CHAPTER 5

REPORT ON THE 1987 POTTERY SURVEY

by

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5.1 Introduction

During this season a further nineteen areas were sampled by the author and by Dr Paul Nicholson of Sheffield University, as part of the surface-sherd survey begun last year (*AR* IV: Chapter 9). Our main objective this year was to make an intensive investigation of a narrow strip running east–west across the city, taking in areas of both known and unknown usage. We therefore concentrated principally on the area to the west of Grid No. 2, taking as our easternmost point the west wall of the German "Weihnachtshaus" (Q46.1), and running down to and across the road linking et-Till and el-Hagg Qandil (Figures 5.1 and 5.2). The areas examined here were principally rubbish dumps, probably deriving from the houses in the area, and also from later illicit excavations of the houses. However, close to the road aerial photographs showed clear indications of larger more formal buildings. As well as the survey strip, various other areas were also sampled, two in the Central City, two in the area of Grid No. 1, and one to the south of our excavations in the region of the sculptors' workshops.

Information about the sherds collected from the surface of each survey area was recorded under detailed headings as to fabric, surface treatment, and, where possible, form, as in the previous season. In addition the weight of each category of sherds was recorded. This was done in order to make an eventual comparison between the results derived from the counting and weighing of sherds. For the purposes of most of this discussion, the various categories of sherds have been grouped together into larger units comprising details of fabric, surface treatment, and whether the sherd comes from an open or closed form. These units are:

1. **Siltware open forms**
2. **Siltware closed forms, unslipped**
3. **Siltware closed forms, red slipped**
4. **Siltware closed forms, cream slipped**
5. **Siltware closed forms, blue painted decoration**
6. **Siltware closed forms, exterior surface lost**
7. **Siltware sherds, unidentifiable**
8. **Breadcones**
9. **Marl clay vessels**
10. **Imports**

5.2 The survey areas

The two maps (Figures 5.1 and 5.2) show the locations of the survey areas for both 1986 and 1987, the 1987 areas comprising nos. 24–43; the bar charts for the 1987 areas showing the percentages of occurrences of the ten pottery groups listed above are given in Figures 5.3 and 5.4.

Area 24: probable ancient dumping in the Central City, with dense pottery cover consisting of large sherds, and including many fragments of bone. This was the only area examined this year to contain a significant number of breadcones (7%), which immediately links it to many of the other areas in the Central City examined last year. The area also showed a relatively high proportion of open siltware forms (14.5%). Cluster analysis (see below) showed a close connection between this area and last season's area 4, and the area of dumping to the west of the Clerks' Houses.

Area 25: area of modern disturbance in the ancient ground surface of the street between two rows of the Clerks' Houses. Because the sherds derived from a recent disturbance they were better preserved than was usually found, and this may at least partially account for the high proportions of cream-slipped and blue-painted ware noted in the survey (10.8 and 14.8%
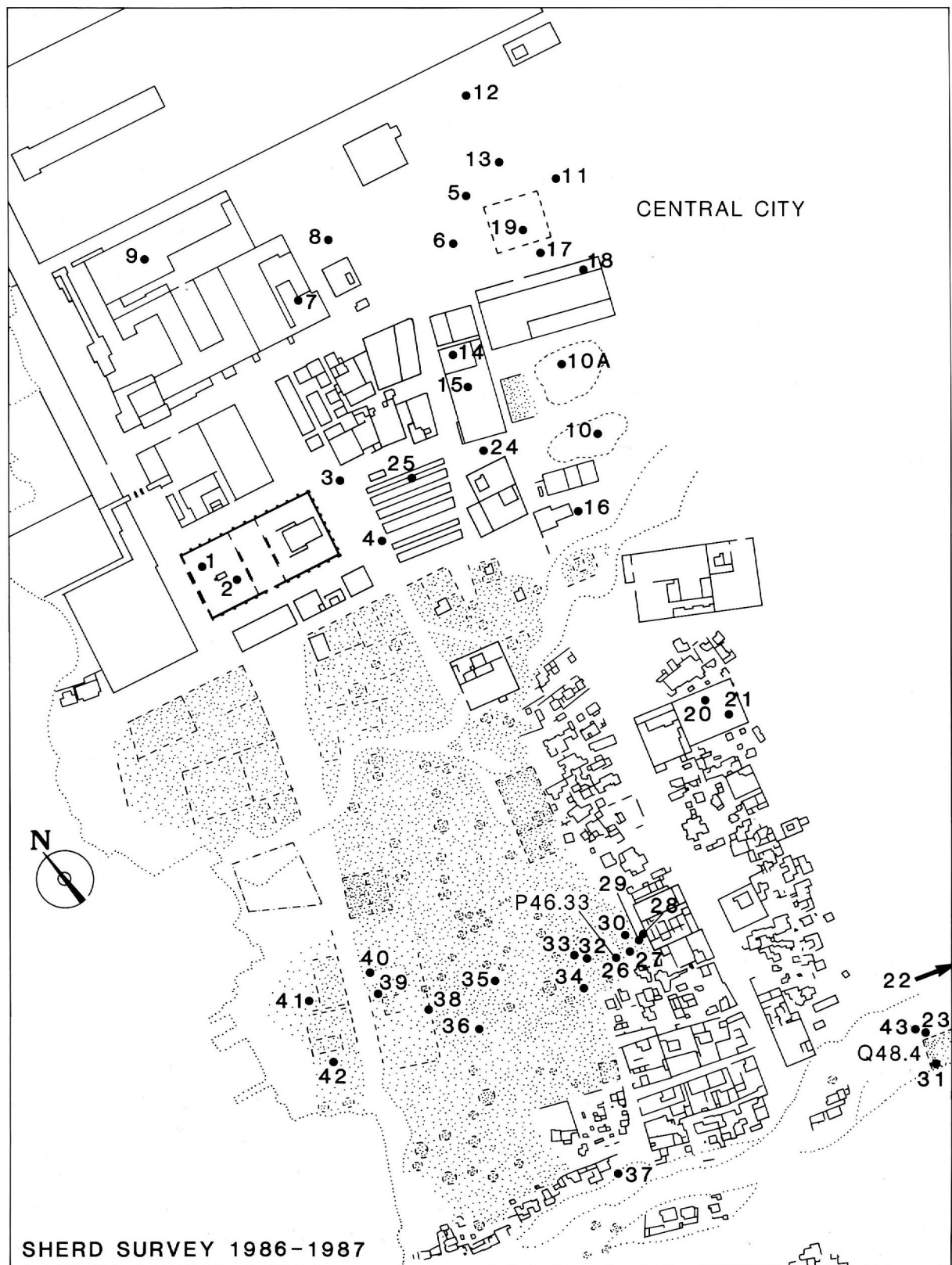
Figure 5.1. General plan showing the location of all sherd-survey areas (1986–87).

Figure 5.2. Map of the eastern end of the main-survey strip of 1987, showing also the layout of Grid no. 2, and the location of the 1987 excavation which uncovered house P46.33. Sherd-survey circles 26-30 are marked as numbers inside heavy circles. The shaded areas are probably ancient rubbish heaps in the unexcavated areas. The rear of the large estate, house Q46.1 (the so-called "Weihnachtshaus"), runs along the top right-hand side of the map. Contours are at quarter-metre intervals.

respectively). These figures are considerably higher than those for the same types in the dumps to the west of the Clerks' Houses sampled last season (area 4). No breadcones were found in the area, a fact which indicates perhaps that the Clerks' Houses are not to be thought of as part of

the ceremonial area of the Central City (AR IV: 118). Cluster analysis did not show strong links with either of the 1986 areas (3 and 4) in the vicinity of the Clerks' Houses.

Area 26 (Figure 5.2): undisturbed ground surface, Grid No. 2; the area overlay the site of the excavation of house P46.33. Too few sherds (32 in all) were recovered from this context to be useful, and all were badly weathered.

Areas 27–30 (Figure 5.2): areas of ancient dumps immediately adjacent to the west wall of the "Weihnachtshaus", within the survey strip. The condition of the sherds collected from these areas was usually poor owing to weathering. All four of the areas were very similar in content, as one could expect from rubbish deposits probably deriving from a single source, probably the "Weihnachtshaus" itself. The proportions of cream-slipped and blue-painted wares were all very low (as is true for most of the rest of the strip); identifiable marl wares consisted almost entirely of Egyptian amphorae. Interestingly, very few meat-jar fragments were identified. In two of the areas (28 and 30) Late Period ribbed marl-clay body sherds were found.

Area 31: sample of excavation unit Grid No. 1 H3 [3090].

It was felt to be of interest to include two areas from the current excavations in the survey (the other being Area 43) to see how excavated material compared with that derived from the surface survey. This unit comes from just below the surface of the square, and covered the whole five-metre square; therefore we took as our sample the sherds collected over half the square, this being roughly the same area as the four-metre diameter circle usually used. On the whole the material collected could be shown to be very similar to that from the survey strip (see below), although the proportion of marls was rather higher (over 25.5%). The marls included a larger number of imitation Canaanite amphorae than was seen elsewhere (in general these only formed a tiny proportion of the marls), and also several fragments of the imported type. The proximity of the area to the well, at which both types of amphora seem to have been used almost exclusively for the transport of water, and the connection of the excavated area from which the unit came with the supplying of the Workmen's Village probably account for this phenomenon.

Areas 32–36: further areas of ancient dumping and disturbance within the survey strip, in the middle area between the "Weihnachtshaus" and the road. In general these areas turned out to be similar, and also similar to the group of areas further to the east. Area 33 however showed some variation. Here it was noticeable that the sherds picked up during the survey were relatively unweathered, and in large fragments, and consequently contained far fewer unidentifiable pieces than was usual. This may be the result of illicit excavation or turning over of the adjacent house, although apart from the condition of the sherds no obvious traces of this could be seen. It is however noteworthy that, despite the better preservation of the sherds, the proportions of cream-slipped and blue-painted wares were still as low as in the other parts of the survey strip. This area also had several other distinguishing features: many of the marl fragments showed a slip on both their interior and exterior surfaces, although they did not apparently come from open forms, and one showed traces of post-firing blue painting. The same features were noted during the last season in area 13. Also amongst the siltwares were fragments of offering pots, and part of a tall red-slipped stand; the proportion of open vessels was somewhat higher than in the adjacent areas. These features would seem to suggest that the area reflects something different from that which was taking place in the surrounding areas; cluster analysis suggests a possible linkage with the 1986 area 16, the excavator's dumps from the House of the King's Statue (see below).

Area 37: surface material on the wadi edge south of the sculptor Thutmose's workshop, which also included chippings from many different kinds of stones. The sherds from this area differed little from the areas within the survey strip, although several fragments of offering pot and tall stand were found. Also amongst the sherds was a fragment of a vessel associated with the firing of faience or glazed vessels.

Areas 38–40: areas of dumping and disturbance near road within the survey strip. These areas fell within the boundaries of a large enclosure visible on the aerial photographs standing on the east side of the road, forming a continuation of the Central City. In the case of areas 38 and 39 the distribution of sherds was on the whole similar to that in the rest of the survey strip. However, area 40 was very different. All three areas also differed from the rest in that each contained at least one sherd of imported fine ware: a Cypriot sherd from area 38, a Mycenaean fragment and an unidentified fine ware from area 39, and five Mycenaean sherds from at least two different vessels from area 40. Both areas 38 and 39 produced fragments of marl vessel with
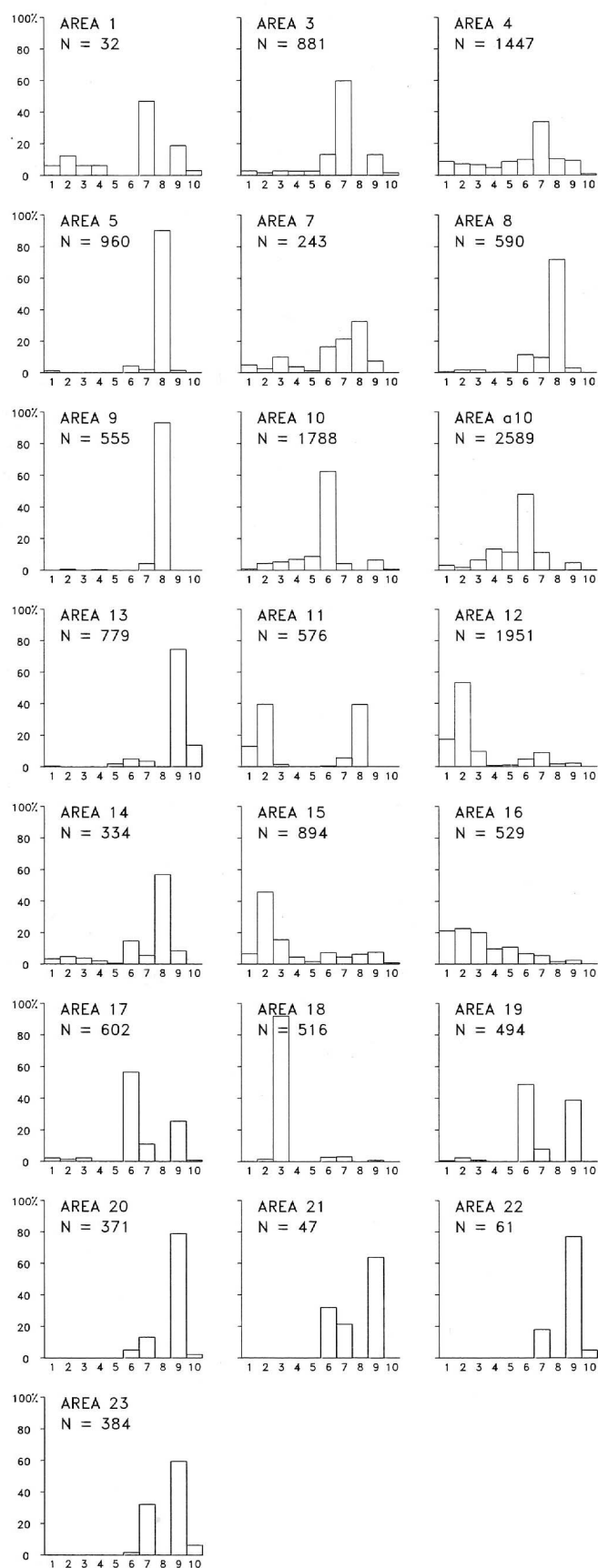
Figure 5.3. Bar charts of sherd types from the sherd-survey areas of 1986.
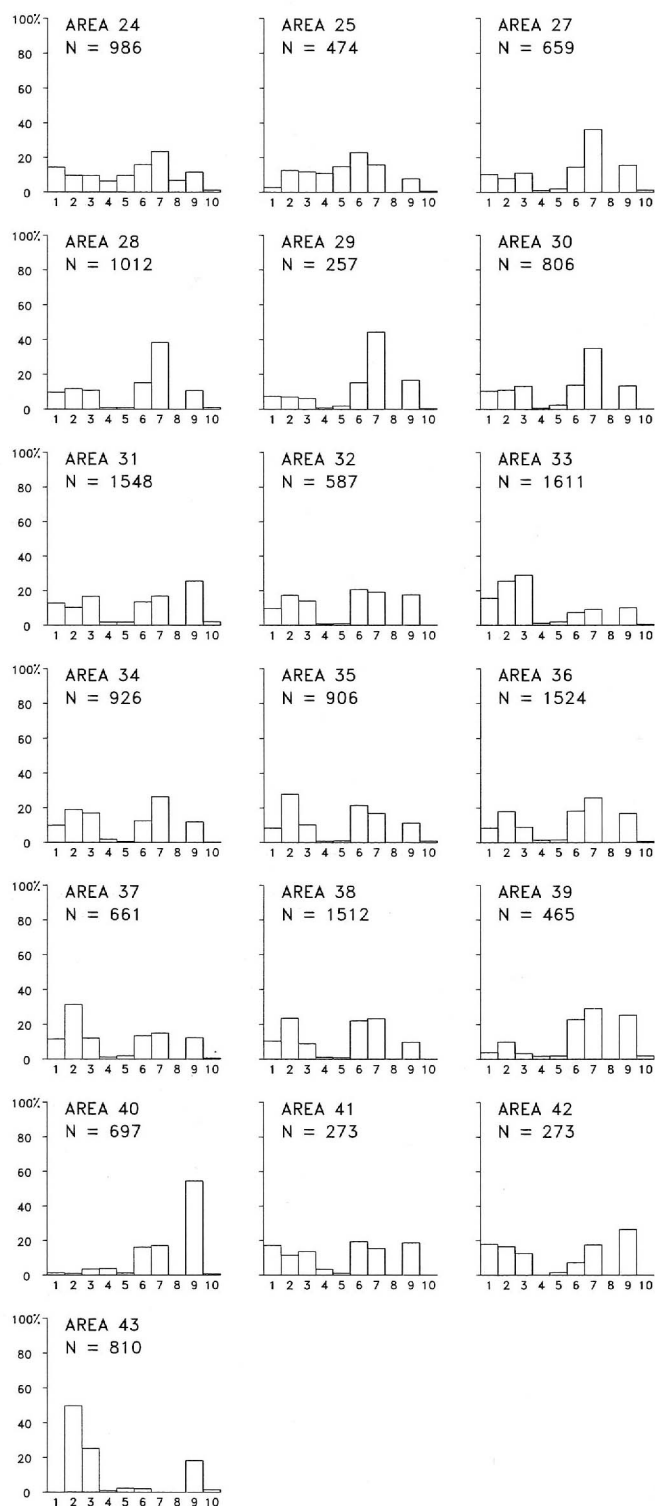
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Figure 5.4. Bar charts of sherd types from the sherd survey-areas of 1987.

interior slip, and in area 38 was found a fragment of siltware wavy-rimmed bowl, which may be an indication of the presence of cobra bowls in the Main City. Area 40 differed from both of these in that it contained a very high proportion of marl-clay wares (54%), including a number from tall-necked wide-mouthed amphorae as found last year in area 13 (see *AR* IV: Figure 9.2, nos. 5–7 for an illustration of the rim form of this type of vessel). In the latter area, such forms were frequently associated with post-firing blue-painting. It is also noteworthy that amongst the marl clay wares were no imitations of Canaanite amphorae, nor any imported ones.

Areas 41, 42: areas of dumping west of the road, within the survey strip. The dumps derive from the digging out of the buildings in this area at a time prior to Lepsius' visit to the site (*AR* II: 58–63); since then the areas have been and still are much disturbed by village traffic. A number of modern sherds were found intermixed with the small quantity of Eighteenth Dynasty pottery on the surface. Both areas showed a much higher proportion of open forms than was usually seen (over 17% in both cases), and in the case of area 42 a high proportion of marl wares. This may be due to the survey circle's proximity to the ancient well next to the building. In the case of both areas the marl clay wares included a greater number of imitation Canaanite amphorae than of "Egyptian" types.

Area 43: sample of unit Grid No. 1 G13 [3730]. This unit formed part of the fill of the well and comprised sherds caught up in the packing of loose material on to the well sides to prevent collapse (see Chapter 1). The sherds have not, therefore, been exposed to normal weathering processes and are more easily identifiable. The most noteworthy feature of the sherds from this area is the virtual absence of open forms: only one siltware bowl sherd was recovered. Marl sherds make up some 26% of the total, about half of which derive from imitation and real Canaanite amphorae; the rest are all siltware closed forms, principally biconical jars and smaller jars with short flaring rims (groups 17 and 18 in the pottery classification system). The presence of large numbers of such vessels down the well prompts the suggestion that water was drawn from the well in these smaller vessels and transferred to the much heavier Canaanite-type amphorae on the surface for transport out to the Workmen's Village. Certainly the depth of the well as exposed during this season's excavations makes the carrying of such weighty vessels up and down the ramp to the water level an unlikely prospect.

5.3 Analysis

Cluster analysis of the survey areas from both the 1986 and 1987 seasons was carried out using the CLUSTAN program package (Wishart 1987).[1] This was based on numerical data in two forms.[2] The first of these derives from the percentage data of types of sherds (for example, the sample from survey area 41 consisted of 17.2% open siltware forms, 11.4% unslipped siltware closed forms, 13.6% red-slipped siltware closed forms, 4.4% blue painted and cream-slipped forms in total, 19.4% unidentifiable siltware closed forms, 15.4% unidentifiable siltwares, and 18.7% marl clay wares), and secondly on "standardized" percentages. By this method, each variable is considered to be of equal importance in the clustering process; this permits variables that may, for example, only occur in very low numbers but vary considerably within their range — and which would be obscured by using raw percentages — to be given equal weight in the analysis. In both cases the summarized data pertaining to each area have been used, rather than the more detailed and therefore more complicated field data. It is hoped that an analysis using the latter can be undertaken after the next season.

Dendrograms for percentage and standardized data for all areas with sufficient numbers of sherds from both the 1986 and 1987 seasons are given in Figures 5.5–6, based on average linkage on a matrix of squared Euclidean distances. The results of both methods showed a clear homogeneity amongst the samples derived from the survey strip to the west of Grid No. 2, with one exception. In the case of the percentage data, calculation of the 10 "nearest neighbours" to each area west of Grid No. 2 (i.e. the ten other areas to which the area in question is most similar) occurred within a squared Euclidean distance of 58 (the average distance for areas within

the survey strip was 38), with the exception of area 40. Here the distance between the closest and the tenth nearest neighbour was far greater, at 109, and indicates a considerable difference from the other areas. It should be noted that in the same analysis areas from the 1986 Central City survey exhibited much wider variation in distance, ranging from 44 to 997, average 276. The average for all areas included in the analysis was 170.1. For the standardized data the similarity within the area west of Grid No. 2 was even more marked. Whereas in the case of the percentage data the 10 nearest neighbours for each area had included in total 20 areas from outside the survey strip, the standardized data had only one such occurrence. Here the nearest neighbours fell for the areas of the survey strip within a distance of 0.37 (average 0.3), again with the exception of area 40 at 0.45. For all 1986 and 1987 cases values fell between 0.14 and 2.81, average 0.8.

Of the areas tested this season which lie outside the survey strip one of the most interesting was area 31. This comprised the unit of excavation Grid No. 1 H3 [3090], a spread of dense rubbish lying below the surface. The cluster analysis of both the percentage and standardized data shows clearly that area 31 fits very well within the survey strip (percentage distance 40 between the closest and the 10th nearest neighbour, standardized distance 0.14, the latter being the smallest distance of any of the areas!). One can therefore suggest that the rubbish making up unit [3090] either derives from closely similar activity (in this case probably domestic) to that which characterizes the survey strip, or even perhaps that the area was originally used as a dumping ground for debris from this area. Area 37, south of the sculptor Thutmose's workshop, also fits well within the range of the survey strip; the strip and these outlying areas may, therefore, represent the pottery from ordinary (probably small-scale) domestic occupation, which may accordingly be replicated over many of the ordinary housing areas of the city.

Two of the areas within the survey strip exhibit traits that set them apart from the rest. Most obviously, area 40 stands out in both the percentage and standardized data as exceptional, when compared to the rest of the strip, and exhibits a tendency to cluster with areas associated with well-surroundings. Whilst no obvious wells can be picked out in the area, the ground is so pitted that any of a number of sand-filled hollows might mark the position of one. The presence of other features in areas 38, 39, and 40 (such as the imported fine wares) and of the more elaborate forms of marl clay wares also separate the areas within the large unexcavated enclosure beside the modern road from other members of the survey strip, although the first two (areas 38 and 39) do not stand out as significantly different in the cluster analyses.

Area 33 also shows some differences from the adjacent areas, but this is reflected differently in the two datasets. In the standardized data it fits reasonably closely with the other members of the survey strip, but in the percentage data it is relatively isolated from these and forms a pairing with the enigmatic "House of the King's Statue" (R43.2). Certainly from the examination of the individual sherd types in the area a greater range of types can be seen, representing a different or wider sphere of activities, and the types found may suggest possibly a religious usage.

The areas which fell outside this season's survey strip showed more variation. Areas 24 and 25, both in the Central City, showed close similarities to the survey strip in the percentage data but considerably more variation in the standardized and also included many more associations with areas outside the strip. In particular, area 24 exhibits close connections with the 1986 survey area 4 in both analyses. Area 43 also showed marked diversity from the other areas. As with area 31, it comprised part of an excavation unit in Grid No. 1, G 13 [3730], part of the well fill. Presumably here both the good preservation of the sherds (in that much less weathering had affected them), and their specialized context (as being for the most part vessels associated with the drawing of water) account for its dissimilarity with other areas. It is clear, however, that this area does not cluster with other areas associated with wells; this is probably a reflection of the fact that these areas have been at the well mouth.

As a further means of investigating the survey information, a Principal Components Analysis using SPSS-X (SPSS Inc. 1986), was carried out on the standardized data. The technique seeks to construct new composite variables or "factors" from the original variables (in this instance the pottery types listed above) by exploiting their mutual correlation. Each factor thus accounts for as much as possible of the variation present in the original data, whilst being uncorrelated with the other factors. From these it is usually possible to describe much of the information contained in the original variables in a greatly reduced number of factors. Analysis isolated four factors, accounting for 73% of the total variance. The first of these, accounting for 26% of the total
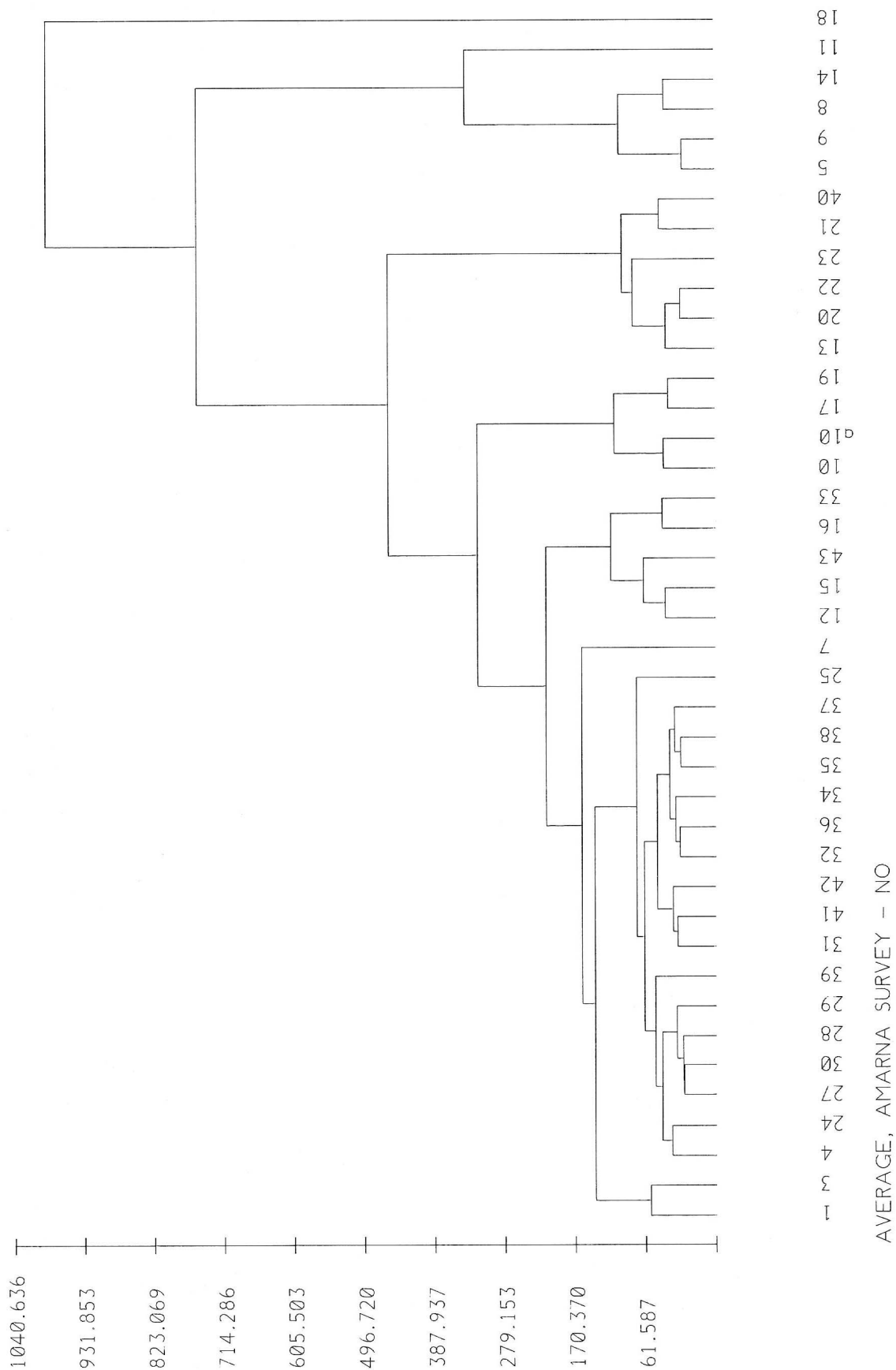
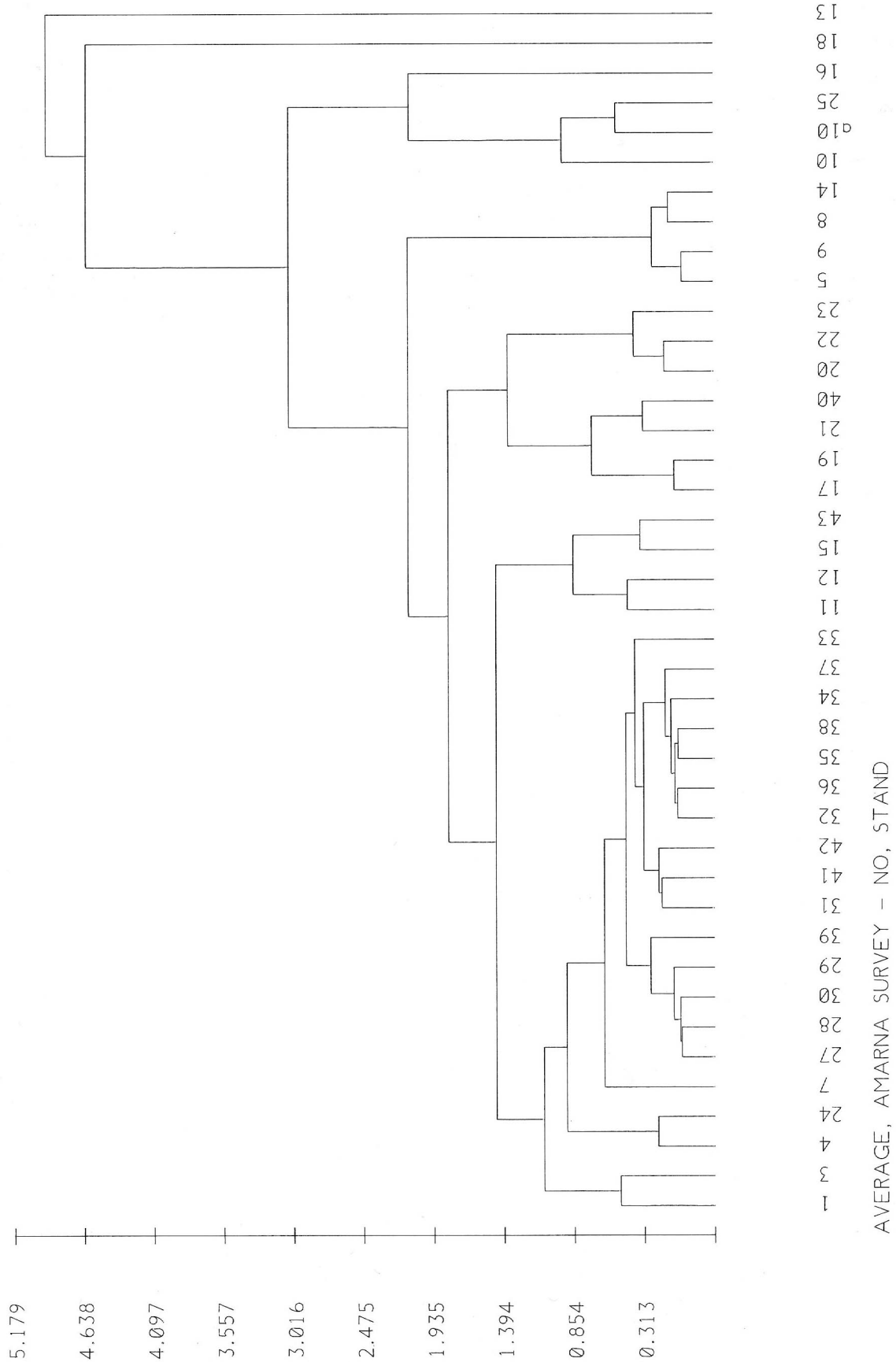**Figure 5.5.** Dendrogram for percentage data from selected 1986 and 1987 areas.

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Figure 5.6. Dendrogram of standardized data from selected 1986 and 1987 areas.

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variance, showed a strong negative loading (i.e. correlation with) on marl-clay and imported wares, and a positive loading on open bowls, cream-slipped and blue-painted vessels; the second, accounting for 20% of the variance, showed negative loading on unslipped closed forms, and positive on cream-slipped, blue-painted, and unidentified closed forms; and the third factor (16% of total variance) showed a strong negative loading on breadcones. A fourth factor was also isolated, accounting for 11% of the variance, with a negative loading on unidentified siltwares.

Figures 5.7–8 shows pin-diagrams of the survey areas based on the first three components (accounting for 62% of the variance), and illustrates the distribution of each area vis-à-vis the others in terms of similarity. The former shows the combined data from both season's work, the crosses marking 1986 survey areas and the circles 1987. The clustering together of many of this season's areas stands out clearly in this. Figure 5.8 illustrates the largest cluster distinguished by CLUSTAN amongst the standardized data (marked by the circles) as opposed to the rest of the areas, marked by crosses, in a ten-cluster partition. This cluster comprises all the survey strip areas with the exception of area 40; it also incorporates areas 31, 7, 39, 24, and 33. Whereas the first of these falls well within the densest part of the cluster, the remaining ones are all outliers, being less similar to the other members. However, the homogeneity of the survey strip stands out clearly in comparison to the scatter of other areas.

The clusters formed by the areas surveyed in 1986 can be seen from both the dendrograms and the pin-diagrams to be less tightly grouped and more widely dispersed than those from the 1987 season. In general, it is possible to highlight a cluster made up of areas 5, 9, 8, and 14 the first three of which are part of the breadcone manufacturing and disposal process associated with the Great Aten Temple; area 14 also contains many breadcones but lies in a separate building. In the percentage data, areas 13, 20, 22, 23, 21, and 40 appear to have something to do with wells, although this grouping is not present in the standardized data. In the case of these very diverse areas further more detailed analyses based on a wider range of variables than those used here are necessary for accurate clusters to be distinguished.
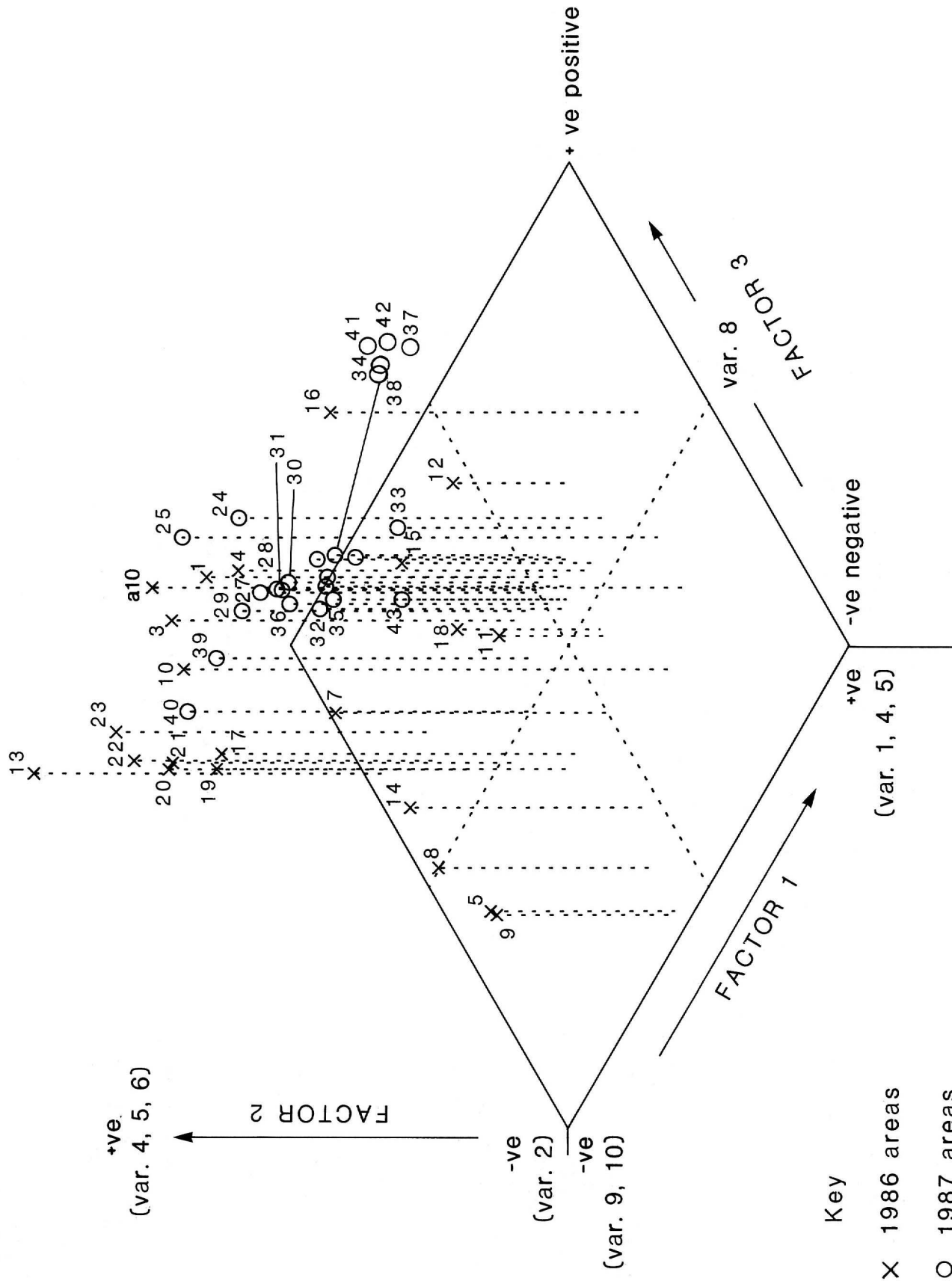
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Figure 5.7. Pin-diagram of principal components analysis of 1986 and 1987 data.
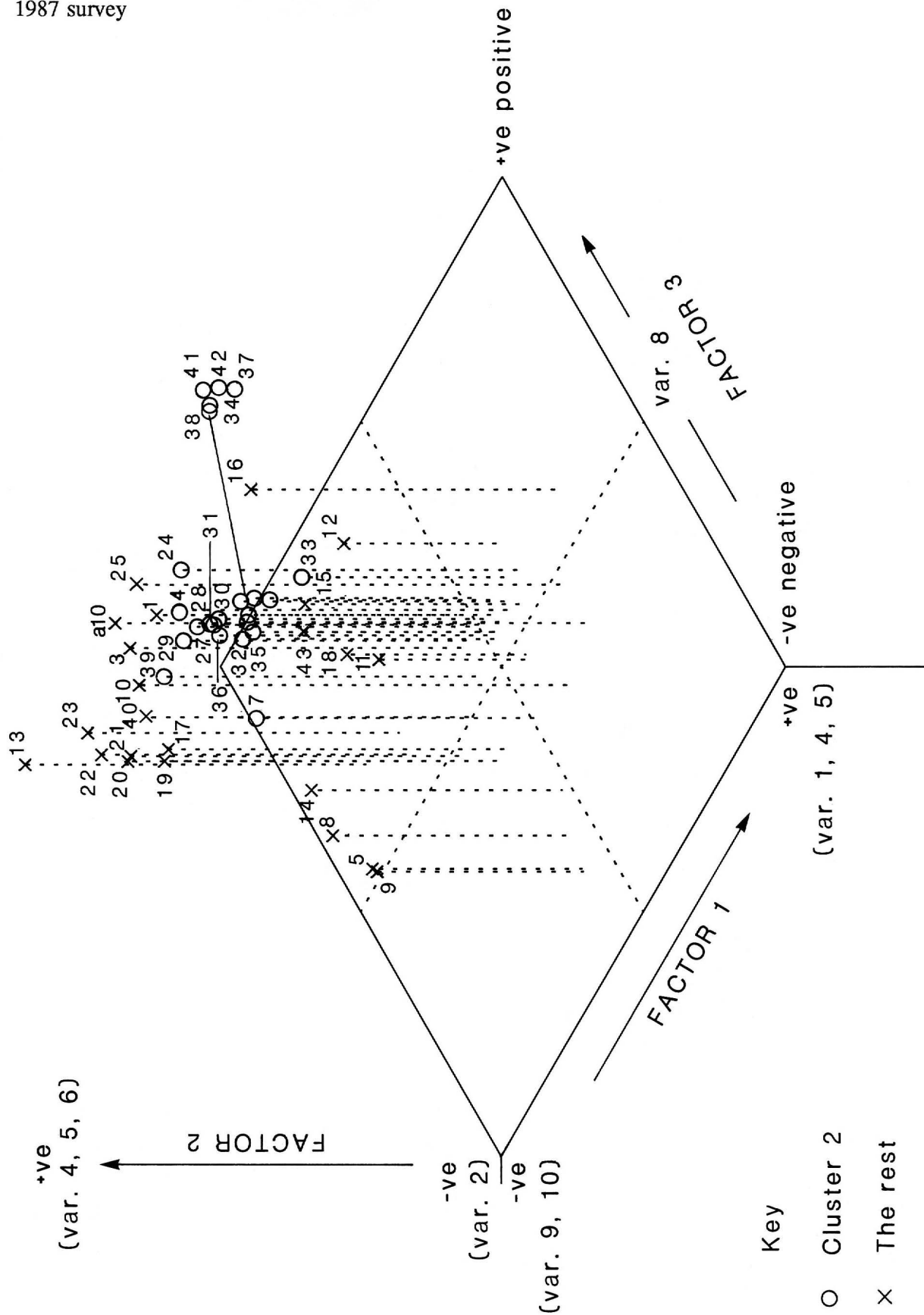
Figure 5.8. Pin-diagram of principal components analysis illustrating the homogeneity of the survey-strip areas.