

ON THE SIMILARITY IN THE GROWTH OF TREES IN NORTHERN SCANDINAVIA AND IN THE POLAR URAL MOUNTAINS

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ACCORDING to Zeuner (1950), Schulman (1951) and Schove (1950, 1954) the width of tree rings in certain regions can be regarded as an indicator of the summer thermal conditions. Adamenko (in press) has also shown that the width of tree rings is an indicator of ablation conditions on the polar Ural glaciers.

The object of this paper is to illustrate the similarity in the growth of trees in northern Scandinavia and in the polar Ural Mountains (based both on the data given in the interesting paper by Schove (1954) and on those collected by the author in the polar Urals). For this purpose the perennial changes in the growth of tree rings of conifers are given in Figure 1. The 30-yr. running mean dendrochronological indices, calculated from data in Schove's (1954) paper, are given in the upper curve, whereas the same indices for the polar Urals are given in the lower curve. If the origins of the co-ordinate systems for both upper and lower curves were to be constructed in such a way that there is a difference of 25 yr. between them then there would be a striking similarity between the secular changes in the growth of tree rings in both the polar Urals and northern Scandinavia.

On the basis of this comparison, the following conclusions can be reached:

1. There is a strong resemblance between the growth of conifers in Scandinavia and the polar Urals.
2. This resemblance shows that both in the polar Urals and in northern Scandinavia there is a close similarity between the thermal conditions of glacial ablation and their secular changes.
3. This resemblance can only be explained by the fact that the perennial changes during tree-ring growth (ablation of glaciers and thermal conditions during the growing period (Adamenko, in press)) are due to large-scale changes in the atmospheric circulation and even, perhaps, planetary ones.
4. The phases of oscillation in the upper curve (for Scandinavia) in Figure 1 fall behind those in the lower one by about 25 yr. The problem of the probable cause of this 20–30 yr. delay observed in the growth of tree rings is indeed very interesting.

On the basis of a preliminary analysis, the most favourable conditions hastening tree-ring growth in the polar Urals are likely to occur during the periods when the northern periphery of the areas of high pressure which stabilize themselves over eastern Europe are repeatedly situated over the polar Urals, and when the northern margin of the Arctic Ocean is also under the influence of cyclonic centres.

Delay in the growth of trees in Scandinavia, compared with that in the polar Urals, can be explained by the same delay observed in the frequency trends of the anticyclonic situations in western and central Europe, compared with those in eastern Europe, but this problem requires special study.

5. An analysis of the data given in Figure 1 leads to the conclusion that in the eighteenth century the conditions for tree-ring growth (and perhaps glacial ablation) in the polar Urals and in Scandinavia were more favourable than those of the nineteenth century. At present (the twentieth century, beginning from the 1920's) the second period of active tree growth and active glacier ablation is proceeding; these phenomena are connected both with changes in the general atmospheric circulation and with the twentieth century climatic warming observed by other authors (Petterssen, 1949; Adamenko, in press).

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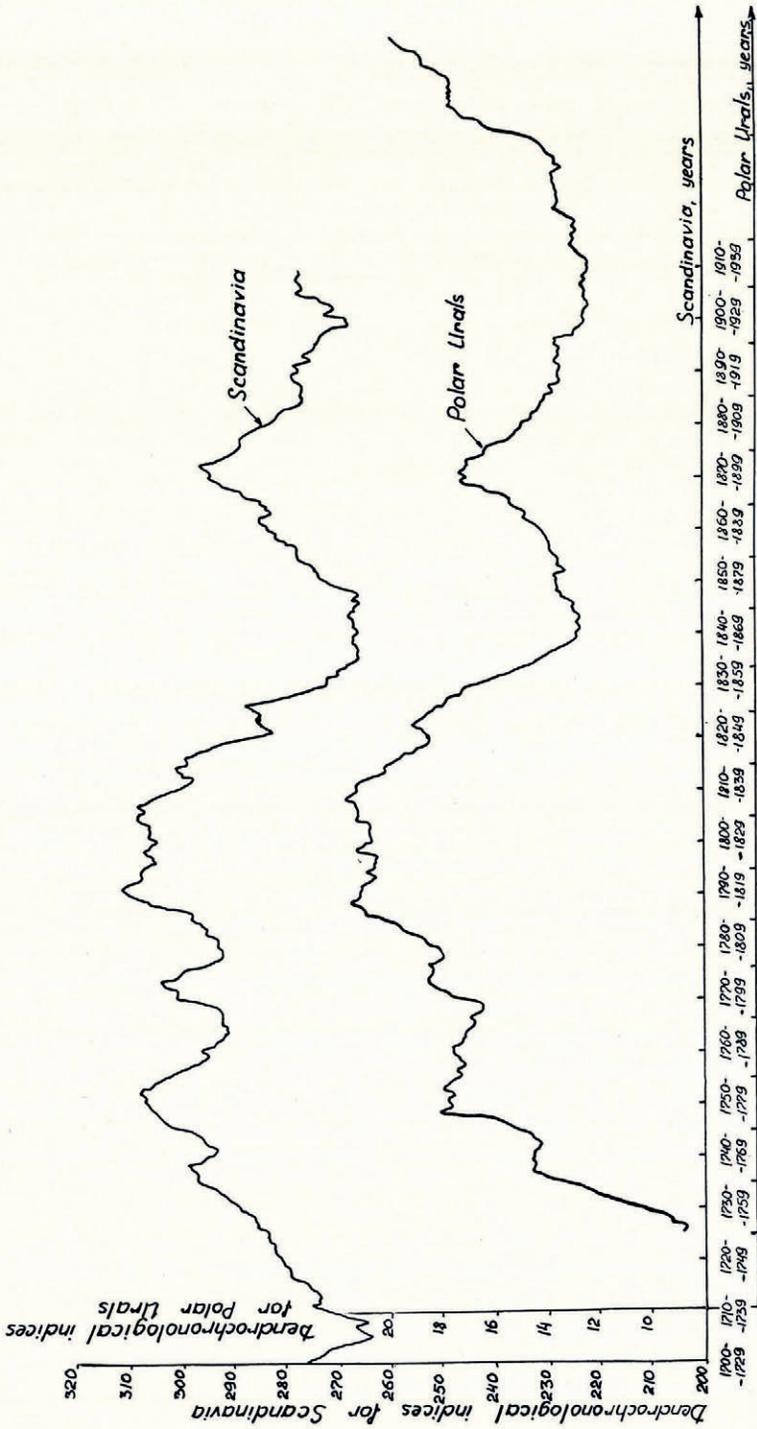


Fig. 1. Perennial changes in the growth of coniferous tree rings in northern Scandinavia (after Schove, 1954) and Larix sibirica in the polar Urals (running 30-yr. means)

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