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# DENDROCHRONOLOGY OF OAK IN SOUTHERN SWEDEN

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**ABSTRACT**

Tree-ring investigations on samples from modern oaks in the Swedish southwest region of Scania show that the area is a dendrochronological unit and that a chronology for the province is similar to a chronology for southern Denmark.

Jahrringanalytische Untersuchungen an rezenten Eichen aus Scania in Südwest-Schweden zeigen, daß dieses Gebiet eine dendrochronologische Einheit darstellt und die Chronologie einer für Süd-Dänemark aufgebauten Chronologie ähnlich ist.

## INTRODUCTION

In 1967 investigations on modern trees showed that dendrochronology of oak was possible in northern Germany (Bauch, Liese, and Eckstein 1967). When Eckstein (1969) obtained good results from a dendrochronological investigation of the Viking town of Haithabu and at the same time presented methods for practical treatment of samples, an investigation of the possibilities in Denmark was started. Results of this investigation showed that the southern part of Jutland and the most northern part of Germany can be covered by one chronology, which also would be representative of the greater part of the rest of Denmark (Bartholin 1973).

The valid area for a chronology for northern Germany was therefore larger than expected, and when a project was started in 1973 for the southern part of Sweden, we expected to be able to use the German experiences and methods to a great extent; firstly to discover a valid area for a chronology in the southwest region, Scania, and secondly what to include in a chronology. This paper presents the results of a primary investigation on modern samples of oak in Scania.

## METHODS AND SAMPLE COLLECTION

The dating of modern samples was made by means of visual synchronization of the tree-ring curves supported by the values of agreement. The tree-ring curves were drawn on semi-logarithmic paper as suggested by Huber (1941), and his method for calculating the value of agreement (Huber 1943) was used in a rationalized form for computer-treatment (Eckstein and Bauch 1969).

It was practical to collect the modern samples from as old trees as possible for the forthcoming chronology. In Scania there are many oaks, that by tradition are very old, "thousand years old," and they were already mapped out. But inspection showed that these oaks in all cases had obtained their considerable size due to favorable growing conditions or had hollow trunks.

The samples were then taken from single trees in regular forest stands. The best places for old trees were found at the three locations marked on the map (Figure 1). These localities are also supposed to have a situation representative for Scania. At each place at least 10 trees were selected. The distance between the trees could be as much as c. 10 km. At a height of about one meter above ground one core was taken with an electric borer. The tree-rings were measured on an ADDO electronic measuring machine.

## RESULTS

After further treatment three local chronologies could be calculated. They are shown in Figure 2 for the period A.D. 1800 to 1973. At locality S2 two trees were found with over 400 annual rings, the oldest living oaks so far with certainty found in Scania (Sweden). They bring the chronology back to the year 1560.

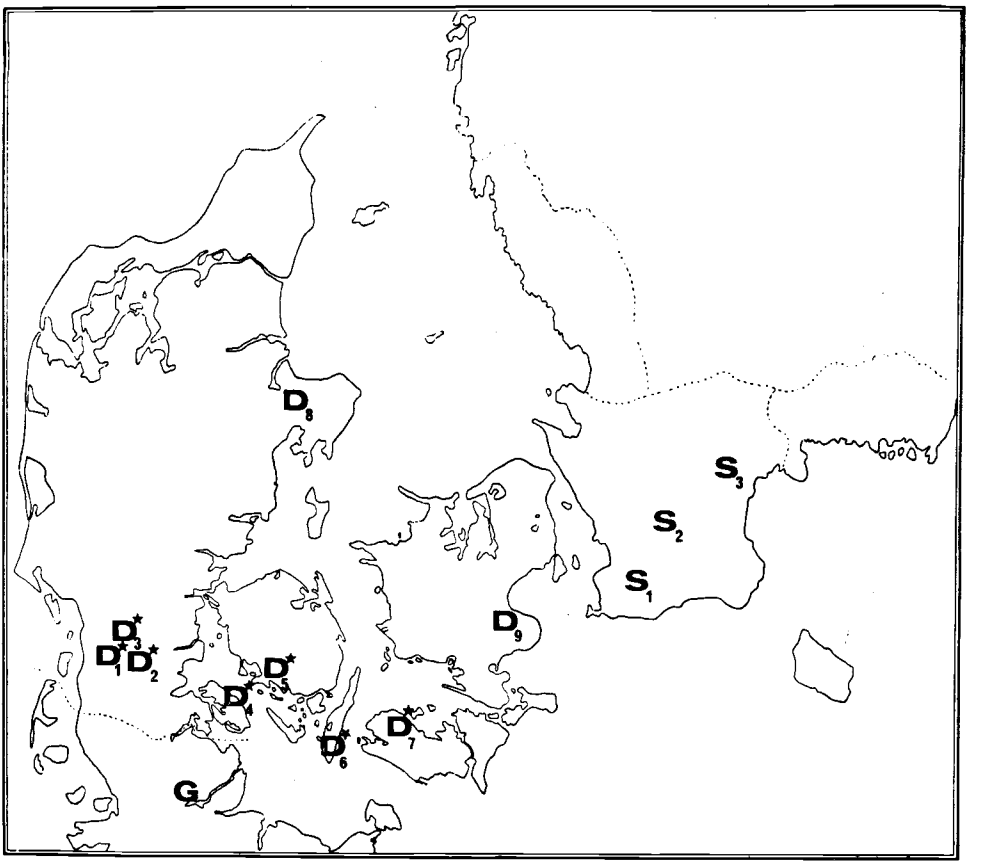


**Figure 1.** Localities with dendrochronological investigations on modern oaks. G: Germany, forests around Schleswig (Bauch, Liese and Eckstein 1967). D: Danish localities: D 1-8: Bartholin (1973). *-marked localities (D 1-7) form the chronology for southern Denmark, Figure 3. D 9: Holmsgaard (1955). S: Scania, southern Sweden, localities from this investigation: S 1: Börringe Kloster and Torup. S 2: Bosjökloster and Fulltofta. S 3: Uddarp and Torsebro Krutbruk.

The curves in Figure 2 speak for themselves. The similarity between them is sufficient for making a visual synchronization possible. The similarity of the curves is further underlined by their high percentage of agreement: S1 to S2, 71.6%; S1 to S3, 73.9% and S2 to S3, 70.6%. The percentage of agreement with local chronologies from Denmark and northern Germany is shown in Table 1.

**Table 1.** Percentages of agreement between Scanian and Danish-German curves, calculated for the period A.D. 1840-1949, as fixed by the shortest chronology, D9.

| | *Scania* | | |
|---|---|---|---|
| | S 1 | S 2 | S 3 |
| Denmark D 1 | 67.0 | 64.7 | 66.1 |
| Denmark D 2 | 56.9 | 61.0 | 57.3 |
| Denmark D 3 | 69.7 | 65.1 | 71.6 |
| Denmark D 4 | 72.9 | 65.6 | 66.1 |
| Denmark D 5 | 67.4 | 67.9 | 63.3 |
| Denmark D 6 | 72.9 | 65.1 | 67.9 |
| Denmark D 7 | 70.2 | 65.1 | 65.1 |
| Denmark D 8 | 57.8 | 61.0 | 60.1 |
| Denmark D 9 | 67.4 | 65.1 | 67.0 |
| Germany G | 66.1 | 65.6 | 65.6 |
| Mean | 66.8 | 64.6 | 65.0 |

These figures do not disclose any regular differences between the Scanian local chronologies. The average of all the percentages of agreement in Table 1 is 65.5. Between curves from Denmark and northern Germany the mean value is 67.5%. The figures show, in this way, a falling value of the percentage of agreement with increasing distance, which was to be expected, and in Denmark even seen at shorter distances (Bartholin 1973).

## CONCLUSIONS

The conclusions of this investigation are that the province of Scania is a dendrochronological unit which can be served by one chronology. A chronology based on modern samples is further seen to be almost identical with a chronology from the southern Danish localities, D 1-7 (Bartholin 1973), in spite of differences in percentages of agreement (Figure 3).

Compiling a chronology for Scania may therefore be facilitated by the possibilities of making control datings on a chronology covering north Germany and south Denmark.

The dendrochronological method for the dating of oak has even in practice proved its usefulness. Based on many samples from a current excavation of the medieval town of Lund, a floating chronology is being constructed, at present on 518 years, presumably covering the period A.D. 700 to 1200.

## NOTE

Latest results from the summer 1975 show that south Sweden ought to be divided into two dendrochronological units: one for southwest Scania (S1 and S2 on Figure 1) and one for northeast Scania (S3) and Blekinge (the province east of S3). The floating chronology for Lund is now on 561 years, and it seems to cover the period A.D. 600 to 1160. An absolute chronology for southwest Scania now goes back to 1274 (see

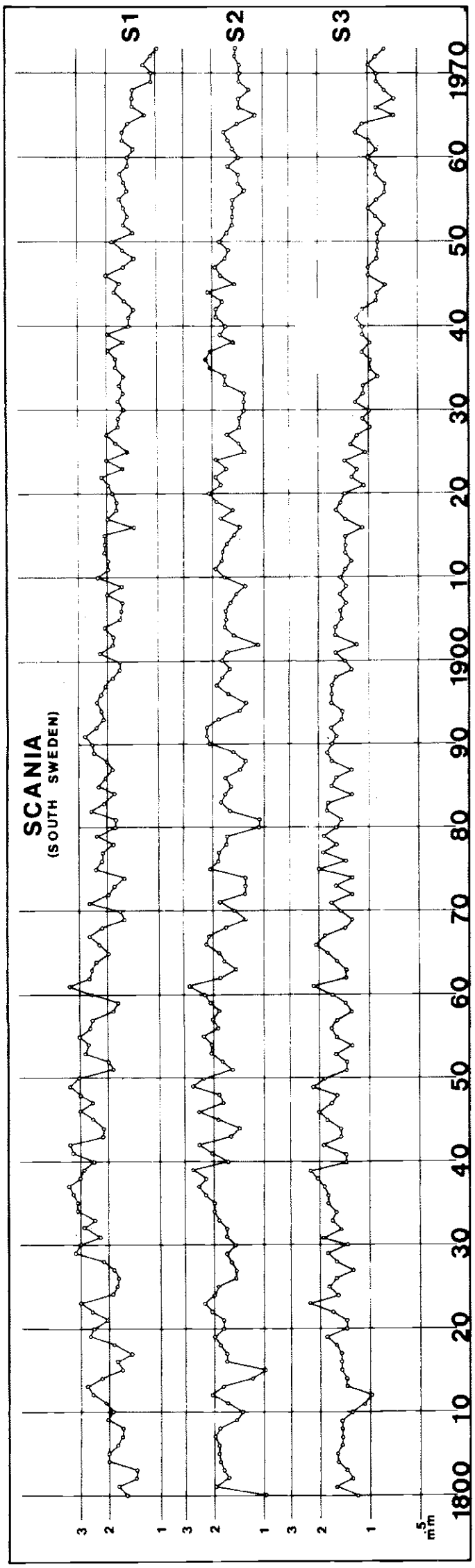


**Figure 2.** Chronologies from the three Scanian localities.

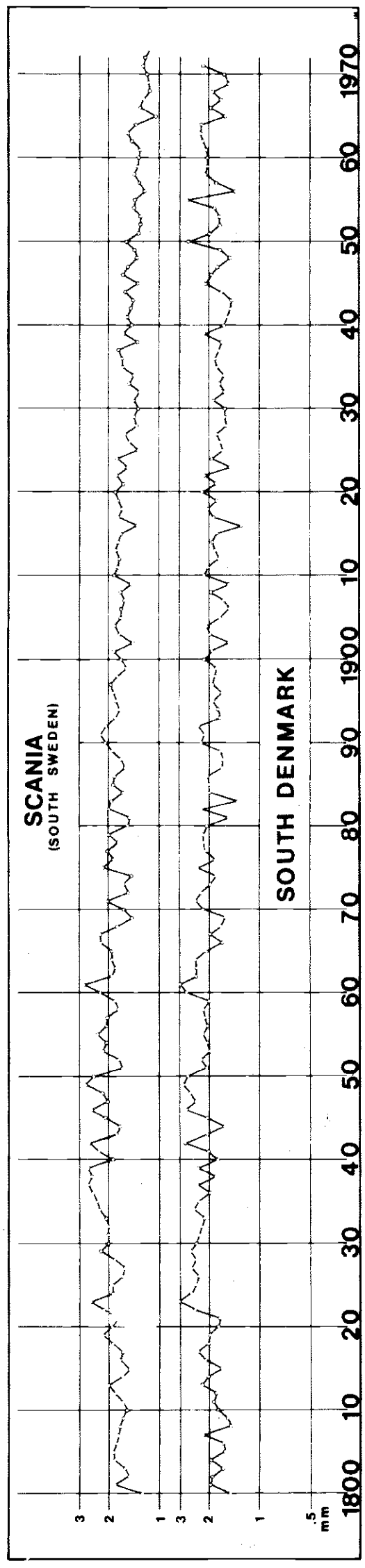


**Figure 3.** Chronologies from Scania and south Denmark.

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