DENDROCHRONOLOGY AT KASTELHOLM

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Work on the dendrochronological dating of Kastelholm is in progress. No absolute dates are presented here.

Dendrochronological analysis at Kastelholm is based on several different approaches:

1 a) Every archaeological excavation at the castle exposes wooden structures or pieces of wood. Samples are taken regularly.
   b) The examinations of the building itself reveal structural details of wood with varying functions. An unexpected amount of wood from scaffolding has, for example, survived in the beamholes of the walls.
2. Parallel with the routine sampling of structures that have to be dated, reference samples for a master chronology of Åland are being collected.

Samples from living trees of considerable age could be recovered without significant difficulty. At various places on Åland there are trees which extend the reference curve back to the middle of the seventeenth century. However, it proved more difficult to move further back in time using material from Åland exclusively. Åland was particularly badly hit by the hostilities between Sweden and Russia during the »Great troubles» (Stora ofreden). Almost every building was burnt down. It is unlikely that there are any secular buildings from before 1719 left on Åland. Most of the churches did escape damage but they contain very little post-medieval timber which can be used for sampling. Consequently the task of dating at Kastelholm seemed somewhat problematic for a while.

Further research confirmed the truth of the old saying »Help is nearest at times of greatest need.» The castle itself yielded an unexpectedly large quantity of old timber. In the attic of the castle's east wing usable samples could be extracted from the supporting beams and planks of the floor and from the roof.

In connection with renovation work, the roof and walls of a shed near the old prison, »The White Bear», east of the castle, also provided samples. All these specimens should extend the chronology and make its earliest section more representative, but the problematic gap in the master curve from 1300—1650 still remains.

The recent part of the chronology can be convincingly matched with a sequence from the Swedish mainland, the Uppsala master curve. This suggests that it should also be possible to date the early part of the Åland tree-ring chronology with the help of a Swedish counterpart.

Irrespective of whether a date is attained by reference to the Swedish or Åland chronology, the tree-ring sequence to be dated must be composed of several samples/trees in order to ensure that the sequence is representative of the tree population from which the samples were taken.

The large number of samples from the palisade which surrounds the castle on all sides comprise an exception (there are 20 000 poles according to the estimations of the excavators, Fig. 1).

The palisade is likely to have been constructed over a limited period of time. Later repairs of the palisade as a result of partial destruction led to the addition of batches of synchronous poles.

The great problem with the dating of the palisade is that the insignificant dimensions of the poles produce such short tree-ring sequences — 25—30 rings (diagram, fig. 2, left). Correlation of these short sequences can only be confirmed if the overlap includes most of the sequence. This only occurs when the poles are synchronous. If the erection of the palisade took a long time, with the result that trees included in the construction were felled on different occasions, the possibility of a certain correlation decreases. The greater the number of samples taken, the greater this possibility becomes. The chance of finding groups of synchronous samples and poles with longer tree-ring sequences than the present average of 25—30 rings will also improve.

Grouping according to sequence length is based on the way in which regeneration normally occurs. The disappearance of one or several older trees as a result of storm, insects, fire or human interference gives rise to a regeneration gap which is filled by young plants of rughly the same age. When contemporaneous trees were required in quantities, it was practical to exploit such stands, in the case of the Kastelholm palisade c. 30 year-old ones. Clearance could be restricted to one area and transport was simplified.

A combination of both methods of grouping (using tree-ring widths, fig. 3, and sequence lengths, fig. 2, in combination) increases the possibility of making conclusions on the basis of a large body of material about the probable locality of groups of samples/trees which clusters may form. If the samples in these clusters are kept together and given priority, the process of dating should be simplified due to the fact that greater similarities are expected within the clusters. The diagram fig. 4 has been primarily compiled to simplify the dating procedure. It can also be seen as a model for the reconstruction of occasions when and localities where clearance took place. Further information can be extracted when it becomes more clear which structures in the castle the different clusters may represent.

Some floating chronologies have been established containing material from a few of the archaeological excavation areas and, of course, from the reference material included in the Åland master curve.

For reasons discussed above the floating chronologies are still (statistically) far too »thin» — they consist of too few samples — for dating in relation to a master curve from the Swedish mainland to be possible.

However, these mean sequences »get fatter» and become more representative as work with dating progresses. The laboratory receives new samples at regular intervals.

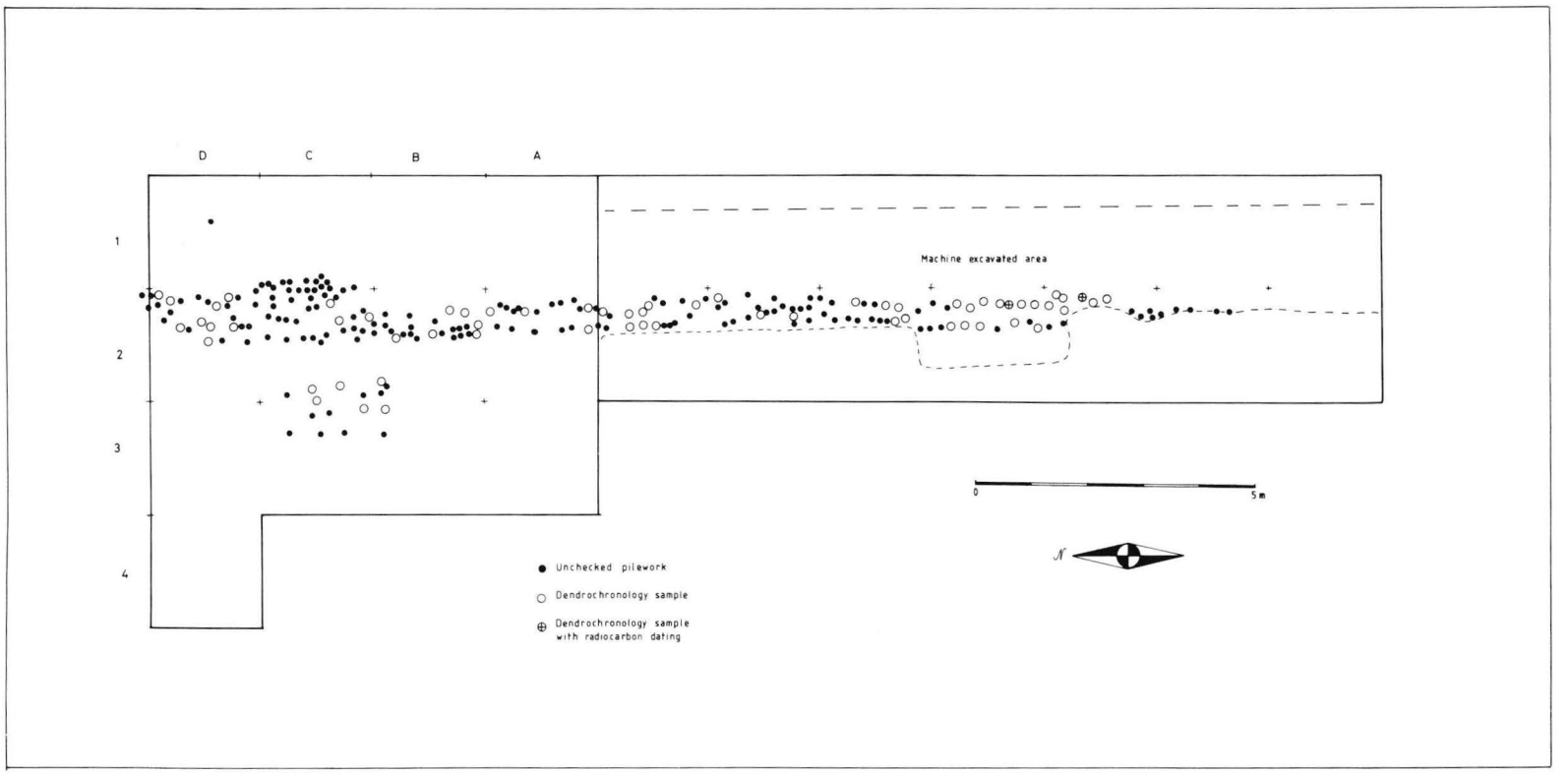

Fig. 1. Site plan at the pilework excavation south-east of the castle.

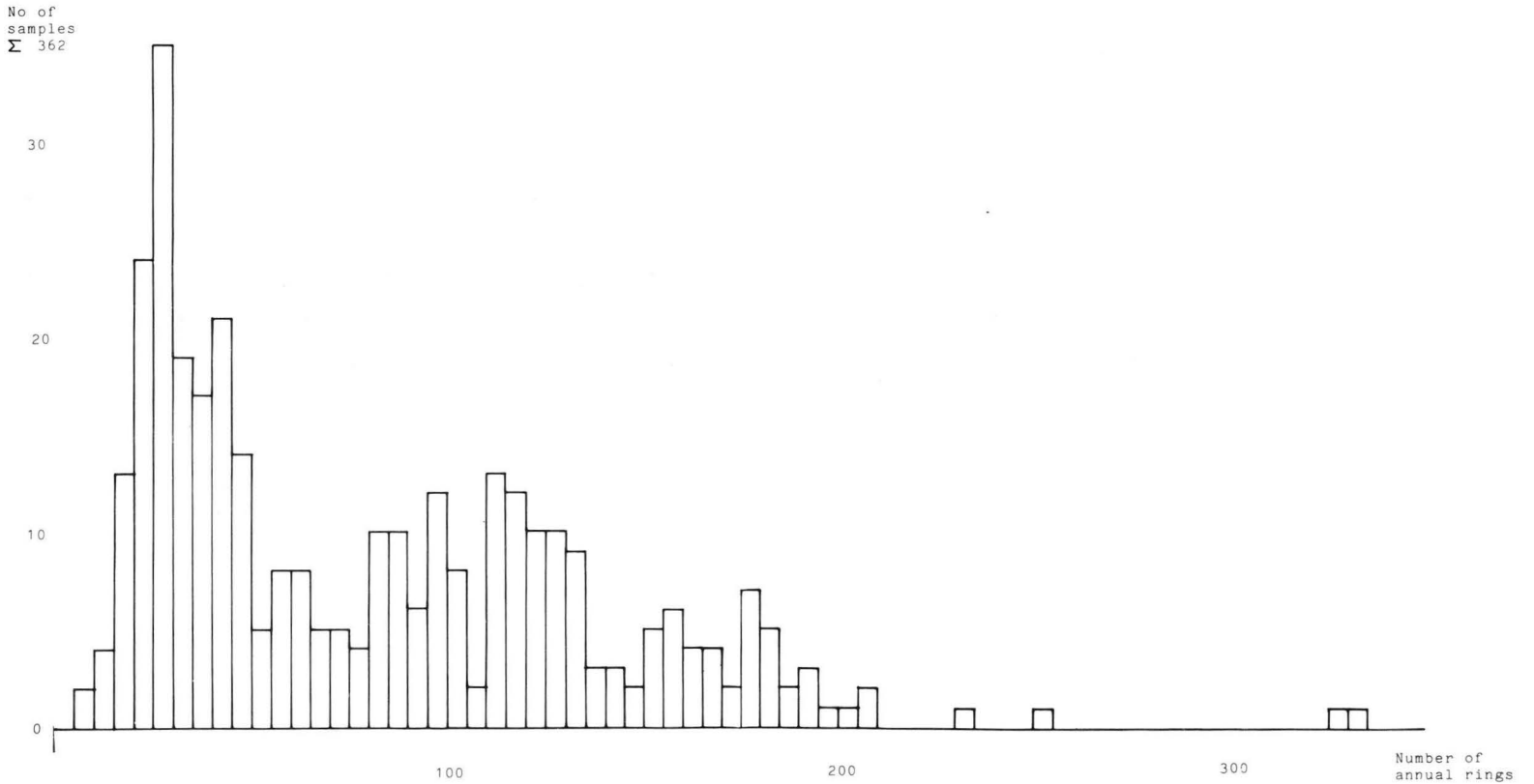

Fig. 2. The age-distribution of dendro-samples from Kastelholm with surroundings. Sequence lengths vary from 11—330 annual rings. The poles from the palisade represent timber of a size which is seldom put to use but which is quantitatively predominant among the Kastelholm samples.

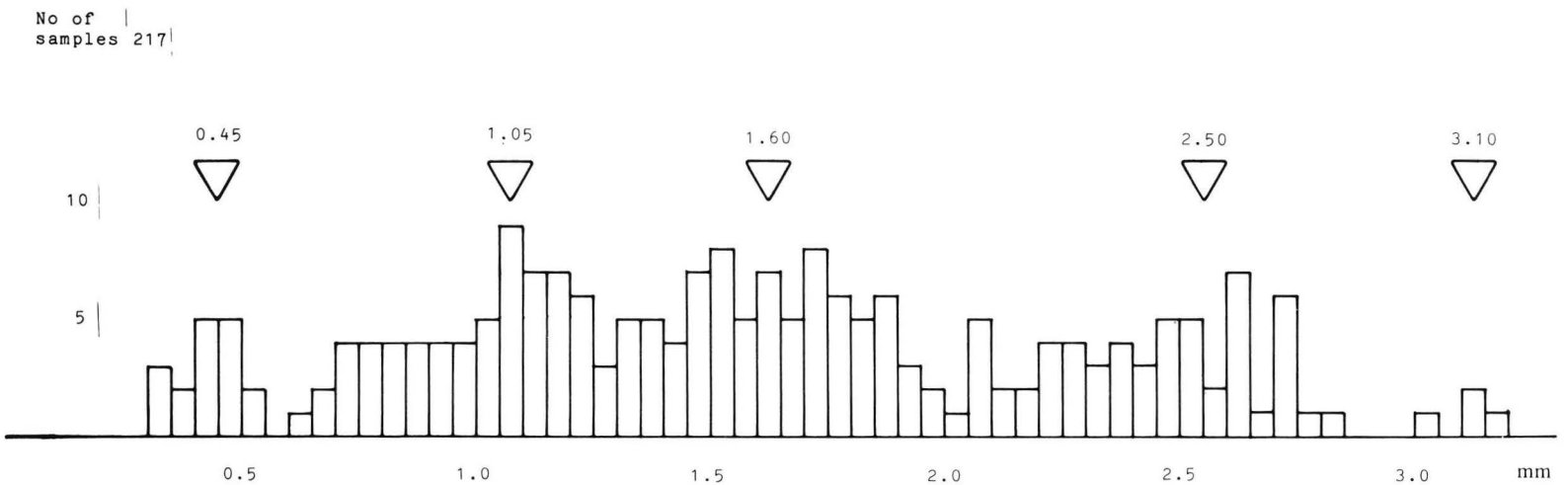

Fig. 3. The distribution of tree-ring widths. The tree-ring widths of the dendrochronological samples vary a grat deal. A division into five groups can be descerned. The width group 0.45 consists of the old growing trees immediately to the south of the castle. They are included in the Åland master-curve.

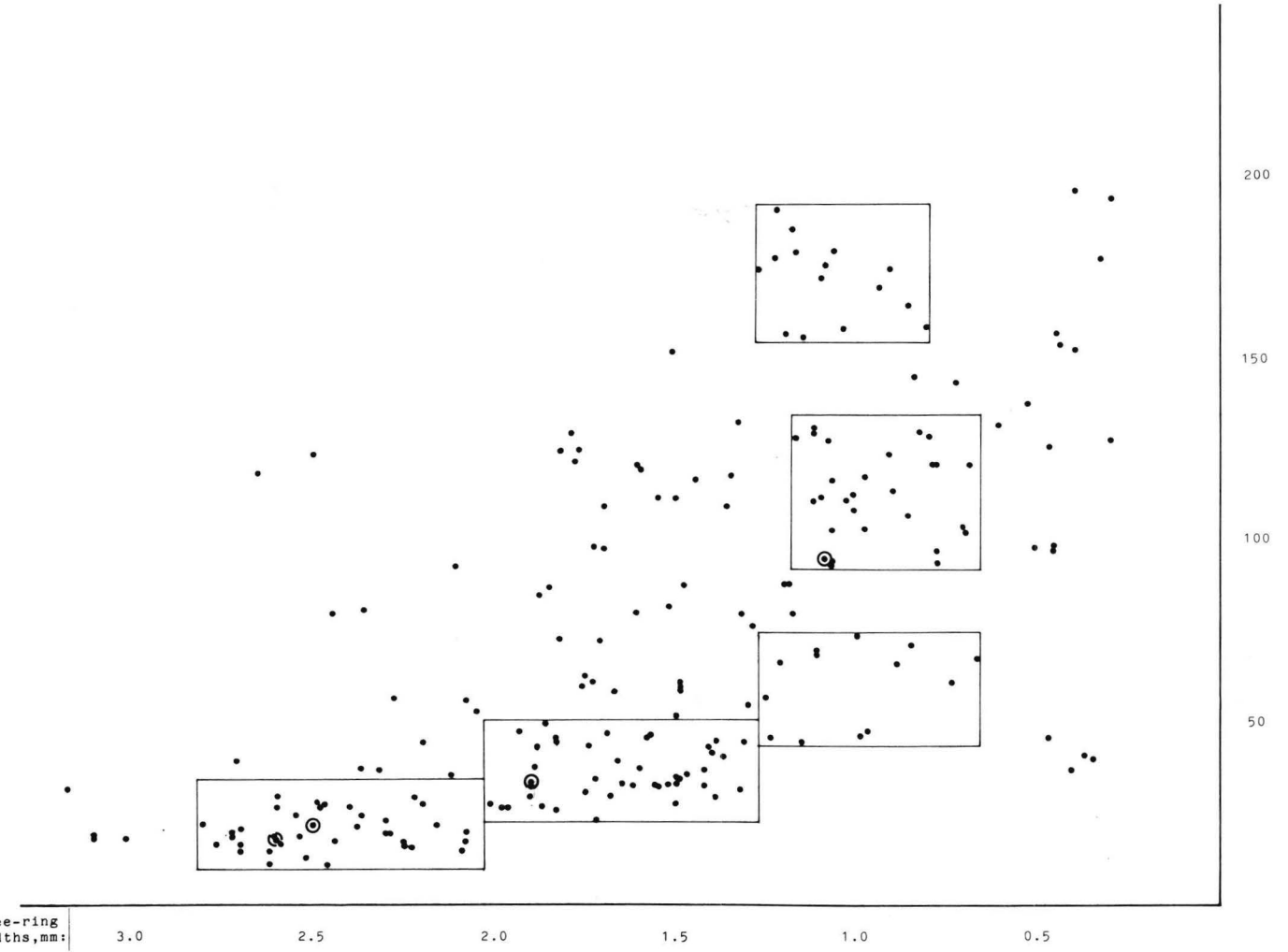

Fig. 4. The relation between tree-ring width and sequence length. Dots combining number of rings and ring width form clusters which are presumed to represent localities with similar growing conditions and/or occasions when trees of the same size were felled.