

CHAPTER 4

REPORT ON THE 1985 EXCAVATIONS BUILDING 540/541

Site supervisors: Janet Richards, Linda Hulin, Ian Shaw,
B.J. Kemp

4.1 Introduction

Re-clearing selected buildings originally excavated in the 1920s has become an important aspect of the expedition's work. The choice of nos. 540 and 541 was made last season (*AR II*: 35) as an element in the strategy to explore further the sector running northwards from Chapels 570 and 571 where evidence had been found of an earlier phase of use in which garden plots had been laid out. The ground to the north saw two separate excavation teams working in 1985, one on the animal pens reported in Chapter 3, the other on the re-clearance of Building 540/541. Although the two sites were physically separated by an open stretch of ground about 4.50 m. metres across at the narrowest point, both seem to have belonged to the same ancient activity: the raising of pigs. Furthermore, stratigraphic evidence demonstrates that the garden-plot phase had also been present here, but before the construction of Building 540/541.

Building 540/541 had been grouped by Peet and Woolley under the heading of "chapels". From this standpoint it appeared to have little interest and was given only summary treatment in *COA I* (p. 101 and Plate XXIV). The sole description reads: "Chapels 540 and 541 lie in the bottom of this same valley at its junction with the main valley. They are insignificant in size and their walls hardly stand more than one course in height; they yielded no object of any importance." It should be noted that they lie actually towards the top of a low hill, and that on the east side up to four courses of brick are preserved.

The 1985 work began with the removal of the sand which had blown in since 1921 and thoroughly buried the building. This revealed that the eastern part had survived reasonably well, but that the western side had suffered more, partly from more intense erosion since ancient times but also by a deeper removal by our predecessors of desert materials to below the original floor level. Thus the site, when cleared, had the appearance of being on two levels, but this is an illusion. The "floor" of the excavation on the west must actually be well below the ancient floor. It was also evident from surface details that other features of interest lay against the outside walls of the building and that these had never been examined. During the remainder of the season these various parts were excavated and recorded to the extent that the study of Building 540/541 can now be regarded as complete.

In *COA I* the buildings are subdivided into two parts, 541 in the south, and 540 to the north and east. This is useful in that 540 represents an enlargement to the original building 541, increasing the specialist facilities that 541 provided. The details of the buildings and the locations of the various unit numbers are, in



Figure 4.1. Building 540/541, general view to the south.

this volume, distributed over three different plans: Figures 4.2 and 4.3 in this chapter, and Figure 3.2 in the previous chapter.

4.2 Building 541

The basic shape of Building 541 (Figures 4.1, 4.2) is a rectangle measuring 12.75 by 6 metres, bounded by walls [1855] (south), [1975, 1927] (west), [1935] (north), and [1945, 1954, 1962, 1967] (east), subdivided into two more or less equal and square parts by wall [1956]. The southern (**Area x**) is the most denuded of the complex, and has lost all of its original floor and floor deposits except for patches in the north-east corner [1964]. As will be explained below, section 4.6, the separate island of bricks and soil forming units [1971] to [1973] (Figure 3.2) is nothing to do with the building, being a remnant of an earlier phase of use when garden plots were laid out over this part of the desert. As it stands now, the southern enclosure has only a single internal division, a small 2.25 metre square area in the north-east corner (**Area xi**). On the south it is

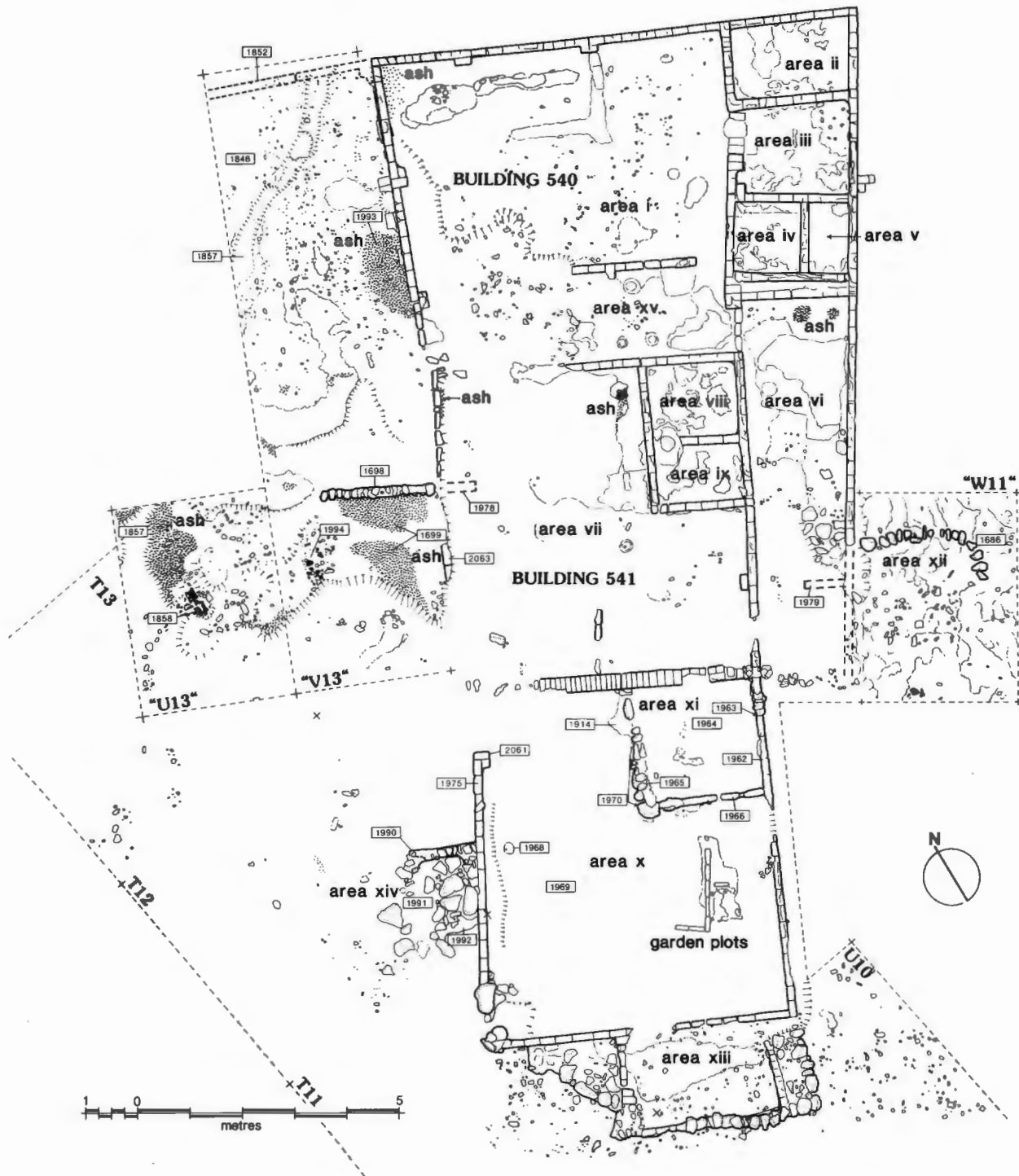


Figure 4.2. Building 540/541, general plan (originals by J. Richards, I. Shaw and B. Kemp).

bounded by the remains of a brick wall [1966], on the west by stones and marl mortar [1965], the foundations for a wall and probably the threshold of an entrance at the north end, where deposit [1914] lies. Most of the floor and floor deposits in this area have been lost. The ground inside is just the decayed surface of the desert bedrock [1964]; an exception is a small patch of hard

compaction of the desert such as occurs beneath floors and floor deposits when better preserved.

A point to consider is whether this area originally possessed a gypsum-coated mud plaster floor which would make it equivalent to other such enclosures in the complex. The loss of floors in ancient buildings can be severe. In this case, however, it can be reasonably concluded that a well-laid whitened floor has not been lost. At the northern end of the east wall [1962] a sufficient height of brickwork has survived to preserve the impression of a thin wooden stake, 2.5 cm. dia., 11 cm. tall, which had been plastered vertically into the inner wall face [1963]. This is just the kind of protected corner area where one would expect to find some trace at least of an original gypsum surface which had covered floor and walls and was often thicker than usual in the actual corner. Nothing like this is present. Furthermore, the rough doorway with organic deposit in front [1914] also does not conform to the other plastered enclosures.

The only other feature of note in this southern part is a circular concave patch of mud [1968] towards the middle of the west side. This is the kind of trace left by pressing a pottery jar into a floor of damp mud. On Newton's plan (*COA I*: Plate XXIV) a short length of wall is placed here running north-south. No trace was found here by us that could be so interpreted. There has been wall loss since Newton's day, but in this case the coincidence with deposit [1968] renders this a less likely explanation than that Newton misinterpreted the remains at this point, as he did with the garden plot lying to the east.

The northern half of Building 541 has a general resemblance to the southern. More than three quarters is open space containing little internal detail, the ground surface being the natural desert surface of sand and decayed marly bedrock [1929]. A short length of wall [1976] runs at a slight angle from the southern boundary wall [1956], and must mark part of an inner enclosed area, presumably in the south-east corner. Beyond it, a little way to the north, is another circular mud patch [1955] from a pottery vessel originally impressed into the ground.

The north-east corner was walled off to create two adjacent rectangular enclosures, 1.67 x 1.30 m. on the north (**Area viii**), 1.65 x 1.10 m. on the south (**Area ix**), divided by a wall [1941] which has been damaged by the digging of a hole [1943] at its west end. Both of these enclosures have been floored with a layer of mud plaster [1940, 1977] thickly coated with gypsum, which was also plastered on the walls (visible in Figure 4.4). In the case of the southern floor [1977] its surface bears groups of scratches near some of the walls and corners. Dr. Hecker, who examined them carefully, considered that they might have been caused by the claws of a digging animal, such as a dog.

Against the outer face of the west wall [1944] a patch had been preserved of the floor of the main courtyard. This was primarily a layer of mud [1937], partly covered with thin deposits of ash and what appears to be straw-rich plaster [1938]. The rectangular brick-shaped feature [1939] is no more than about a centimetre high and its purpose is not clear. Both floor layers ([1937] and [1938]) had originally been coated with gypsum, small patches being preserved along the foot of wall [1944]. Towards the northern end of this area of floor an

upturned and re-used pottery offering-stand [1913] [1] had been sunk into the ground, to serve as a stand for a pottery jar.

Much of the west wall of Building 541 [1927] appears to have been lost since Newton made his plan. He records it as a continuous length of wall, with a short offset which has been marked in Figure 4.2 as unit [1978]. This appears to be a continuation of the outside wall [1698] which probably bordered the main entrance. The small patch of brickwork further to the south [2063] must also be part of the west wall of **Area vii**, although its alignment is slightly skew. Note also the ash [1928] between and beneath the bricks of this wall at its northern end, as if a deposit of ash had originally accumulated in this corner.

4.3 Building 540

This is clearly an addition extending the complex to the north and east by means of three walls no longer on a rectilinear plan: [1925, 1856] (west), [1860] (north), and [1859, 1952] (east). Although there has been progressively more severe denudation to the west, a much greater extent of the original floor and floor deposits has been preserved (Figure 4.3).

On the east side lies a further group of small enclosures carefully floored with mud and then thickly plastered with gypsum which was also laid on the walls. Indeed, patches of gypsum were found adhering along the whole length of the inner face of the north wall of the building [1860], implying that all the inner faces of the court, **Area i**, had been treated in this way although no trace was found on the courtyard floor even where it had been protected by the survival of original deposits.

The small enclosures are not the product of a single building operation. From the bonding of the bricks we can deduce that the wall enclosing the north-east part [1866] belongs to the original construction, as does the southern wall of the whole group [1877], and so by implication the west wall [1872], which created a larger rectangular area with its own floor [1870], and an entrance with a brick threshold [1868]. Subsequently this larger area was subdivided into two roughly equal parts by a cross wall [1871]. At the same time the southern wall [1877] was doubled by adding an inner wall almost parallel to it [1876]. A further subdivision was created by the north-south wall [1873]. In the eastern compartment (**Area v**) the original floor [1875] was probably kept. But in the western compartment (**Area iv**) a completely fresh mud and gypsum floor [1874] was laid over the old one. A slight groove [1884] of unknown meaning crosses this floor at the north end. The original floor was visible at the bottom of the shallow rectangular hole in the south-west corner [1880], and (as unit [1921]) beneath the rubble filling the space between walls [1876] and [1877]. The explanation for the rubble filling might perhaps be that it gave greater protection from the fireplace on the other side of the wall [1946].

The final median dimensions of these four enclosures are: **Area ii**: 2.25 x 1.40; **Area iii**: 2.00 x 1.67 m.; **Area iv**: 1.25 x 1.35 m.; **Area v**: 0.75 x 1.35 m. Only **Area iii** was provided with a properly constructed entrance. In the case of the others

[1] For the type see *ARI*: Chapter 12, no. 51973, and this volume, Figure 7.2.

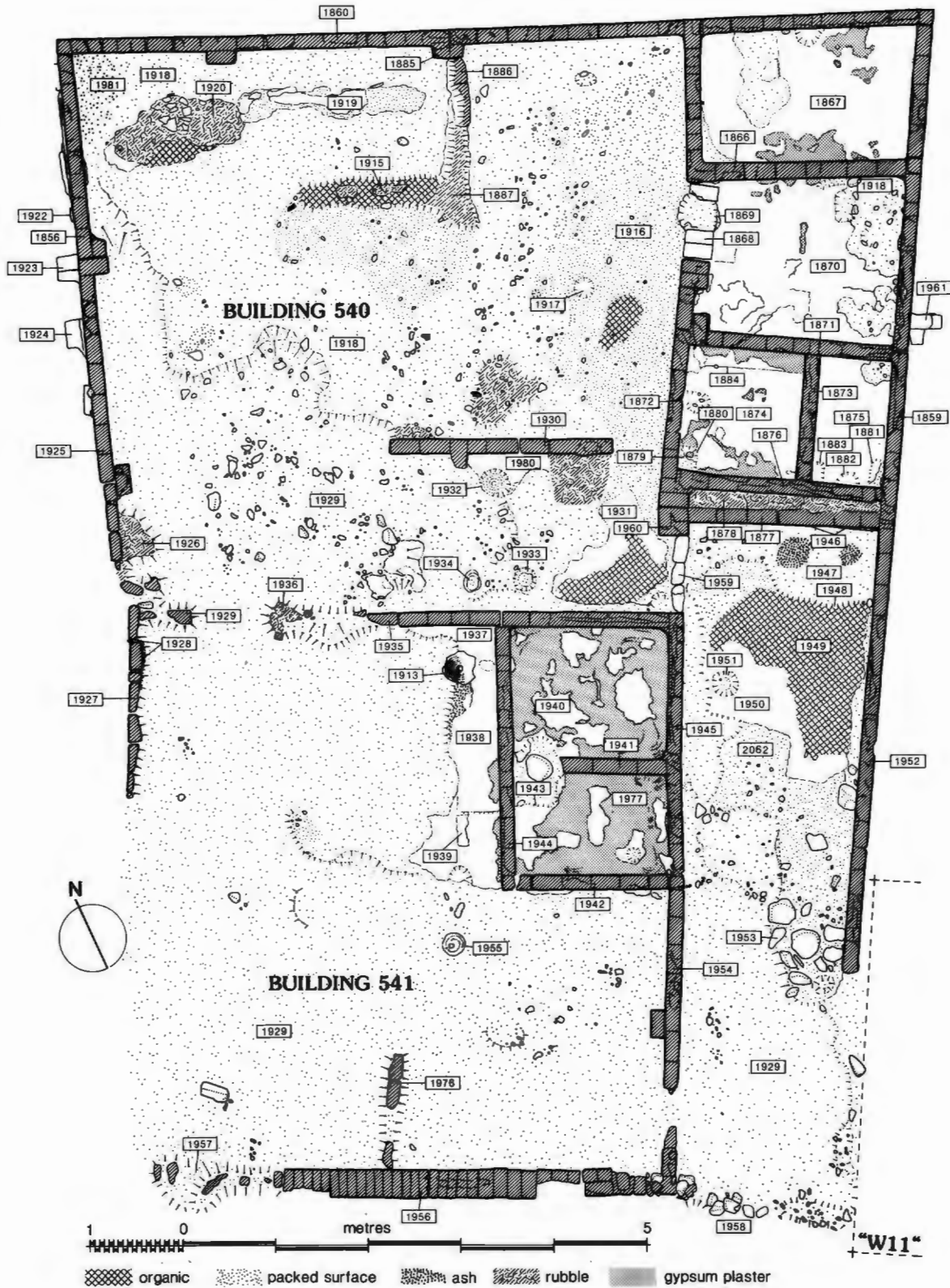


Figure 4.3. Detail plan of Building 540 (original by B. Kemp).

one could only enter by stepping over two or three courses of bricks.

How one entered these enclosures is related also to the question of roofing and general wall height. Because none of the rubble deposits had been left by

the 1921 excavation, we have no direct evidence which bears on either question. Nor, unfortunately, does the comparative evidence from elsewhere in the Village help much. This will be discussed in section 4.7 below, but in every case so far the relevant buildings have also been too disturbed to provide definite answers. The removal of the sand over **Areas ii to v** brought to light a few pieces of mud bearing cylindrical impressions which may have been of wooden poles but this is not really conclusive. If the main purpose of the carefully prepared floors was to create areas for the clean handling of meat (see section 4.7) then roofing would seem to be a necessity, with the walls taken up to a sufficient height except where gaps for access were left. Without roofing the whole reason for having small enclosures in the first place is undermined.

Running south from these enclosures was a narrow elongated space behind the rear of the northern half of Building 541 (**Area vi**). It was closed to the south by a wall of which only a discontinuous line of stones [1958] survives. The last part of the eastern wall [1952] has also vanished, but on Newton's plan it is shown complete, together with a short offset wall marked in broken line on Figure 4.2 and given the unit no. [1979]. Despite these losses some of the floor and floor deposits remain, consisting of a packed surface of desert [2062] in which a large patch of stones [1953] is embedded, a thin layer of mud plaster [1950] bearing a patch of ashy stain, and an organic deposit [1949]. A shallow circular cutting [1951] might represent a jar emplacement. At the north end access to **Area i** was through the space left between the north-east corner of Building 541 and **Area iv**, across a threshold made from an irregular row of bricks [1959]. At this end the floor has been destroyed by a shallow pit [1948]. However, two ash deposits [1947] and a patch of burning [1946] on wall [1877] show that a fireplace was located here.

In front, i.e. to the west, of the entrance to **Area vi** a part of the large courtyard had been walled off, **Area xv**, by means of an east-west wall [1930] with buttress. Remains of a mud floor [1931] bearing an organic deposit [1980] survive, as do three circular mud-filled depressions [1932-34] marking the positions of pottery jars, their rounded bases pressed into the floor (Figure 4.4). Possibly others originally lay to the west, but the floor has been progressively destroyed in this direction.

Much of the rest of the courtyard is covered by a flat surface of packed desert [1916, 1918]. Over this a distinct layer of organic material had accumulated. It is preserved, however, only as an L-shaped patch [1887] which lay beneath a wall added at a late stage to the north-west corner to create another small enclosure. Of this wall only two bricks [1886] and a patch of bedding mortar [1915] survive. This wall is marked on Newton's plan. Further towards the north-west corner lies an uncleared patch of rubble [1920] from the collapse of wall [1860]. Some pieces of the brick rubble have gypsum-covered faces. Actually in the corner of the courtyard is a deposit of ashy sand [1981].

One question that is not answered directly by the plan of the surviving walls is how Building 540 was entered. If, as will be argued below, it was part of the cycle of pig raising, the entrance can scarcely have been at the south end of **Area vi**, since this would have led persons and animals past the fireplace in the north-east corner. The entrance to Building 541, to which it was a supplement,



Figure 4.4. **Area xv** with pot emplacements, looking east.

was to the west. However, as the plan of collapsed brickwork from wall [1856, 1925] in area "V13" shows, the west wall of Building 540 did not contain a doorway. The explanation must be that a door was cut from **Area vii** of Building 541 to lead into the main courtyard of 540, somewhere along the now missing westwards continuation of wall [1935]. Newton's old plan shows this part as a line of stone foundations, which for this explanation is neutral evidence.

4.4 Three exterior structures (Areas xii, xiii and xiv)

One point which it was felt important to establish was whether there was any direct connection between Building 541 and the newly discovered animal pens, Building 300. The excavation by 5-metre squares was therefore extended from Building 300 as far as the south wall of Building 541 [1855] (Figure 3.2). Whilst this showed that no direct connection existed, it did lead to the discovery of a small single-chambered building constructed against 541, now designated **Area xiii**. It is built partly of brick and partly of stone, and measures internally about

1985 excavation

2.70 x 1.75 m. It had been added directly against the south wall of Building 541 [1855], but this connection has for the most part been broken by a shallow trench [1718] dug in 1921 whilst following the line of wall [1855]. The east end of the room is composed of two parallel walls, one of brick [1982] and one of stone [1983], with rubble filling [1984]. This was presumably to support something, such as a feeding-trough, but was too denuded to reveal any details. At the other, western end a doorway [1985] is clearly visible as a single course of bricks laid as stretchers between two piers [1986, 1987]. In front of the doorway is a triangular area of stones set in mortar [1989], which appears to form a step. It was difficult to distinguish the original outline from superimposed rubble. A good part of the floor inside the room bore a thin but compacted layer of organic soil [1988] which helps to denote that animals were kept inside this structure.

The enclosure that we have called **Area xii** was visible from the surface outline of stones [1686] which defines it. A rectangular area, 4 metres by 3 metres, was laid out to cover it and given the nominal grid reference "W11". Removal of a shallow surface layer defined the curving outline of stones [1686] and showed that it was of only a single course. The absence of loose stone or brick rubble may mean that this was simply a line of stones to anchor down a screen of plant stalks. Inside the enclosure lay patches of a thin and weathered organic deposit [1691, 1692, 1689]. A small patch [1687] was detected outside.

It was apparent from the very beginning of the re-clearance of Building 541 that some feature of interest lay against the outside of the western wall [1975]. Over a confined area the ground was mounded up and covered with large stones. Excavation yielded enigmatic results. Removal of the loose stones revealed a short wall of stones set in mortar [1990] projecting at right-angles from the east side of Building 541. Against its north-west side lay a small heap of rubble [1908], in part very decayed and probably fallen from walls [1975] and [1990]. Amongst the rubble, however, were fragments of painted plaster. On the opposite side of the wall was an area of stones set in marl mortar [1991]. It was impossible, however, to distinguish stones which had been originally set there from others which had fallen and had become embedded in weathered mortar. Nor was it possible to distinguish a second projecting wall parallel to wall [1990] although from the plan it can be seen that one might have been present [1992]. The number of really large stones both in this layer and found loose on the surface precludes their having formed part of wall [1975], for the brick foundations would not have supported their weight. The most straightforward solution is to see the structure as the remains of a broad set of steps and thus the main entry into the courtyard of Building 541. When re-cleared, the ground of the courtyard at this point was below the level of the steps, but this is a consequence of earlier over-digging and erosion. The preserved remains are consistent with a higher and perhaps deliberately built-up floor to the courtyard. Even so the number of large stones removed from the deposits seems excessive, unless some of them derive from a subsequent blocking of the broad doorway. The pieces of painted plaster also seem quite out of keeping with the nature of the building.

4.5 Ground west of Building 540

Immediately west of Building 540 the ground sloped gently down and did not imply the existence of any extension in this direction. However, a line of stones [1698] did break the surface further along, against the middle of the west wall of **Area vii**. This prompted the clearance of a strip of ground three metres by twelve running along the whole western side of 540 and for a short distance along the western side of 541. This was given the nominal grid reference of square "V13".

Removal of surface sand quickly brought to light a layer of decayed brick rubble [1697] from the outward collapse of wall [1856], cut by a narrow water course [1857] scoured by the wash from occasional rainstorms. Although the rubble is for the most part too decayed to allow counting of the number of courses of bricks originally present, the small articulated patch roughly half-way along the deposit provides the basis for an estimate of about fifteen, giving an original minimum wall height of just over 1.80 m. This is a useful piece of information, establishing that the surrounding walls were at least man-height.

The rubble lay on an even sloping surface of brown packed gravelly desert containing many weathered sherds and a patch of ash [1993] against the wall. This must be the original 18th Dynasty ground surface, and is the one planned in Figure 4.2. To the south it peters out from erosion, but reappears beyond the line of stones [1698] already mentioned. As revealed by excavation, this is simply a single-course curb of stones set in mortar which provides the northern boundary to the path of entry to Building 541. Newton's plan shows that the line was continued by a brick wall for a short distance into the courtyard of Building 541, marked in broken line as unit [1978]. The patch of ancient ground surface surviving south of this wall contains more ash [1699] and a patch of rubble with sherds [1994]. From the way that this patch lies it appears possible that it formed the beginning of a path running at an angle westwards down the hill towards the nearest point of the Main Quarry. In order to check this the excavation was extended westwards for a further three metres along the southernmost four metres of the whole strip. The nominal square designation "U13" was given to this.

The first stage of excavation showed merely the outlines of a patch of rubble with a deposit of ash and a sherd concentration [1858] occupying about half the area, the remainder having been eroded down to natural sand. The outlet of the gully [1857] also appeared near the northern corner. After planning this surface it was intended to collect the sherds from the concentration [1858] which appeared to represent most of a single storage vessel which had broken where it had been thrown. On lifting the sherds, however, it was soon revealed that they were merely the top of a considerable deposit of broken pottery which had been thrown with earthy debris into a hole in the desert. The deposit was completely removed and now awaits detailed study. Three preliminary points can be made, however:

(i) from the location of the dump and the presence of earth, ash and brick rubble we can deduce that it was made during one of the repairs or enlargements to Building 540 or 541 and can therefore be treated as if it were part of the original archaeological contents of the buildings themselves. In view

of the loss of the interior debris through the earlier excavations this is a welcome discovery;

(ii) a limited range of vessel shapes is present, the predominant one being the biconical storage jar with plain rim (Group 17, see *ARI*: 137, 135, Figure 10.1);

(iii) many of the sherds were encrusted with crystals which appear to be of salt, although no proper identification has been made. The encrustation was sufficient to cement groups of sherds into layers.

The origin of this deposit is, to judge from the way it lies, to be sought within Building 541. The only structural alteration that we can postulate for this building is the making of an entrance in the north wall [1935] to provide access to the Building 540 when it was added on. If ash and sherds had been heaped here (and ash remains as a thin deposit [1928] beneath and between the brick of wall [1927]) the mixture of material in the deposit is explained.

In area "U13" the archaeological deposits appear to extend no further down the hill slope, i.e. towards the south and west. But to be absolutely sure square T13 was also made the subject of excavation. The removal of a layer of surface sand revealed, however, only undisturbed desert material devoid of archaeological debris.

4.6 The sequence of phases

As at other parts of the site careful examination of the ground has revealed, despite the small depth of deposits, an internal history represented by several phases of activity. The sequence can be reconstructed something as follows:

1) Laying out small garden plots over the area. The surviving evidence is confined to Building 541, **Area x** (Figures 3.2 and 4.2). It consists primarily of the remains of partition walls of brick [1971, 1972] which originally separated square plots of dark alluvial soil, of which part of one [1973] remains. However, more of this distinctive dark soil occurs beneath wall [1965], as unit [1970]. It is this relationship which helps to date this phase to before the construction of Building 541. It also shows that this soil must have covered a larger area of ground prior to the excavation of 1921.

2) Building 541 was constructed as a self-contained entity.

3) At a time which cannot be synchronised with the main line of development something was constructed to the west of where Building 540 was to be built. All that has been revealed so far are traces of construction at the northern end of area "V13". Beneath the ground level which belongs to Building 540 the base of a wall [1852] was uncovered running east-west, at a slight angle to the line of the north wall [1860] of Building 540. It is marked in broken line on Figure 4.2. since it lay beneath the ancient desert surface [1848]. It did not join up with the latter construction, however. Where it meets the line of the west wall of 540 [1856] it runs beneath and is separated by a thin layer of sand, showing that it was destroyed and shallowly buried when 540 was constructed (Figure 4.5). It is also possible that other bricks beneath wall [1856] belong to this earlier construction (they are units [1922-1924] on the plan, Figure 4.3). The only other clue we have for the nature of this brickwork are traces of gypsum plaster on the south face of wall [1852]. This is perhaps a sign that it was a courtyard

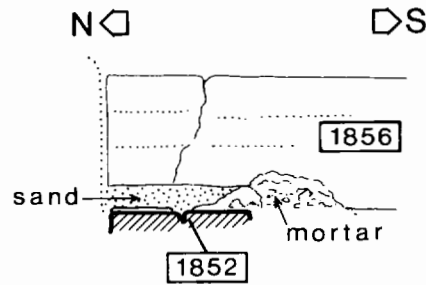


Figure 4.5. Sketch elevation of the north-west corner of Building 540, **Area i**, seen from the outside. It shows the relationship between the enclosure wall of Building 540, unit [1856], and the foundation course of wall [1852] lying below and separated by a layer of sand.

in a precursor to Building 540.

4) Building 541 was next enlarged to the east and to the north by the construction of the outline of Building 540. It probably had only three internal enclosures: **Area ii**, **Area iii**, and **Area iv-v**, which extended all the way south to wall [1877]. As noted already, it seems not to have had its own external doorway, but must have been entered from **Area vii** of Building 541. It is possible that the clearance of ash and pottery and removal of part of the wall to make this doorway created the deposit of sherds, ash and rubble in square "U13".

5) **Area iv-v** was subdivided to create separately **Areas iv** and **v**. This involved a new floor in **Area iv**, and the thickening of the south wall [1876].

6) A separate enclosure was added to the north-west corner of the main courtyard, **Area i**.

4.7 Discussion

In order to understand the nature of Building 540/541 we have to consider not only the evidence from the site itself but also comparisons provided by previously excavated parts. In this we are assisted by the distinctive character of the building: open courts containing, amongst other things, small rectangular enclosures thickly plastered on floors and walls with mud and over this gypsum plaster. The use of gypsum stands out particularly, since it was used sparingly by the villagers. It was not, for example, regularly used inside their houses, except, significantly, around the quern emplacements (see Chapter 1). Indeed, we have found it used extensively for only two types of buildings: those under consideration and the chapels. In the latter it was also confined to the "ritual" parts and excluded from other areas, as the contrast between the Main Chapel 561 and its Annexe 450 shows. Chapter 7, on the pottery from the Main Chapel, also demonstrates that the same division was reflected in the practice of plastering gypsum over pottery vessels.

The comparative evidence is as follows:

(i) Building 523 (*AR I*: 25-7). So far the excavation has been limited to re-

clearing the northern part first excavated in 1921. The southern part of the building, probably a courtyard and until 1984 covered by a large dump from the older work, still awaits excavation. The northern part consisted of three contiguous enclosures, either one or two of them further subdivided by internal walls. More attention than was usual had been paid to the floors: they were of brick, plastered with mud. A patch of gypsum remained in the corner of the best preserved enclosure. Traces of a brown organic deposit were found on some of the floors.

(ii) Building 400 (animal pens; *AR I*: 43, 41, Figure 4.1). The large courtyard (**Area i**) had contained in its original state a small rectangular brick enclosure [769, 770], floored with marl mud plaster [926] which had been coated with a layer of gypsum [771]. A pottery storage vessel [908] had been buried in one corner. Subsequently the walls had been demolished and the gypsum floor had vanished beneath a thick organic layer.

(iii) Building 350 (Kemp 1980, 1983; *AR I*: 53-56). This whole ragged group of structures belongs to an earlier phase of the Village's history than the buildings so far considered in this chapter. The relevant part consists of **Areas v to xvi**, and **xviii to xxii**. **Areas xiv to xvi** form a small block of rectangular enclosures added to the south side of the main part of Building 350. The floors had been mud plastered and coated with gypsum. A second discrete set of enclosures lay behind the main part of Building 350, on the floor of a small quarry which had been squared off and plastered with mud. They comprise **Areas xviii to xxii**. Traces of an original gypsum coating adhered to the walls in a few places. Gypsum wall coating was also a conspicuous feature of **Areas v** and **vi**. Although they might appear to belong to a set of five identical chambers (**Areas v to ix**), they are separated by having their own courtyard (**Area x**) which contained a sunken jar, and by having steps outside to assist entry into the room by climbing over the western wall. With **Areas vii to ix** there are traces of narrow doorways in the walls.

These comparisons derive essentially from buildings which have already been identified as intended for the keeping of animals, most likely pigs. The inclusion of Building 540/541 within this group does not depend wholly on comparison, however. Direct evidence can also be cited. It comes from a remnant of the original fill of the courtyard in Building 541: a small patch of sandy soil containing organic debris [1914] located just in front of the likely entrance to the smaller enclosure, **Area xi**. It contained several well-formed specimens of coprolites similar in size and shape to those found in 1983 in Building 400 and used as evidence for identifying the building as pig pens. It also contained coarse black bristles of the kind identified below (section 4.8) as coming from pigs. We can say, therefore, that Building 540/541 appears to have served an aspect of pig keeping which could, on a smaller scale, be incorporated within the pens themselves (as with Buildings 350 and 400), or be constructed separately as is the case with Building 540/541 and probably also Building 523. What was this aspect?

The breeding and raising of pigs in terms of the site were discussed in *AR I*: Chapter 4. Three elements are involved: farrowing, foraging, and permanent shelter with a water supply. The pens found in 1983 and this year provide for

the first and last elements, whilst foraging was simply a matter of allowing the pigs to roam over the nearby rubbish heaps during the day, relying on the pigs' strong natural homing instinct to bring them back at night.

The study of the animal bones (*AR I*: Chapter 11) shows that most of the pigs were slaughtered in their first or second year. The slaughtering of pigs and the treatment of the meat traditionally follows a pattern that differs somewhat from other forms of butchery. Egyptian tomb scenes and tomb models which so frequently depict the butchery of cattle and sometimes of desert game offer no evidence at all. But the fact that pigs were raised for meat, and at the Workmen's Village in a well organized manner amounting to a small industry, carries with it the implication that a certain routine was followed in slaughtering. To help the reader to visualise something of what must have taken place around the Village, on the ground that now bears the archaeological record, the following brief and generalised account is given. It is based partly on reading [2] and partly on discussion with Dr. A.J. Legge, of the University of London Department of Extra-Mural Studies.

A key factor in pig slaughtering is rapid drainage of the blood, which improves the quality of the meat. In rapid succession the pig is slaughtered by means of a narrow, very sharp-pointed and rather long sticking knife being inserted quickly into the neck, severing the jugular vein, and driven home in the direction of the heart with a turning motion. The carcass is immediately hoisted up by the hind leg to allow the blood to drain out. The second major step is to remove the body hair. This can be done by burning or singeing, a simple method being to strew a quantity of dry straw over one side of the animal and to set it alight, and then to repeat the process with the other side. A more widespread process, however, is to scald it, either by pouring boiling water over the body or by immersing it in a vat or barrel partly filled with water not quite boiling. One recipe urges the adding of wood ashes to the water "to make the hair slip". The scalding water loosens the hair roots, and the hair can be removed by scraping, or "scudding", with a hand scraper which resembles a Roman strigil. The carcass is then ready for butchery, both for meat and for pork fat or lard, which requires further heat for melting and clarifying. Butchery may involve stripping the meat from the bone, a practised butcher hardly marking the bones in the process. Finally the meat, unless eaten straight away, requires preservation. This can be done by salting, either dry or in brine, or by smoking, or by a combination of both. Salting increases the osmotic pressure in the meat cells and so makes bacterial penetration more difficult. Many salting recipes urge the addition of saltpetre.

We can reasonably assume that the occupants of the Workmen's Village had to follow some variant of this sequence. We are not required to invoke the presence of professional butchers: home slaughtering of pigs and preparation of the meat were, until this present century, widely practised in Europe and North America and manuals were written to help. It falls into the range of common domestic skills which householders in closed non-mechanised societies have to

[2] Books that I found useful, but there must be any number of them, are Long (1886): 279-287, 297-8; Spencer (1897): 169-175; Coburn (1909): 508-525.

master for themselves. The main question at the Workmen's Village is whether or not the slaughtering and processing were done in a special set of buildings, for if they were, the buildings under consideration are really the only contenders. No others that could possibly have served these functions have so far been found, and little of the ground south of the Village, where the animal pens are most numerous, now remains to be explored.

The archaeologist is frequently put into the position of reporting on buildings and other finds which he cannot explain satisfactorily by direct inference from recorded details or by reference to authoritatively defined parallels from other sites. The narrowly logical course is then simply to describe and leave it at that. This only, however, postpones decisions and reduces the chance of finding in the future the small but telling details which will help to bring a resolution to the problem. Interim reports such as these are particularly suited to putting forward hypotheses. In this instance we have to consider how well matched Building 540/541 (and the other related structures discussed above) is to the normal cycle of pig butchery.

The process involves heat during at least one stage, the removal of body hair. From the common presence in the soil outside the Village of thick bristles sometimes still with the root attached we can conclude that scalding rather than burning was the preferred process. Building 540 possessed a fireplace, and during the use of both this and Building 541 quantities of ash had been produced and some left inside and the rest taken outside and dumped (all marked on Figure 4.2). It should be remembered that the Main Quarry was quite near, where ash is one of the constituents of the ancient fill. One general point arises here which applies also to domestic cooking. How was water boiled? Burning marks are one of the points checked during the routine cataloguing of potsherds. They are quite rare. The common-sense answer is that bronze vessels were used, perhaps no more than one or two per household, and that because of their known intrinsic value (and the value of metal scraps as well) they were not discarded as rubbish. We know from texts that bronze vessels were traded amongst the villagers at Deir el-Medina (Janssen 1975: Chapter 17), even though, because they were so valuable anciently, few were ever left behind to be found by excavation. In the case of a specialist requirement, as here with the need to have scalding water available in large quantities, we have to think in terms of a larger vessel perhaps made specially for the purpose. Any storage of meat would most likely have been in pottery vessels. In **Area vii** we have a small enclosure where vessels were stood upright, and, more particularly, outside the buildings we have the dump of broken vessels which are mostly of the biconical storage jar kind. Many of the sherds were cemented together with crystals of what looks like salt, although this remains to be scientifically confirmed. Abundant salt is, of course, an essential ingredient in preserving pork.

We must, however, include in any explanation the small gypsum-plastered rooms. It is these which make the building distinctive. One thing that gypsum does is to provide a clean surface with the association, through its whiteness, of purity. Its most common usage at the site was in the chapels, and it was, as well, applied to the surfaces of pottery used in the chapels, and not only offering-stands (*AR I*: Chapter 12; Chapter 7 of this volume). The whitened

chambers could have provided surfaces on which the cutting up of the carcasses was done which were not only easier to keep clean but also had the association of purity.

If we identify Building 540/541 as a butchers' yard we are considerably adding to the evidence for pig rearing having been an industry at the Village to which more care was given than we might have expected if its purpose had been only to supplement the villagers' own diet. Nothing resembling the whole complex has been found in the Main City, and this reinforces the idea that the villagers were raising pigs for people living in other parts of Amarna. This industry was certainly not in decline when the Village was abandoned, apparently late in the reign of Tutankhamun. It follows that there would have been a population to sell the meat to in the Main City as late as this date.

I do not expect that all readers will accept that the butchers' yard hypothesis really works for Building 540/541, and it is not advanced other than in the spirit of discussion. It does, however, fit more of the circumstances than any other that occurs to me.

4.8 Appendix. Report on two fibre samples from el-Amarna by H.M. Appleyard, F.T.I., Dip. R.M.S.

Many of the deposits outside the Walled Village have a frequent occurrence of bristles, often black but also brownish-red. They occur in sandy deposits representing the trampled desert of the first years of the Village's life, in organic deposits in and around the buildings identified as animal pens, and in the thick rubbish deposits, including those filling the Main Quarry. Their ubiquity is a marked feature of the Village extra-mural stratigraphy. At the suggestion of Gillian Eastwood, two samples were submitted to H.M. Appleyard, a textile consultant specializing in microscopy and fibre identification. The following is his report.

"I believe that the fibres in both samples are from the same species of animal. They are very straight, stiff and where there are true tips these are flagged.

Sample no. 1 (P25[1590]). In whole mount these fibres are very coarse, regular in thickness and have smooth profiles. At the root end there is a narrow, intermittent medulla which changes to a continuous medulla along the length of the fibre. The tips are split into three sections. Scale casts were made of some of the fibres. As is frequent with fibres of this age, the scale pattern is not so clear due to deposits and other forms of damage. However, where the scale pattern is visible it is irregular waved mosaic with close crenate margins. In the cross-sections there are a few cracks due to the brittle nature of the fibres. Such fibres often crack during cutting.

The pointers in all the preparations are all towards **hog bristles**. The split fibre tips is characteristic of these fibres, which always appear to split into three sections. The scale pattern is also typical of hog bristle. The cuticle as seen in the cross-sections is not as thick as is often seen in hog bristles, but the contour and pigment distribution is typical.

Sample no. 2 (Ch541[1914]). The description given for sample no. 1 also fits these fibres.

1985 excavation

Figures 4.6 to 4.12 are photomicrographs of the bristle samples. The substance surrounding the fibres in the cross-sections is tissue used for packing the fibres in the microtome."

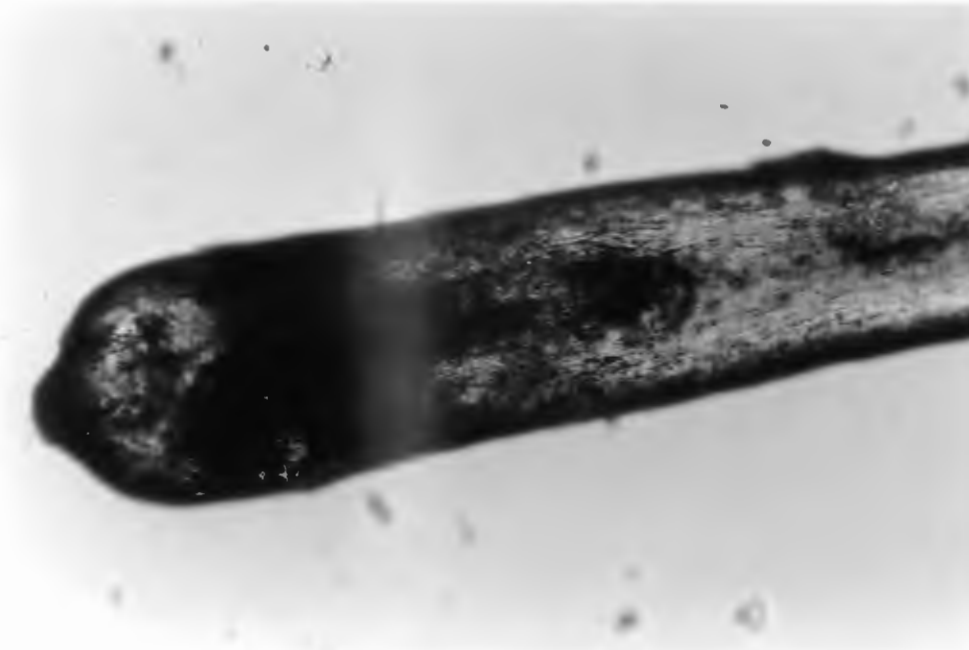


Figure 4.6. Root end of fibre, sample 1. Magnification 120x.



Figure 4.7. Whole mount of fibre from sample no. 1 showing the smooth profile, narrow medulla, pigment near the medulla and some scale margins. Magnification 120x.



Figure 4.8. Whole mount of fibre from sample no. 1, showing the split end at the tip. Magnification 120x.



Figure 4.9. Cross-section of fibres from sample no. 1. Magnification 120x.

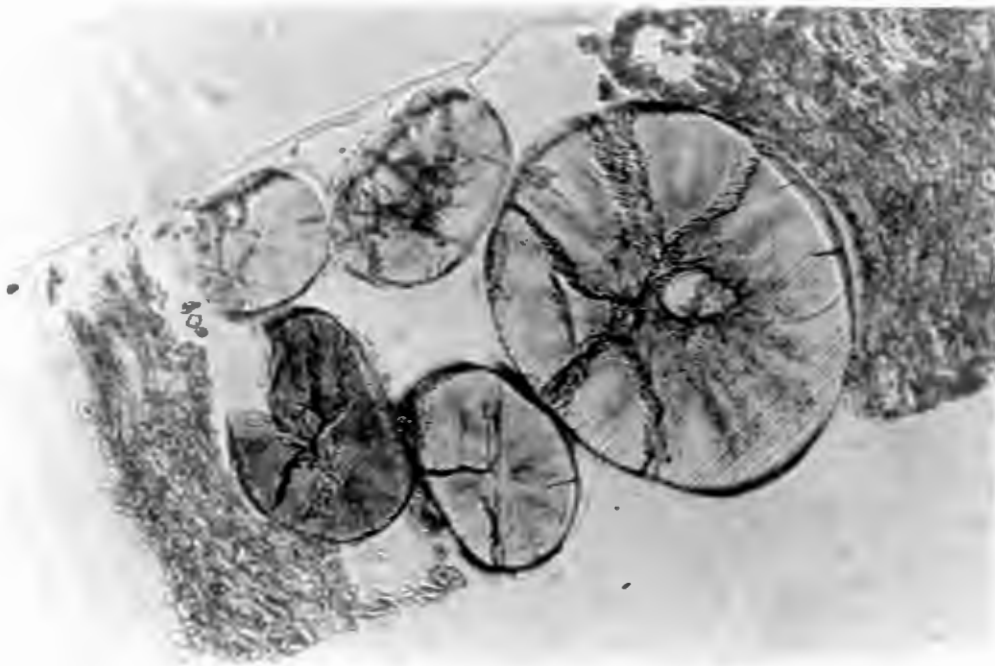


Figure 4.10. Cross-section of fibres from sample no. 2. Magnification 120x.

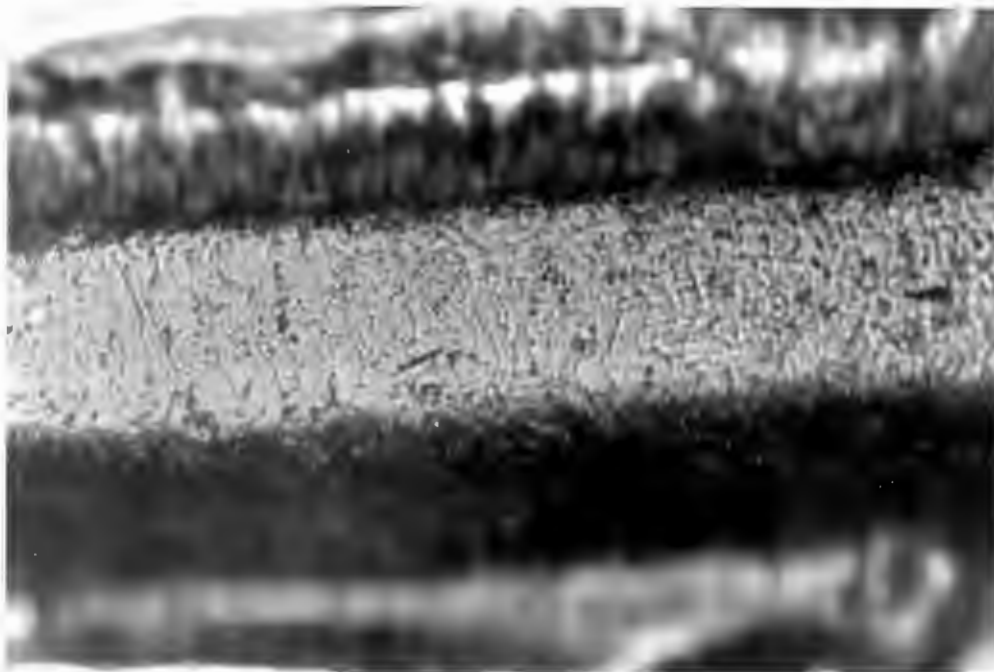


Figure 4.11. Scale-cast of fibre from sample no. 1. Magnification 320x.

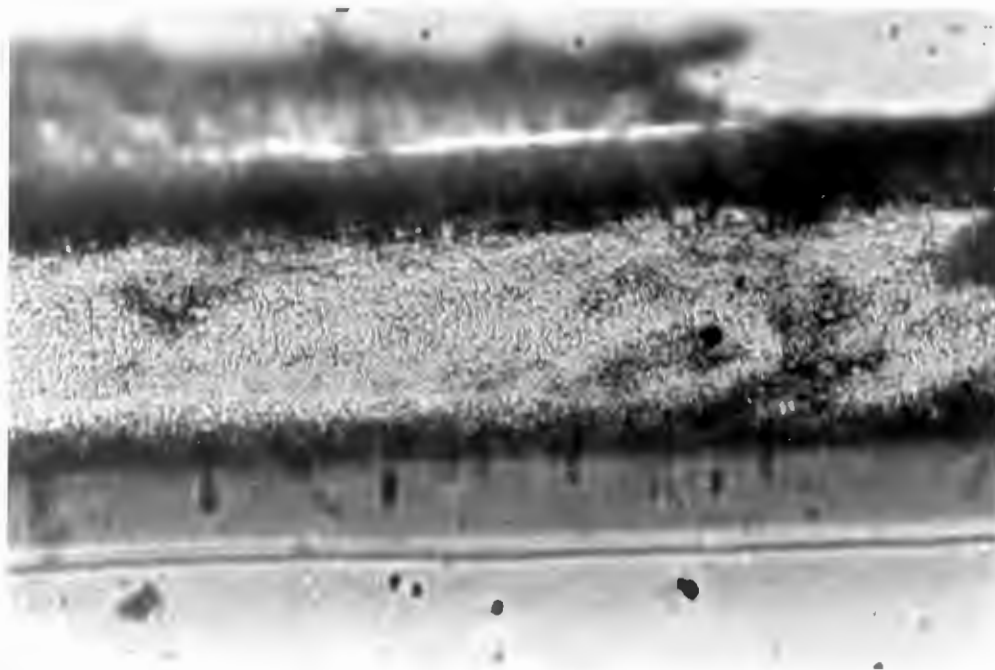


Figure 4.12. Scale-cast of fibre from sample no. 2. Magnification 320x.