Stability and change. Stratigraphy in early medieval Sigtuna

Methods and preliminary results

By Björn Petterson

1. Background

The culture-layers of Sigtuna have long attracted the interest of archaeologists. Previous excavations have been small, mere peeps into the past. Because of this there has been many suggestions but no satisfactory answer to the questions of the earliest dating and functions of the town. Many of the hypothesis were made already in the 1920´s. In November 1987 a seminar was arranged where the purpose was to summarize the rescarch conserning early medieval Sigtuna and create a foundation for continual research. Several of the hypothesis presented at this meeting were later confirmed by the results from the Sigtuna Excavation of 1988-90, for example the structure of townplan and communication within the town[1].

In early June 1990 this excavation was completed, one of the largest urban archaeological excavations in Sweden so far. The work had then been going on for nearly two years with about 15 archaeologists. The project was organized by Sigtuna Museum with Sten Tesch as project leader and the excavation was directed by the present author and Mats Roslund. The excavation, situated centrally in the early medieval town covered an area of some 1100 sqms with 1500 qbms of cultural layers containing building remains of a dense settlement[2]. The excavation at the »Trädgårdsmästaren« site would offer the opportunity to determine a period, previously roughly dated to the 11th and 12th century.

The primary post-excavation goal of the project was to carry out the straticraphic analysis, i.e. group the record and consequently the finds, into dated phases. Thereafter the project could continue to address questions about town layout types of buildings, trade, cultural contacts, craft and diffrent categories of finds. Prior to the stratigraphic analysis the documentation record was divided between the two directors, each was to work with one half of the site[3]. The division coincided with a medieval plot boundary making it practical and methodically satisfactory. This paper therefore refers to the methods and results of the eastern half of the site, plots IV and V (fig. 1).[4]

2. Methods of excavation

Previously the remains of buildings and the finds were seen as the only sources of information. It has however been shown that the intermediate layers of manure, craft debris, fires etc. can yield a lot of data. They are the links between the building remains which together with the finds form the so called building layers. The material history of the town lies stacked like the pages of an enormous book. This is the basis for a stratigraphic method of excavation. Complete townyards of early medieval Sigtuna coin-

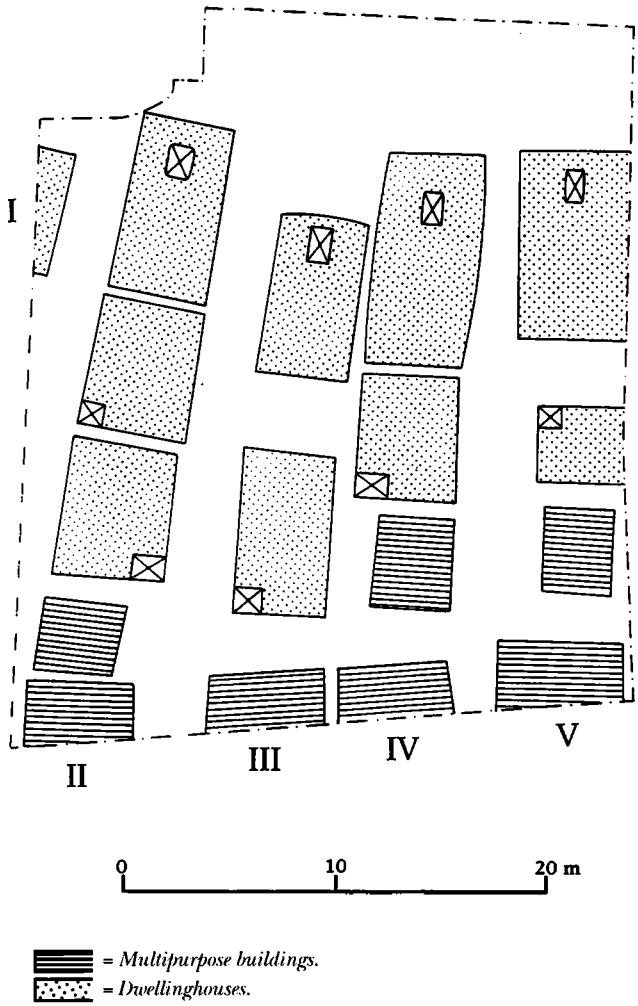

Fig. 1. Interpretation of the buildings in the end of main-phase II, with the main functions of the houses marked. Multipurpose buildings close to the main street and dwelling-houses farther back on the plot.

ciding with the formation of the Swedish state, would be uncovered for the first time. It was obvious that the method of excavation should be such that it could be determined already during the fieldwork which building remains were synchronous and to collect the finds accordingly.

Scandinavian urban archaeology has quickly expanded in volume the past 20 years. Alongside of this methods of recording and stratigraphic analysis of the culture-layers have developed[5]. Since the stratigraphic work begins at the dig, I will start there. The whole process of excavating, recording, stratigraphic analysis and finally answering specific questions can be seen as a chain in which all the links have to be equally strong to get the best result possible. In other words each part must be carried out with determination and with the methodological awareness. Every archaeologist at the site must be aware of his role as an interpreter when choosing and transferring information from the layers to the records. He always has a responsibility in deciding which levels to uncover and how to record them. The process is subjective and analytic. If the archeologist instead tries to be an objective observer to whom all information is equally important then there's a great probability that the quality of the documentation will be uneven and low. The consequence of this »objective« attitude will be a record where important information is obscured by or worse has given way to a flood of arbitary details. Only active collection of data will allow the historic development of the site to be reconstructed.

The excavation at the »Trädgårdsmästaren« site started with all the post-medieval disturbances being cut away. Already here one could observe elongated plateaus, where buildings had been standing in long

rows at a right angle to the main street. The plots or town yards on the plateaus were separated from each other by shallow ditches with fragmentary remains of wooden trackways. These observations were helpful when deciding where to set up sections. A grid of 2 x 2 m squares was laid out on the site. It was also divided into 5 x 10 m sub-areas separated from each other by sections. There was a section along the middle of each plot so that it's buildings could be related to each other. Transverse sections were laid out to record the connection between the plots. A team of 4 or 5 archaeologists worked on, and had the responsibility for each subarea. The aim was to remove one »building layer« at a time. A building layer consists of three principal sub-layers: **1**. The bottom layer is the construction level, i.e. sill stones, clay floor and possibly wooden remains of the building itself. **2**. Above this is the accumulated layer with rubbish and objects emanating from the building's period of use, sometimes covered by a burnt layer. **3**. On top is usually a destruction layer, levelled-out deposits forming the lower limit of the next building layer.

Thus the subareas were excavated from destruction layer down to construction level. The finds were collected per 2 x 2 m square. The collected finds within the same building layer and square were treated as a closed find. Find inside and outside the building were separated when possible.

The frame of the record are the drawings. These were supplemented with verbal descriptions and sketches of the features giving details about construction, relations to other features and interpretation. The accumulated and deposited layers were described per 2 x 2 m square, as a supplementary diary. The layer descriptions include sequence and extent of the layers and their relation to the section drawings. The cataloguing of the finds was carried out parallel to the excavation, partly because of the time schedule but also to give the staff a greater knowledge of the different find categories. When the excavation was finished, after almost two years of digging, some 400 constructions had been recorded on 600 drawings plus verbal descriptions and photos. The finds were catalogued under 30.000 numbers, each more often than not including several finds. In addition to this there were 6 tonnes of animal bones, and a large number of soil and dendro samples.

3. The Stratigraphic Analysis

An archaeological record has to be analysed in several steps to get a clear picture of the find contexts and the settlement structure. It is a process whereby the records are organized so that the diffrent parts can be intergrated into each other and can be viewed as one unit. This will hopefully give a picture which is not too far removed from the actual historic development.

The aim is to phase the record and the finds. What will be assigned to a certain phase is a question of linking stratigraphicaly contemporary constructions together. The phases could be seen as limited spans of time following each other[6] and in which remains of buildings and finds are confined. The time-span within the phase will then be equal everywere on the site. It should be emphasized that any overlap, in time, between the phases must be avoided, otherwise parts of the find material might appear in several phases, which in turn would make the find studies unduly complicated.

The first step in the phasing is marking the construction levels and fire layers on the section drawings. After this all plans are linked to the sections, i.e. all constructions that are crossed by a sect-

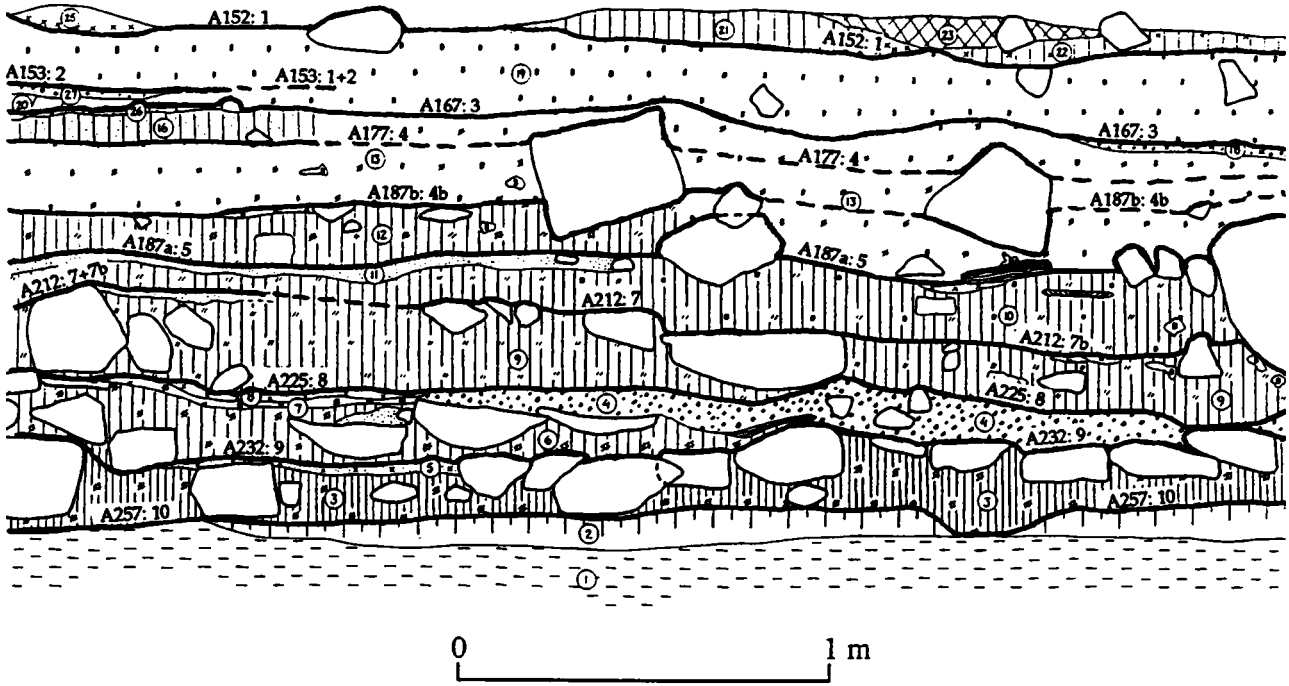

Fig. 2. An important part of the stratigraphical analysis is to connect plans to the sections. As an example, A 212: 7 means construction number 212 at plan number 7. The thick line is an interpreted level connecting different constructions to eash other.

ion are marked with a line on the appropriate drawing (fig. 2). With these thus marked section drawings as keys individual buildings can be located and delimited. Parallel to this a form is filled, noting which 2 x 2 m squares and layers belong to which building. Thereafter the all buildings contemporary to one another within a townyard are determined. The changes in the areas in between buildings are noted and used as these larger units are assembled. Finally the chronological relations between town yards are established so that features in the alleys are placed in the correct phases.

The analysis is done like this, step by step, starting at posthole and layer level working upwards to houses, plots and finally phases. The section drawings are important tools in this process. If none was drawn where needed for the phasing one can be constructed using the plans and the levels noted for the features. When finally all construction features have been redrawn on plans showing buildings which are contemporary to each other, the finds too have been given a relative dating.

After two years of work with the stratigraphic analysis all the drawings have been processed and a com-

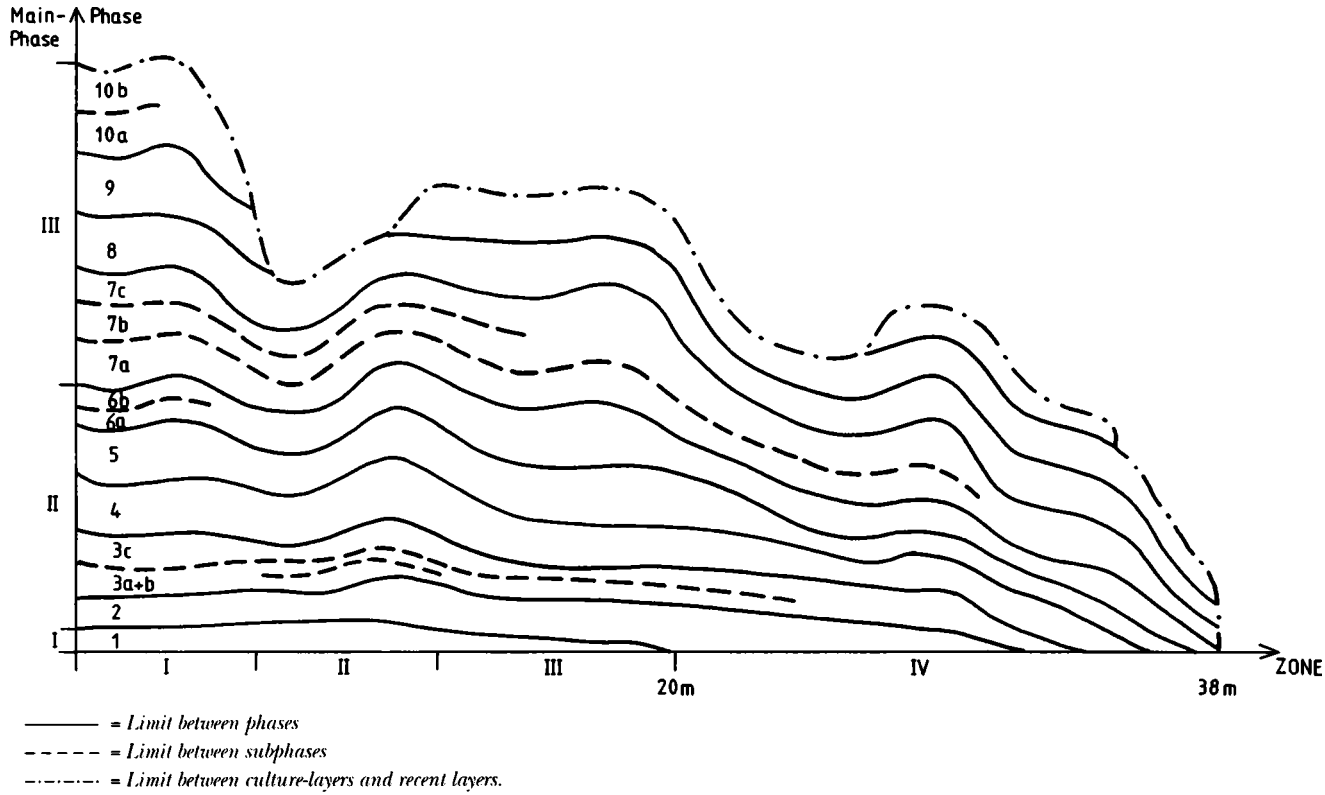

Fig. 3. The accumulation and the area covered by culture layers in eash phase and subphase. The mainstreet to the left. Note that a subphase only cover a part of the total area within the phase, for example 7c

plete picture of the built up area can be seen. In addition all the finds have been given a »home address« in time and space, in or outside a building within a dated phase. The forms where every 2 x 2 m square and excavated level in each phase has its own number is the key to the absolute chronology. With this as a tool special studies can be done like answering questions about when the town was established, town plan, town yards, how different parts of the plots were used, construction types, craft, trade and exchange. Analysis and dating of different find groups, e.g. pearls, spindle-whorls, pottery, combs and animal bones will be made. The 413 constructions recorded on the site have, after the stratigraphic analysis, been reassembled to 176 buildings and some 20 wooden trackways between houses. The re-

sult is a sample of the early medieval town with four town yards north of the main street which can be followed through ten phases. From the very beginning in c 980 the plot boundaries have been marked by half a metre wide ditches dug into the sub-soil. The boundaries remain fixed through the culture-layers to the beginning of the 13th century.

The results of the stratigraphic analysis can be shown at different levels. During the analysis three levels of phases have developed. On the highest level are the three main phases, each containing one or several phases, covering the whole site, with similar layout and usage within the town yards. The next level are the ten phases. From one phase to the next all the buildings within the site have been renewed. When working with the site at main phase or phase level it is possible to make comparisons across the whole site and with all finds. The lowest level are the sub-phases, which are present where there are local changes within the site. Some houses survive through several sub-phases which means that also the finds will be repeated. At this level find studies can only be made within areas where finds are not repeated (fig. 3).

4. Results Concerning House and Town Yard

As a background to the results described below a short summary of previous research on early medieval settlement in Sigtuna is given. Concerning house-constructions it could be described as an early period with wattle-and-daube houses and at a later phase cross-timber or post-and-plank constructions were introduced. All recorded houses have been fragmented and small[7]. In 1925 a well preserved wattle-and-daube house with wooden sill was uncovered on the »Trekanten« site, neighbouring to »Trädgårdsmästaren«[8]. In and around the house, which had a centrally placed hearth, a number of bronze clippings were found. This led to the conclusion that it was a bronzecasters workshop. Because of the lack of other recognisable house types in the town this came to represent the typical Sigtuna house. Some suggestions have been made concerning the structure and function of the town yards. According to one theory the merchants' quarter was along the south side of the main street. From here narrow alley-ways led down to the small shops and jetties. On the north side of the street was the craftmen's quarter with workshops and store-houses with entrances from the yards. All dwelling houses were situated at the back of the yards on the north side of the main street[9]. A later suggestion follows the along the same lines except for the fact that the merchants' dwelling houses are placed south of the street[10]. The post-excavation work at the »Trädgårdsmästaren« site has led to great changes in the views of the development of the town's structure, which will affect all interpretations concerning the archaeological material.

This development through the three main-phases is given here (fig. 4)[11]: During the 980's, in the beginning of *main-phase I* the plot boundaries are long ditches at intervals of about eight meters set at a right angle to the main street. This period has only one phase with one or two houses in a row near the street on every plot, which makes them relatively short, c 20 metres.The houses are small wattle-and-daube buildings without any wooden or stone sill[12]. They have centrally placed hearths. Neither finds nor layout indicate any specialized functions. All buildings have been dwelling houses. There are some indications of craft suggesting limited production for use within the yard. *Main-phase II* has five phases and is roughly dated to the 11th century. The build-

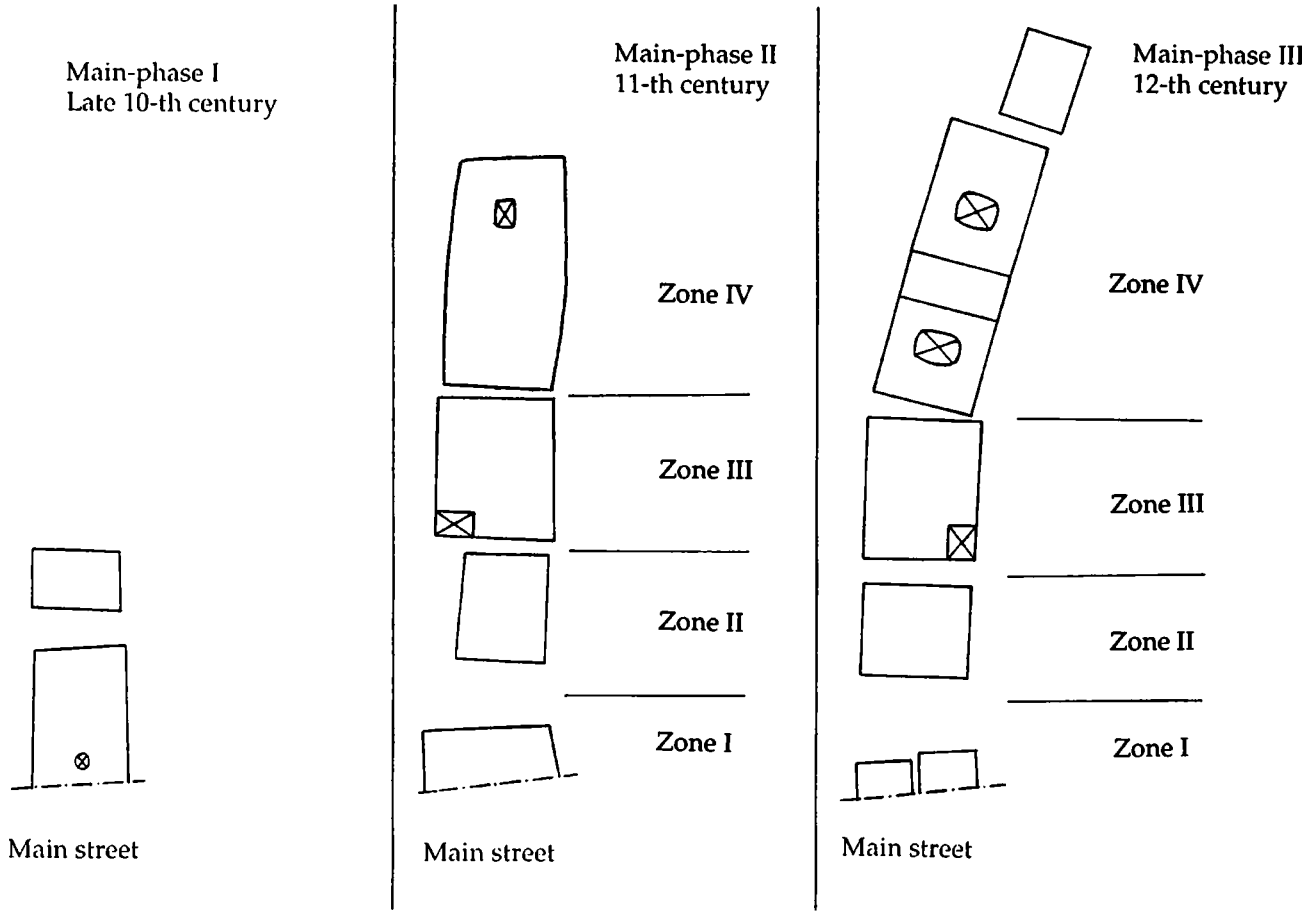

Fig. 4. The picture shows a typical townyard at the three main-phases and the location of the foure zones. Note that the length of the plots are increasing through time.

ings are placed as in the previous main-phase but there are now four or five houses per plot making the plots at least 30 metres. During the early parts of the period the houses are still built with wattle-and-daube, but now a difference in functions can be seen. The houses closest to the street have no distinct fire-place. Here crafts like bronze-casting, black-smithery and textile handicrafts like weaving have been carried out. They might also have been used as store houses, in other words multi-purpose build-

ings. The dwelling houses are situated at the far end of the plot. There are two different types. The ones closest to the middle of the plot have a hearth or an oven placed in a corner. The large number of pottery sherds found in these houses suggests household functions like cooking. The house furthest away from the street is a somewhat larger hall like building with a centrally placed hearth. There is a description of a type of house in medieval Bergen called schøtstuen. This building was also placed at the far end of the plot and was used as a meeting place during meals. Food was brought there from the fire-house[13]. The Saga of Olaf Kyrre tells that«...beer was carried round the fire.« in a building where the king had his throne[14]. The hearth was centrally placed in the kings hall and it's possible that these kind of buildings mainly were used for meetings and social gatherings. Looms are present in both types of dwelling houses. During the later part of the same main-phase, i.e. the end of the 11th century, the town yards have the same structure but all the houses are more solidly built with close-fitted sill-stones as foundations for cross-timbered and post-and-plank constructions. The location of crafts towards the street is even more pronounced and it has increased in intensity, noted by a greater amount of slag and »furnace-stones«. Bone and antler craft starts leaving traces in the culture-layers near the street. Textile craft is no longer present in this specialized area near the main street. A similar structure with multi-purpose buildings and workshops near the street and dwelling houses at the far end of the plot has been uncovered in the early medieval layers at the »Folkebiblioteks« site in Trondheim[15]. In *main-phase III*, from the early 12th century to the beginning of the 13th century, the town yards are even longer and the structure of the built-up area has changed once again. The remains of buildings were more difficult to interpret than in the earlier phases. There were scattered sill-stones, heavily decayed wood and patches of clay floors. Some wattle-and-daube constructions were fairly well preserved, though. The pattern with clearly defined buildings is broken. The hearths are no longer placed in the same position when a house is repaired or rebuilt. The number of buildings has increased and the one next to the street is replaced by two small workshop side by side. In these bronzecasting, blacksmithery and some combmaking is carried out leaving thick layers of debris. Towards the end of the main-phase the plots are more than 40 metres long, extending beyond the excavated area. In the workshops next to the street combmaking is the dominating craft.

The town yards can be divided into four zones (fig. 4). *Zone I* close to the main street with metal, bone and antler craft especially in the late phases, i.e in main-phase III. *Zone II* has multi-purpose buildings for crafts and storage. The dwelling-houses in *zone III* are mainly for household work. The dwellings in *zone IV* were probably used for meetings and social gatherings .

5. Absolute dating and culture-layer accumulation

One remaining task in the stratigraphic analysis is to establish an absolute dating for each phase. The tools on the »Trädgårdsmästaren« site are some ten dendrosamples[16] in phases 1 – 3 and a piece of lead with a coin die impression from the time of Knut Eriksson, the 1180´s[17], in phase 9[18]. The die impression is a product and has probably been dicarded shortly after being made. These finds give a total time-span of 250 – 300 for phases 1 – 10. It's highly

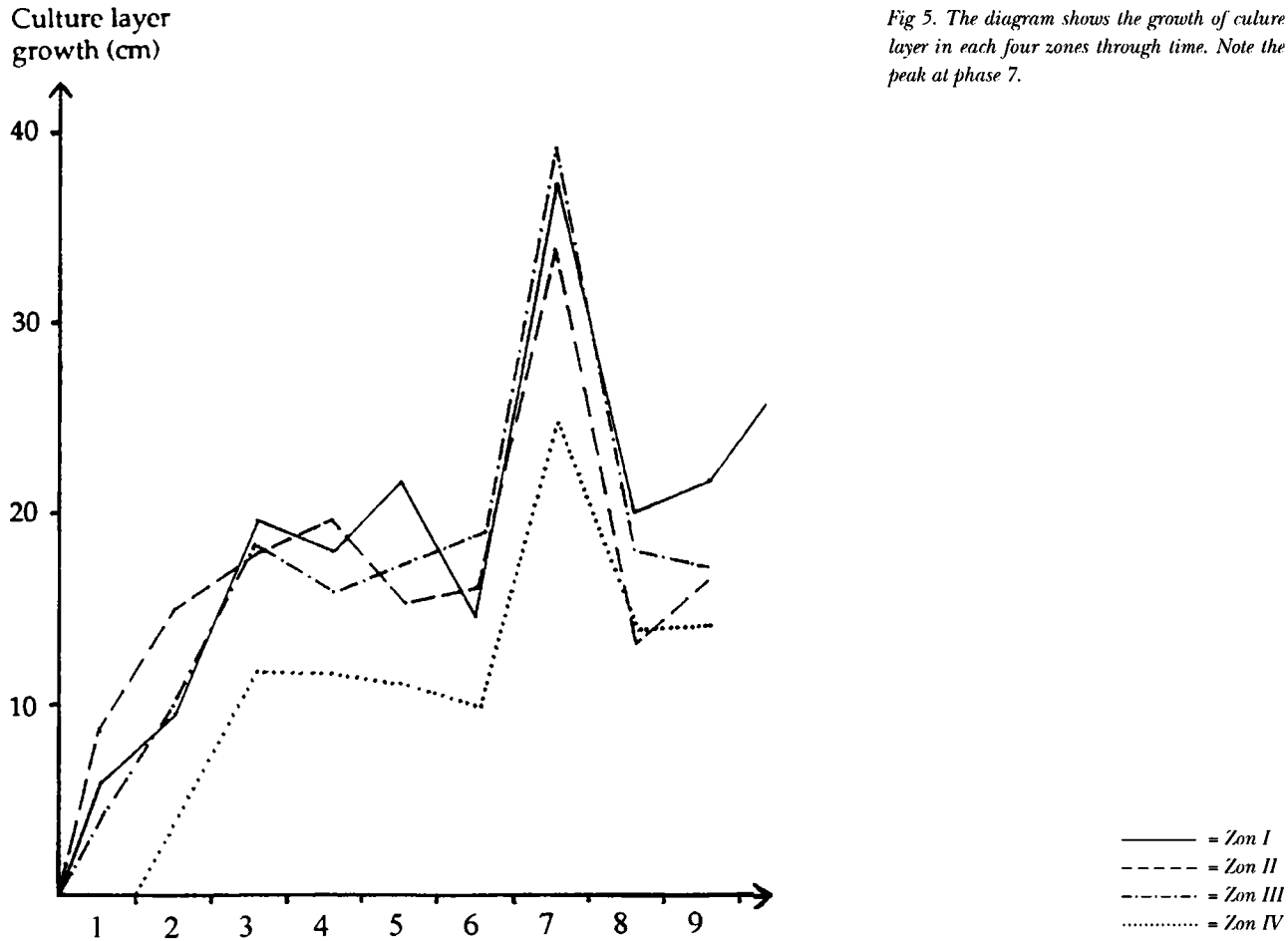

Fig 5. The diagram shows the growth of culture layer in each four zones through time. Note the peak at phase 7.

improbable the the phases are of equal length. A method to reach an absolute dating of every phase and the necessary conditions will be presented below. How they have been met is shown in brackets. **1**: The material must be phased with no overlap in time. (Completed stratigraphic analysis with ten phases). **2**: Some absolut dates and the total time-span must be known. (Dendro datings in phase 1 – 3 and the die-impreesion in phase 9). **3**: Establish activities and type of culture-layer accumulation on the site. (Division of the plots into zones and determining their functions). **4**: Possibility to measure the

	Culture layer growth/phase (cm)				Years/Phase (Rounded)			Absolute dating (years)		
Phase	Zone I	Zone II	Zone III	Zone I-III/3 = M	200/179 x M	250/179 x M	300/179 x M	Phase 1-10= 200 years	Phase 1-10= 250 years	Phase 1-10= 300 years
1	6	9	4	6	7	9	11	980-987	980-989	980-991
2	10	15	11	12	13	17	20	987-1000	989-1006	991-1011
3	20	18	19	19	21	26	32	1000-1021	1006-1032	1011-1043
4	18	20	16	18	20	25	30	1021-1041	1032-1057	1043-1073
5	22	15	16	18	20	25	29	1041-1061	1057-1082	1073-1102
6	14	16	19	16	18	23	27	1061-1079	1082-1105	1102-1129
7	38	34	39	37	41	51	62	1079-1120	1105-1156	1129-1191
8	20	13	18	17	19	24	28	1120-1139	1156-1180	1191-1219
9	22	16	17	18	20	25	31	1139-1159	1180-1205	1219-1250
10	28	-	-	(18)	20	25	31	1159-1179	1205-1230	1250-1281
Σ				179	199	250	301			

Fig. 6. Table showing the growth of culture layer per phase at plot number IV, translated to years per phase and three suggestions of absolute dating of phase 1-10. Above the conclution is made that the alternative with 250 years from phase 1- 10 is the most possible.

thickness of every phase in each zone. (Sections along the middle of each plot, where the layers are well-defined).

The first result of this study is a diagram with four graphs, each showing the accumulation of culture-layers on plot IV (fig. 5). It is clear that the intensity of accumulation co-varies in the four zones. Zone IV follows the pattern but has consistently thinner layers than the others, probably because it is a pure dwelling zone without much household and craft debris. Zone IV will be excluded in the following discussion as it reaches beyond the area covered by phase 1 (fig. 3). The marked increased growth in zone I during phase 8 – 10 is due to the specialized production resulting in a large amount of waste. Apart from this the accumulation of culture-layer covaries through the phases. So with this exception the differences between phases obviously have nothing to do with changes in activity .

My hypothesis under the given conditions is: If the accumulation of culture-layers in zones with different types of activities co-varies through time, this shows that the phases span diffrent lengths of time. With this as a starting point a table was made where the mean value of layer accumulation were converted into three different suggestions for absolute dating of each phase (fig. 6). Considering the dendrodatings and the coin die impression[19], a total time-span of 250 years seems most likely[20]. These calculations have been made on material from plot IV and the purpose is to present a method that can be used in the continued work with the site. The results must be viewed as preliminary until the whole record has been dealt with. The argumentation and calculati-

ons are based on carefully recorded sections and plans, which also are the basis for the stratigraphic analysis which in turn all further interpretations of the finds rest upon.

6. Summary

To be able to study the finds from an archaeological excavation in a meaningful way, the stratigraphic analysis has to be properly done. This is the foundation upon which the interpretations will stand. This makes the choice of both excavation and post-excavation methods important. In Sigtuna we stressed the importance of interpreting the features on site. This doesn't necessarily mean that these interpretations will be unchanged after the excavation is finished. The aim is to improve the conditions for the post-excavation work were the site interpretations will be weighed against other facts during the course of the work. The strategically placed sections along the middle of the plots were used to link the constructions to each other. It has also been demonstrated that the sections together with dendro-datings, dated finds and an awareness of the settlement structure will raise the results of the stratigraphic analysis from a relative to an absolute dating of the phases. The development on the site can be divided into ten phases covering the whole area from the late 10th to the early 13th century, from short town yards with no special division of functions to long ones with dwelling houses at the far end of the plot and workshops near the main street. During the 12th century specialized workshops with blacksmithery and comb-making are established. At this time all household functions are moved to the far end of the plot. The study of the settlement structure is under way but the stratigraphic analysis completed and a suggestion for the dating has been given here. This is a unique material which can reflect the great social changes that took place in middle Sweden from the late viking age to the high middle ages.

Notes

1. Tesch 1989.
2. Tesch et al. 1990.
3. Tomt I-III is stratigraphical analysed by Mats Roslund and plot number IV-V is stratigraphical analysed by Björn Petterson. This articel mainly refers to results from plot number IV- V.
4. Petterson 1992 p 159.
5. Jfr. Myrvoll 1982 pp 34. och Nordeide 1988 p 38.
6. Andrén 1985 p 7.
7. Douglas 1978 p 61.
8. Arbman 1926 pp 178.
9. Floderus 1941 pp 63.
10. Arbman 1942 p 11.
11. This is a perliminary result until a more detailed analysis is made. Previous published in Petterson 1992 p 157.
12. Petterson 1990 pp 46.
13. Helle 1982 p 276, 742, 762.
14. Snorre Sturluson p 587.
15. Christophersen 1990 pp 113.
16. Ten dendro-samples from phase 1-3, dated to the period 981-1013 ekr.
17. Jonsson 1985 pp 190. Lagerqvist 1990 pp 95.
18. The coin-die impression was found at plot number II.
19. Dendrodating of phase 1 to 980's and the coin-die impression in phase 9 to late 12-th century.
20. Since the dating of dendrosamples and the coins are not more exact than ten years, the results of the absolute dating should be used conserning these facts.

* Illustrations by Björn Petterson.

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