

ON THE EVIDENCE DERIVED FROM THE ANATOMICAL ANALYSIS OF WOODEN REMAINS FROM ARCHAEOLOGICAL EXCAVATIONS

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Wood has been an important raw material from prehistoric times up to the present. In places where the ground-water level has been sufficiently high, wooden artifacts are well-preserved over centuries. But in contrast to ceramics, single wooden remains are not so informative for archaeologists and historians, since they do not readily reveal any chronological data. This lack of typological features may be the reason why only in a few excavations the wooden remains are evaluated. This kind of analysis is for example done by Schweingruber (1975) in Birmensdorf/Switzerland, Casparie and Swarts (1980) in Groningen/The Netherlands, Behre (1983) in Wilhelmshaven/Germany, and Bartholin (unpubl.) in Lund/Sweden.

Some years ago our group in Hamburg started to analyse various ancient wooden remains from North German sites: the excavations in Haithabu yielded some 8000 wooden artifacts (Eckstein 1977), the excavations in Schleswig some 2000 pieces of wood, and the excavations in Lübeck some 20,000 wooden remains. Altogether they covered the period between 750 and 1850 AD, thus standing for a more than 1000 years long history of wood-working.

Wood anatomical studies on archaeological remains concern the following questions:

- Which wood-species occur in the cultural layers and what is their assessment for the vegetation history?
- Which wood-species were preferred by man?
- For which purposes was wood used and how was it used?
- Where did the wood come from?

In order to get an answer for these questions various kinds of analyses have to be performed. On the part of archaeology the wooden finds have to be defined in respect of their function, wood-working, and chronological assignment. On the part of wood-anatomy the wood-species are to be determined. The final evaluation should then be done in cooperation of both disciplines.

The identification of wood-species is feasible since trees have a very typical and stable cellular architecture. Trees which are systematically closely related to each other are anatomically similar and are grouped into plant families. Thus for example chestnut, beech, and oak belong to the same family, Fagaceae. A family is subdivided into various genera: for example, oak (*Quercus*) is such a genus. A genus is further subdivided into various species: in the case of oak for example there are pedunculate



Fig. 1. A stave-built bowl.

and sessile oaks (*Q. pedunculata*, *Q. sessiliflora*). The anatomical determination of a piece of wood down to the genus is possible for the majority of Central European tree species, one exception is larch and spruce. However, the determination down to the species level is mostly impossible. Sometimes an identification is feasible only at the family level; this is true for the family Rosaceae which includes our fruit trees.

In this paper some results are presented from one single excavation in Lübeck, namely for Schüsselbuden 16/Fischstraße 1—3. This study certainly does not yet satisfy the requirements for a statistical evaluation. Only when all 20,000 samples will have been analysed can the aforementioned basic questions be answered. But this collection was examined to elaborate initial trends for the expectable results. On this site a well of 8 m depth was excavated by the Amt für Vor- und Frühgeschichte in Lübeck. In its filling certain finds appeared from the end of the 14th to the beginning of the 19th century. They are made of ceramics, leather, glass, and wood.

Since the second half of the 17th century the well did not serve any longer for fresh water, but was used as sewer. With increasing depth the variety of the wooden items decreases, and the proportion of the stave-built bowls (Fig. 1) increases. Altogether the site reveals a large variety of wooden remains, e.g. spindles, cups, covers of tubs, and brooms.

The group of wooden remains from this well contains 666 parts of various items. The spectrum of the wood-species of these parts is illustrated in Figure 2. The wooden artifacts can be attributed to 16 wood-species, 8 of which are of minor importance with a share of 0.6 % at the maximum. Six wood-species occur with a proportion between

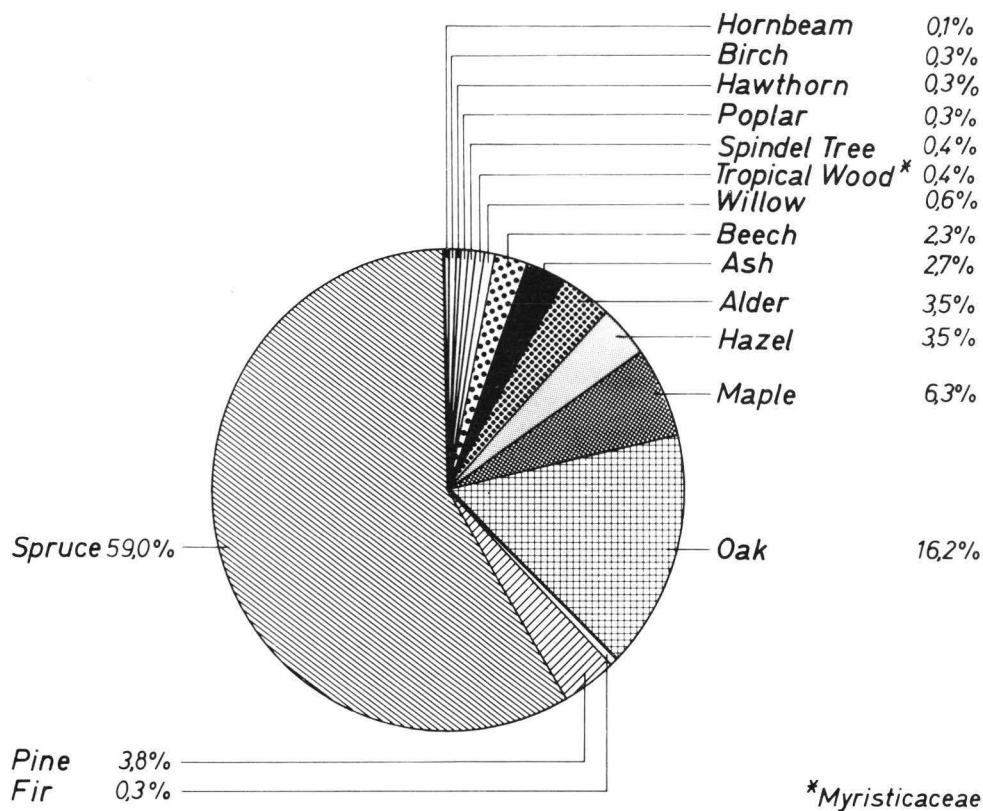


Fig. 2. Spectrum of wood-species (n = 666 parts of items).

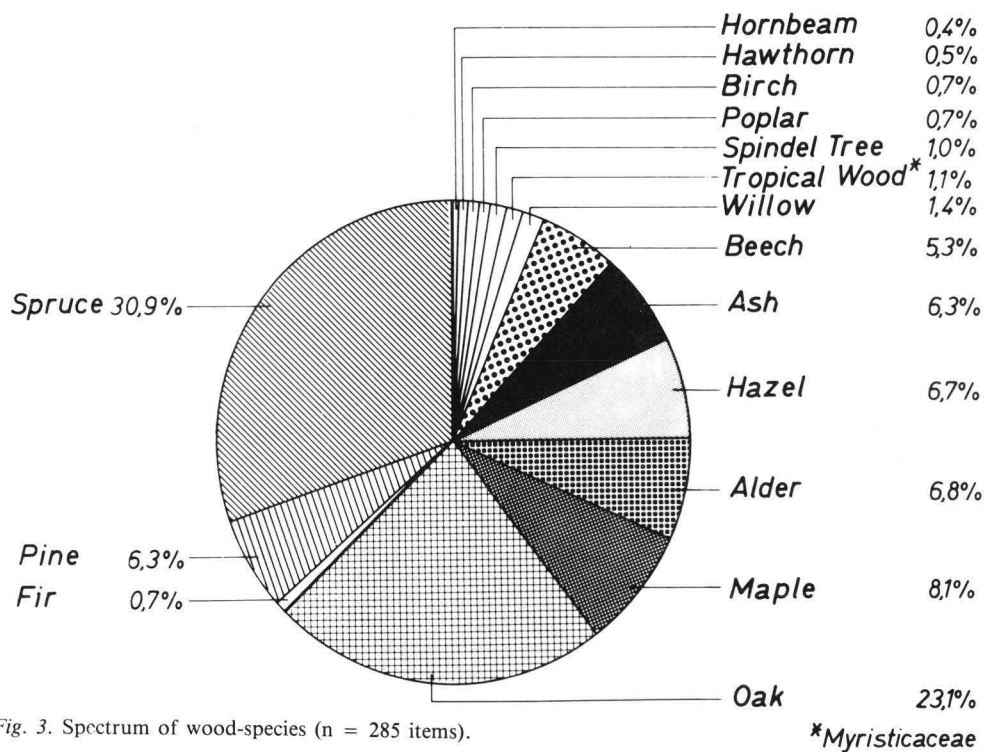


Fig. 3. Spectrum of wood-species (n = 285 items).

2.3 and 6.3 %, and only two, namely oak and spruce, are dominant with 16.2 and 59.0 %, respectively. Although spruce and larch are not distinguishable from each other with certainty, the respective remains were determined as spruce. Larch is a tree growing at high altitudes and in restricted areas. Thus it is not likely that larch timber occurs in the excavations in Lübeck in large quantities. Some 2/3 of the wooden parts consist of the three softwood species spruce, pine, and fir, whereas some 1/3 are distributed over 13 hardwood species.

The archaeologist in charge of the final evaluation¹ succeeded in condensing the 666 wooden remains to 285 items and in separating them according to their function (e.g. spindles, tubs, plates, bowls) as well as to wood-working features (e.g. coopered, turned). A corresponding diagram is shown in Figure 3. A reverse situation can be recognized as to the proportions of hardwoods and softwoods. Within these two groups the proportions of the wood-species show a similar tendency as in Figure 2. The reduction of the sector for spruce (from 59 % to 31 %) shows that the spruce wood pieces were taken together into items consisting of numerous parts. On the other hand, the sector for oak changes very slightly, suggesting that this wood belongs to items which consist of a few parts only.

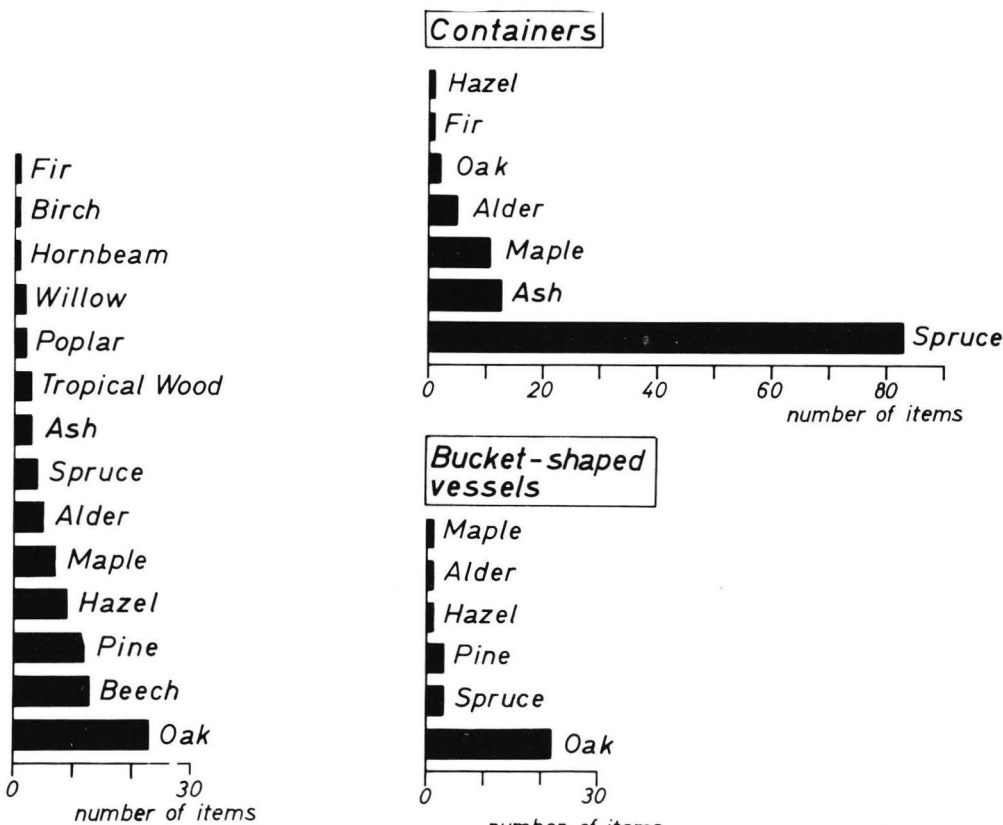


Fig. 4

Fig. 5.

Fig. 4. Timbers without recognizable function and wood-working.

Fig. 5. Spectrum of wood-species, separated into various kinds of small containers and bucket-shaped vessels.

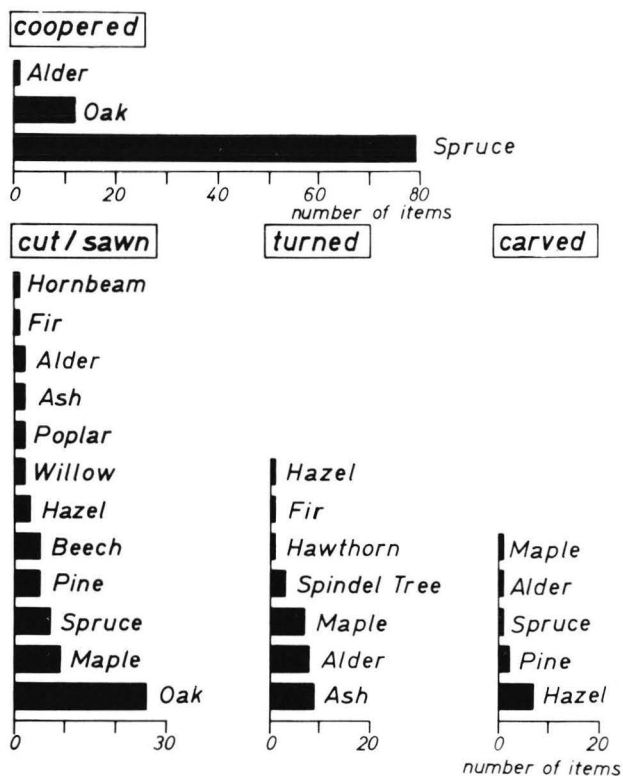


Fig. 6. Spectrum of wood-species, separated into different features of wood-working.

A special finding is the occurrence of four pieces of tropical woods of the family Myristicaceae. Trees of this family grow in West Africa and South-East Asia. These pieces were certainly not imported deliberately, but possibly belong to a small wooden box brought from abroad.

From both diagrams it becomes obvious that there is no single spectrum of wood-species typical for an excavation or period. Rather it depends on what is considered as the basis for this calculation. In this example it is the high number of stave-built bowls of spruce which influence the spectrum because of their numerous single parts.

The question of wood import arises for both the exotic species as well as coniferous species. The area of natural distribution of the tree species in Central Europe is quite well known (Dengler 1971).

Fir is a mountainous tree. Its natural occurrence ends some 300 km away from Lübeck in Saxony and does not reach the coast of the Baltic Sea. The border of distribution of pine runs through Mecklenburg in the GDR and through the south of Sweden, thus following more or less the coastal line of the Baltic Sea. Among the pine-wood pieces two could be determined to belong to stone-pine growing in North Russia, West Siberia, in the Alps, the Tatra, and the Carpathians. Spruce is perhaps also an imported timber, since its border of distribution lies several hundreds of km away from Lübeck.

In order to recognize how the former inhabitants of Lübeck used the wood and which kind of knowledge they had on the different qualities of wood, two types out

of the various functions and four groups out of the various features of wood-working were selected. For reasons of comparisons a diagram (Fig. 4) is given containing those wooden remains without definable function and recognizable features of wood-working. This diagram contains nearly the entire spectrum of wood-species.

The deliberate selection of timbers is best expressed in the deviation of single wood-species from this basic diagram as shown in Figures 5 and 6. Some wood-species are entirely missing. In the group of various kinds of small containers — as could be expected — spruce wood is dominating. In the group of bucket-shaped vessels it is oak. Spruce was selected for coopering in the production of stave-built bowls, oak was cut or sawn and ash, alder, and maple were turned, whereas hazel was carved. This selection of woods for certain kinds of wood-working is still valid today and has already been proven for excavations older than those in Lübeck as well as for other sites (Costantini 1979).

In retrospect it is striking that the species pine and beech dominant in Figure 4 do not or almost not occur in the Figures 5 and 6. This result cannot be explained as yet. Spruce is again a remarkable species, its small proportion is caused by its biased use for stave-built bowls.

The wood-anatomical analysis of all the wooden remains from one excavated site was performed with the idea to gather some basic experience for the analysis of the entire collection of wooden remains, the number of which equals some 20,000 pieces.

Our further analysis is concentrated on certain types of function of the wooden findings and on improving the sampling in order to reduce the analysis time and the incurred expenditure. The final evaluation will be performed in close cooperation between wood-scientists, palaeo-ethnobotanists, archaeologists and historians. From the possible changes in the selection of timbers for certain uses and wood-working processes in relation to time, a contribution to the economic and social development as well as to the history of technology and forest history can be expected.

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