the decay of bricks is therefore an obvious source of some sherds. In the case of house P46.33, however, the numbers are likely to have been small. No sherds have been noted on the exposed surfaces of the mud bricks, and, furthermore, if this were a significant source, it is to be expected that sherds would have a more even distribution through the deposits than was actually the case. In the description of **area 3** it was noted (p.13) that sherds were embedded in the mud flooring layer. It is possible that the same was true for the floor laid over the ceiling above this room, although it has to be said that none of the roofing fragments found had sherds stuck to them. There is, too, one other possible source which might explain the higher sherd concentration. Sherds could have been laid over the roof to increase protection from rain. This idea derives from the fact that sherds had been laid over the roof of the old expedition house near el-Hagg Qandil, the house which now serves as the Society's base at Amarna. Beneath the sherds was a wooden roof; whether mud had been laid over it was not clear, for when I first saw the house in 1977 all roofs had fallen, leaving a layer of sherds on the floor. Some of the roofs were then replaced with domes, and, at a suggestion from a local villager, sherds were packed between the domes for the purpose of soaking up rainwater. To achieve the observed distribution of sherds, of course, one then has to return to the idea that the two roofs fell at widely different times and rates. This explanation cannot, however, apply to the sherds in **area 15**, and probably not to those in **area 6**, if we are correct in interpreting it as having been a light-well.

It is helpful to single out stone objects and the complete or near-complete pottery vessels as items less liable to accidental displacement. Not only are they confined to a limited number of rooms, they are, for the most part, confined to the lower deposits, though not necessarily to those immediately in contact with the floor. Pottery vessels, because they are relatively large but fragile, are a particularly sensitive indicator as to the fate of objects left in the house. With the exception of no. 21, the results are, in fact, very much as one would expect in ideal circumstances. Falling or decaying masonry has been deposited around them, so making them appear as part of low-lying rubble deposits, and some fracturing has occurred, forcing some sherds into higher levels. The parts which make up no. 21 were found in superficial levels, over **areas 4/5** and **6**. This is easily explicable if the vessel had been left near the top of the staircase and so became incorporated into higher-lying rubble and exposed to human disturbance as the house mound weathered down. These items provide a rough guide to how deeply one should set the limits for *in-situ* material and imply that the impact of collapsing brickwork forced material upwards into the rubble, a kind of "bounce" factor.

The principal anomaly in the case of the distribution of heavier objects concerns a group of stone artefacts, seven in number, which was recovered from **area 4**, the cupboard under the stairs. They were spread through the three fill units. The brick rubble in this confined and relatively inaccessible space was in particularly good condition, and derived partly from the fall of the brick stairs themselves. This bestows a high degree of integrity on the deposits. Until the house wall which separated **area 4** from **areas 11–13** came down, it must have served as an effective barrier between the inside and the outside of the house. This makes it hard to imagine that one is dealing with a single deposit, yet, at the same time, it would be a coincidence if this collection of stone tools came from two different but adjacent sources, one inside and one outside the house. The stone tools from **areas 11** and **12** came from rubble deposits lying not far above the floors, and from areas divided by thin walls which would not have stood for as long as those of the house proper. It seems reasonably certain that they, at least, originate from within the latter area. In Chapter 2 (p. 114) the idea was put forward that some of the material in **area 4** had originated in a rubbish dump in **areas 11–14** which was dispersed when the dividing wall collapsed. Some form of dispersal has to be invoked. Even allowing for compression of loose deposits, however, the depth of rubbish in the outside area closest to **area 4** (**area 12**) is unlikely to have been sufficient for it to have spilled over into the former as the walls came down. Was there a window in the east wall of **area 4**, which would have illuminated the almost completely closed space beneath the stairs and through which objects could have been thrown at a time when the stairs were beginning to collapse?

Anomalies which are likely to be the result of minor acts of dispersal, especially if done by people rather than by natural agencies, really represent an aspect of forensic archaeology and are inevitably very resistant to neat and convincing explanation. Furthermore, a single house provides an inadequate basis for seeking an explanation for the three-dimensional distribution of finds. It is clearly the complex result of the operation of several factors the effects of which are still largely a matter of guesswork. The excavated record of many more houses is required simply to judge how normal the situation was in house P46.33. However, although the archaeological record cannot be read in a simple linear fashion, it is not necessary to be wholly pessimistic and to dismiss the record as being not, in the end, more useful than those provided by the earlier excavators who ignored vertical positioning of finds and frequently grouped together all of the finds from a single house.

4.8 House P46.33 as a record of ancient life

Although the finds have a distribution which is not what one would expect from an undisturbed house, they are not spread randomly or haphazardly through the debris. Certain concentrations and separations of material are visible which should not be ignored since, even though they do not provide a tidy example of patterning likely to be the direct result of human behaviour, they might represent an approximation, a picture made "fuzzy" through disturbance that has been only limited in its effects. The element of "fuzzy distribution" applies to vertical and to horizontal distribution alike.

Several boundaries in the distribution of material are visible. The most obvious is that between the interior and the exterior of the house (with **area** 4 an anomaly, Figure 2.41). House P46.33 was relatively clean when it was abandoned. Rubble fell on to floors of mud, not on to a layer of rubbish (Figure 1.7). Much of the material that was found inside the house consisted, in addition to sherds and bones, of small glazed objects. This material contributed, to a significant extent, to the deposits outside the house as well. Because the individual pieces are small and light in weight they must have been more easily dispersed during the occupation of the house, as well as subsequently, and, together with the fine dusty and sometimes ashy matrix in which they occur outside the house, should be seen as part of a background spread of domestic refuse.

This general spreading of material does not, however, apply to all kinds of artefacts. One division in distribution occurs between **areas 15** and **14**. The former is the only space excavated to floor level that is likely to have lain outside the limits of house P46.33 (the contents of the rubbish pit in the floor were left largely unexcavated). Although it has a high sherd count it produced few examples of other kinds of artefacts, and none of any size or weight. **Area 14** is one of the enclosures on the east of the house which together had the highest density of small finds (Figure 2.41). This includes manufacturing pieces for faience and glass (Figure 2.2). **Area 14** differed in turn from the others in the lack of larger pieces (stone objects and catalogued pottery vessels). These larger pieces, from **areas 11–13**, seem very likely to be generally within their original area, a few of them forced upwards into rubble layers presumably as a result of the force of the impact of collapsing sections of brickwork.

It has long been apparent that the enclosed areas around Amarna houses were used for what might be termed life-support activities, which often required fixed installations or processes which used distinctive tools. The clearest case at P46.33 is **area 13** (a roofed area), where the brick quern emplacement points to the grinding of cereal grains. However, the associated finds, both within this area and the adjoining **areas 11** and **12**, suggest that cereal grinding was one element amongst a more varied range of activities. Several hard stone objects were amongst them, including an unusually large quartzite "quern" which lay beside the emplacement. Whether these were all intended for cereals or were used to grind other substances remains to be determined, and this has to come from a broader programme of research which examines the full range of heavy stone tools at Amarna. A major start on that has already been made, with the surface collection of over seven hundred specimens. Our understanding will continue to be hindered, however, by our lack of precise knowledge of Egyptian manufacturing processes and of the tools used, which were often quite crudely made. The kind of intense research, via experimentation and microwear analysis, which prehistorians have devoted to flint tool kits is much needed for the stone tools of later periods.

The little collection of lumps of ferruginous material described above in the Appendix to Chapter 1 is also part of this group, but again the remarks made represent only a tentative pointer as to its significance. The study of the small finds by Boyce (Chapter 2) points to on-the-spot manufacture of small items of faience jewellery, a probably common domestic industry at Amarna. House P46.33 would then have represented, for this part of Amarna, the kind of urban manufacturing area of the "cottage-industry" type that can be isolated in the North Suburb (Chapter 11).

It would help our understanding of the little group of spaces on the east side of the house if we had the full plan, thus the pattern of walls in the still unexcavated squares lying to the east. As it is, we can guess that it is highly likely that **area 13** communicates with **area 14**, and thus that the little oven [3811], made from part of a reused pottery vessel, is part of the set of installations. Even if true, however, incorporating it into the picture is not straightforward. The cereal-grinding emplacement implies the existence of an adjacent bread oven, but oven [3811] is not of the normal domestic kind. Its nearest parallel from evidence derived from our own work is in building Q48.4, where its context suggests much more that it was a small kiln used in the manufacture of small faience objects (*AR* V: 33–6), something which would suit the conclusion reached by Boyce from a study of the small finds (Chapter 2). The condition of the oven and the stratigraphy imply, too, that the oven or kiln had gone out of use well before the house was abandoned, so leaving the area exposed by excavation actually without such a feature during a period of time leading up to the site's abandonment.

When we turn to the interior of the house itself, it is still the case that the least ambiguous evidence is architectural. This is not the place to review the architectural evidence from Amarna houses as to the most likely patterns of spatial utilisation. It is a large subject and, indeed, house P46.33 now makes this more difficult. The possibility that any given house might have had an upper storey means that a ground plan can give us only half of the picture. Moreover, the seemingly fixed nature of the basic Amarna house at ground level carries with it the implication that, if the evidence points to an upper storey in a few cases, we should accept it as having been the norm. So basic is this to interpretation that it makes a powerful case for further excavation of houses with this question in mind, excavation in which the record of building collapse is subject to more intense scrutiny than was attempted in the case of P46.33. The posing of this question I would see as the principal result of this excavation.

Only two rooms in the house, **area 1** and **area 4**, contained a significant body of finds, and the finds from the latter might have been an overspill from **area 13** outside the house. For **area 1**, the front room of the house, at this modest social level the question of function is not properly settled. Was it a social adjunct to the central hall behind, thus a zone of less intimate reception which was modelled on the larger houses (as we interpret them), or was it perhaps more a place of storage for things which it was better not to leave outside? (The ambiguous standing of this room is illustrated by house N49.19, Figure 1.16b, the front room of which seems to have contained the kind of brick emplacements which P46.33 had in its outside spaces, specifically **area 13**.) It had been abandoned with a heterogeneous group of half a dozen pottery vessels lying on the floor (Figure 4.11b) but, of course, the final moments of abandonment could have seen a disturbance to the normal way in which the house contents was stowed within the house, as the occupying family sorted out and packed the belongings they intended to take with them. This possibility must apply generally to the rooms within the house. One requires the repeated pattern from several houses before drawing conclusions. With this house the final clearance was probably quite thorough. **Area 3**, to judge from the fittings, probably contained originally one or more large pottery water jars, but no large pieces of such were recovered during excavation, suggesting ancient removal.

Whilst it is frustrating not to be able to say more about the behavioural evidence from this particular house, it does represent a start on a more thorough documentation of Amarna houses and their contents as a long-term cumulative study. It is much to be hoped that it will prove possible in the future to resume excavation of undisturbed house mounds with a view to addressing with even closer scrutiny the questions posed by the excavation of P46.33.

units	nature	finds	sherds	bones: nos./wt.	vessel no. (of Chapter 3).
Area 1					
3323} 3325}	medium fill - sand & rubble	3	65	3/19	
3690} 3685} 3686}	medium fill - rubble	6 (1)	1136	3/2	{**35, 36, 39, 93, 185**
3703 **R**	lower fill - rubble	5	564	3/14	{**37**
Area 2					
3076	upper sand	1 (1)	169	3/7	
3684	medium fill - rubble	3	96	1/50	
3705	lower fill - rubble	0	120	1/5	
Area 3 (central room)					
3322} **R** 3324} **R** 3332} **R** 3347}	upper fill - sand & rubble	16	1035	78/1443	
3338 **R**	medium fill - rubble	2 (1)	501	48/180	
3349 **R**	lower fill - rubble	6	302	6/23	**38**
Areas 4 and 5 (stairs and stair room)					
3067	upper fill - rubble	2 (1)	54	10/17	**21** (part)
3075} **R** 3239}	medium fill - rubble	4 (3)	223	22/352	
3240	lower fill - rubble	7 (3)	114	9/24	
Area 6					
3033	upper fill - sand	2	456	2/12	**21** (part)
3171	medium fill - rubble	2	72	2/31	
3178	lower fill - sand	2	56	1/0	
Area 7					
3333	upper fill - rubble	1	120	5/9	
3749 **R**	lower fill - rubble	11	219	2/102	
Area 10					
3065} 3032}	upper fill - sand	0	274	0	
3172} 3179} **R**	medium fill - rubble	5	360	6/35	
3181 **R**	lower fill - rubble	3	176	3/10	**34**
Area 11					
3069	upper fill - sand	23	183	12/28	{**29** (part)
3071	medium fill - rubble	4 (2)	127	2/10	{
3185	lower fill - rubble	25 (2)	207	13/30	**16, 65**

1987 excavation

Area 12					
3074	medium fill - rubble	0	142	1/2	
3229	lower fill - rubble	37 (3)	411	26/35	**22, 23, 24, 25, 29** (part) **94** (part)
3230	floor deposit - organic	45	332	27/249	**17, 94** (part)
Area 13					
3227} 3072} **R**	medium fill - rubble	19 (1)	208	3/13	
3186	lower fill - rubble	1 (1)	104	0	
3188} 3226}	floor deposit - organic	11 (1)	160	5/11	
Area 14					
3334} 3068}	medium fill - sand & rubble	7	125	0	
3073} 3751}	lower fill - rubble	15	591	3/16	
3893	midden	5	205	5/38	
3708	ash	2	115	4/10	
3189	floor deposit - organic	3	188	8/76	
Area 15					
3335} 3336}	medium fill - rubble	4	2216	27/278	(shared with area 16)
3754	lower fill - rubble	8	395 + 5 late sherds	3/36	(shared with area 16)
3707	pit fill - rubble	1	503	7/97	
3755	floor deposit - organic	4	683	22/61	
Area 16					
3034} 3335}	upper fill - rubble	0	71	0	(shared with area 15)
3070	sand	0	57	0	
3174	medium fill - rubble	0	0	0	
3754	lower fill - rubble				(shared with area 15)
3900	floor deposit - organic	4	18	2/0	
Area 17					
3066	upper fill - sand	2	140	0	

Table 4.3. Summary of the vertical distribution of finds arranged by area, but omitting surface units. Numbers in brackets in the objects column refer to heavier stone pieces. The letter **R** designates the presence of roofing fragments. This table forms the basis for Figure 4.10.