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TYPE REGION P-h: THE SILESIA-CRACOW UPLAND

The Silesia-Cracow Upland is a region which lay beyond the range of the last glaciation. It is characterized by a lack of lakes and the only large peat-bog came into existence in a wide tectonic depression, the Wolbrom Gate, on the watershed between the rivers Biała Przemsza and Szreniawa. The Wolbrom peat-bog is thus the only reference site in this extensive and highly varied region, which limits the possibilities of interpreting the changes in the natural environment of the area as a whole. The palaeobotanical data from Wolbrom is, however, representative of a secondary unit, the Wolbrom Gate subregion.

Area: c. 10 000 km^2.

Altitude: c. 200—500 m a.s.l.

Climate: mean annual temp. 7.5°C, mean January —3.5°C, mean July 18°C, annual temperature amplitude over 20°C; mean annual precipitation 650—800 mm yr^{-1}; winter usually begins at the end of November and lasts about 100 days, the snow cover being maintained for an average of 80 days. Prevailing winds are westerly.

Geology: the bedrock comprises mainly Upper Jurassic and Cretaceous limestones which are still subject to active karst processes. During the last glaciation, some of the area was overlain by a layer of loess. Pleistocene sands overlie older formations in depressions and river valleys. There are large deposits of coal in the south-west of the region.

Topography: an upland landscape of varied relief; there are swallow-holes, gorges, caves, limestone rocks and areas of a plateau morphology.

Population: average 200—500 people km^{-2}; more than 2000 people km^{-2} in big towns.

Vegetation: the natural vegetation has largely been destroyed. There are small areas of woodland: beech with fir. oak-hornbeam, oak-pine and pine and thickets with *Prunus spinosa* and *Corylus avellana*; a few localities of xerothermic sward communities have been found.

Soils: mainly podzolised loess soils; podzol, pseudopodzol and pseudobrown soils on the sandy formations in river valleys, and anmoor-warp soils on organic substrates; rendzinas occur on limestone outcrops.

Land use: an industrial-agricultural area, with mines and large conurbations. About 25% of the area is wooded. A large part of the region is now under protection as a landscape park. Meadows and pasture are very important in the farming areas. Chief crops: rye, barley, oats, potatoes.

The „Wolbrom" reference site. (Trela 1928; Obidowicz 1976; Latałowa 1976 Latałowa & Nalepka 1987): 19°46'E, 50°23'N, elevation 375 m a.s.l., age range 13 000—5 500 and c. 2 500—2 300 B.P., peat-bog.

The „Wolbrom" site has both positive and negative aspects as a „regional refe-

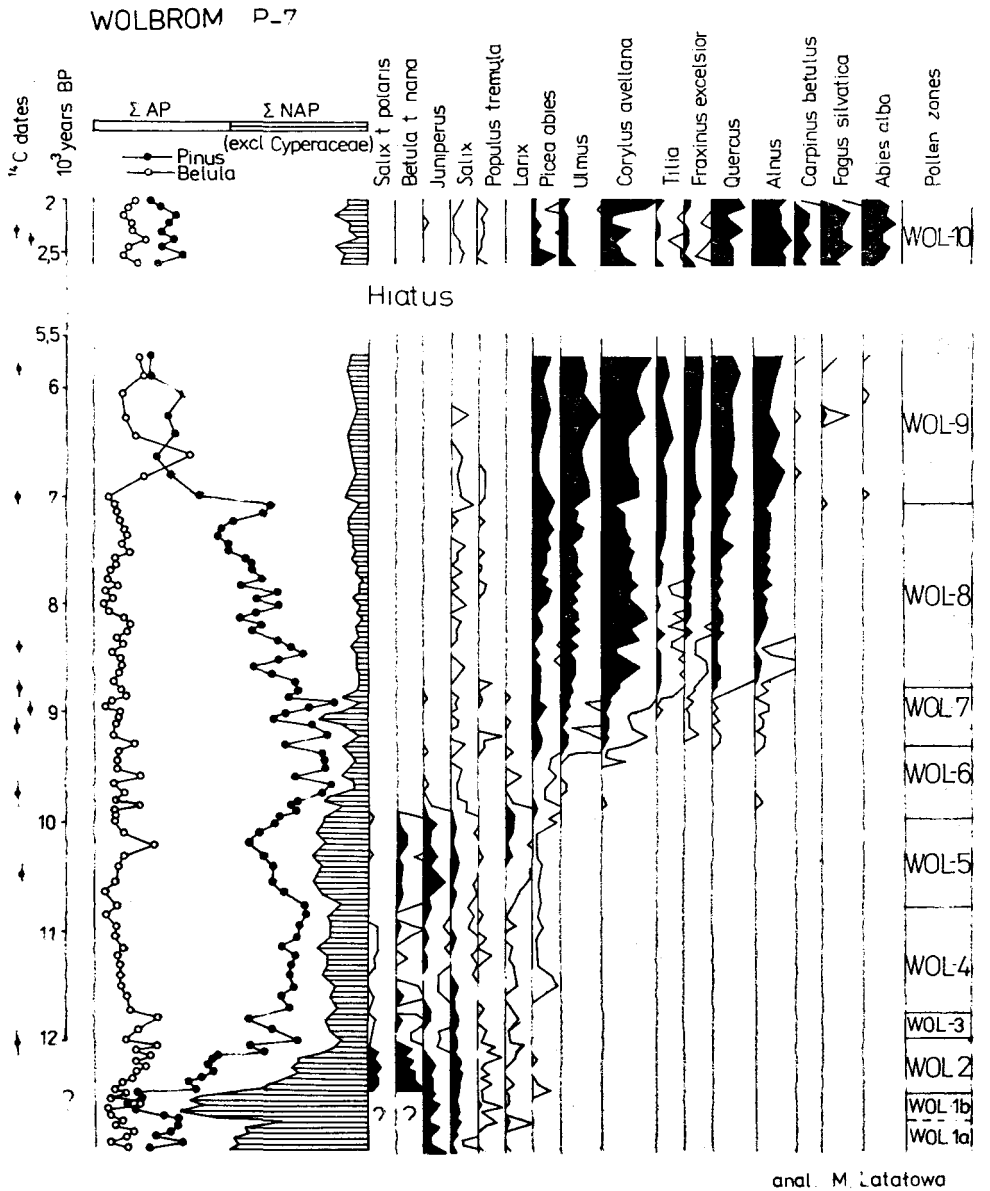

Fig. 1. Compiled pollen diagram from Wolbrom reference site

rence site". The positive ones are: the size of the peat-bog, which guaranties the presence of a „regional pollen rain", three profiles investigated by pollen analysis and 19 radiocarbon datings. The negative features include the disturbance in the accumulation of deposits (the hiatus covering the younger Atlantic period and the Subboreal period), the lack of the top of the profile due to peat cutting and land reclamation, and the high proportion of pollen from herbaceous plants growing in peat-forming communities.

The pollen diagram presented in this synthesis (Fig. 1) has been compiled from the three diagrams WOL. 1, WOL. 2, and WOL. 3 contained in the source paper (Latałowa & Nalepka 1987); sporomorphs of taxa participating in the local communities (including *Cyperaceae*) have been omitted from the (AP+NAP) calculations, which has somewhat altered the shape of the curves in some parts of the diagram.

10 „site pollen assemblage zones" have been compiled from the „local pollen assemblage zones" described in the WOL. 1, WOL. 2 and WOL. 3 diagrams from this locality:

? 13 000 B.P., WOL-1, *Pinus*-NAP paz. The NAP curve generally dominates the AP; heliophytes are abundant; upper boundary — NAP decreasing and *Pinus* increasing.

13 000—12 000 B.P., WOL-2, *Pinus-Betula*-NAP paz. *Pinus* and *Betula* curves rising, high value of heliophytes remains, upper boundary — *Pinus* curve declining, an increase in NAP.

12 000—11 800 B.P., WOL-3, *Betula-Juniperus* paz. *Pinus* rapidly decreasing, whereas *Betula* is rising; a *Juniperus* peak appears; upper boundary — an increase in the *Pinus* curve, NAP decreasing.

11 800—10 800 B.P., WOL-4, *Pinus-Betula* paz. High level of the *Pinus* pollen curve; *Juniperus*, *Salix* and other heliophytes decreasing; upper boundary — a decrease in *Pinus* and an increase in NAP (heliophytes).

10 800— 10 000 B.P., WOL-5, *Betula-Larix-Juniperus-Artemisia* paz. Decline in the *Pinus* curve, increase in *Betula* and total NAP; culmination of *Larix*, *Juniperus*, *Betula nana*, *Artemisia*; upper boundary — *Pinus* curve increasing but NAP and heliophytes decreasing.

10 000— 9 300 B.P., WOL-6, *Pinus-Betula-Filipendula-Polypodiaceae* paz. *Pinus* increasing, *Picea* curve gradually rising, NAP (heliophytes in particular) falling, at first *Filipendula*, then *Polypodiaceae* abundant; upper boundary — *Picea*, *Ulmus*, *Corylus* exceed 1 %.

9 300— 8 800 B.P., WOL-7, *Pinus-Picea-Ulmus-Corylus* paz. *Pinus* dominant, curves of *Picea*, *Ulmus*, *Corylus* rising; upper boundary — *Tilia*, *Quercus*, *Alnus* exceed 1 %.

8 800— 7 000 B.P., WOL-8, *Corylus-Quercus-Tilia-Alnus* paz. *Pinus* curve gradually declining, curves of other trees increasing; *Tilia*, *Fraxinus*, *Quercus*, *Alnus* begin to be important; upper boundary — sharp decline of *Pinus* curve, increase of *Alnus*, *Corylus*, *Ulmus*, *Quercus*, *Fraxinus*.

7 000— ? WOL-9, *Ulmus-Fraxinus-Corylus-Sphagnum* paz. Decline of the *Pinus* curve, culmination of *Picea*, *Ulmus*, *Corylus*, *Tilia*, *Fraxinus*, *Quercus;* upper boundary — artificial — not defined.

^{14}C dates: WOL-10, *Carpinus-Fagus-Abies-Sphagnum* paz.

2 420±70, 2 300±70 Pollen of *Carpinus*, *Fagus*, *Abies* is abundant; *Cerealia* and culture indicators present; no lower or upper boundaries can be determined.

General patterns (Figs. 1, 2):

1. The Wolbrom diagrams illustrate the changes in the vegetation during the Late Glacial:
   — in the Oldest Dryas, the vegetation consisted of treeless tundra;
   — the expansion of birch at the start of the Bölling (s. str.) was followed by development of woodland with a high proportion of pine;

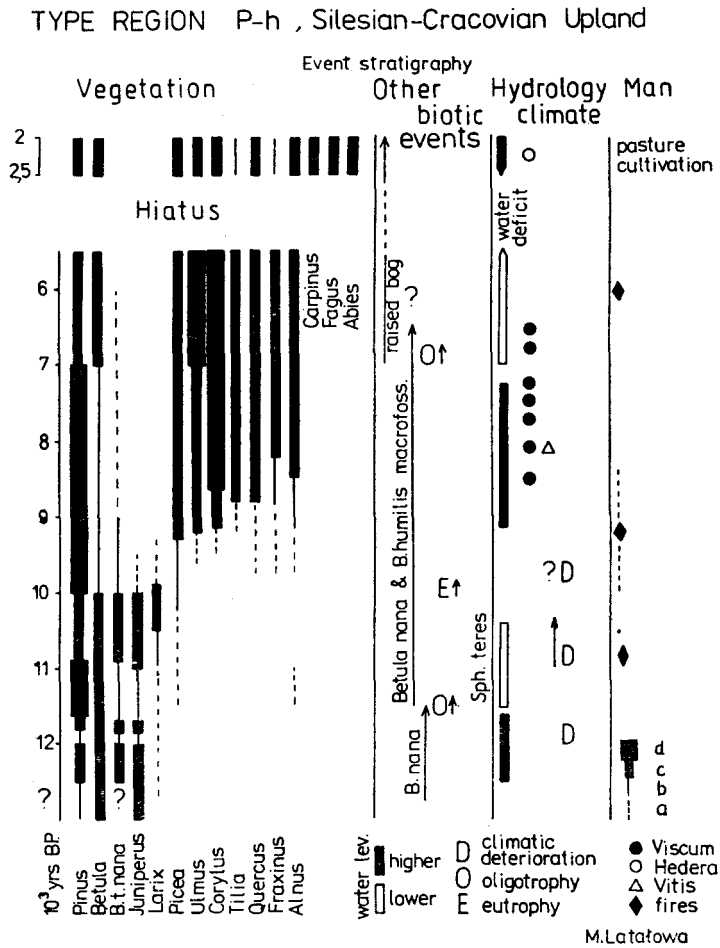

Fig. 2. Table „event stratigraphy". Vegetation — spread of trees and some of shrubs: a — presence hypothetical or slight, b — present, c — expansion or important part, d — common

— in the Older Dryas there was probably a short-lived opening up of the woodland vegetation and a slight expansion of juniper;
— in the Alleröd birch-pine and than pine woods became widespread; *Picea* and *Alnus* probably appeared;
— in this region, the Younger Dryas was the coldest period of the Late Glacial; woodland became more open, and larch became as important as birch and pine; communities with *Juniperus* and *Artemisia* again expanded.

2. Data on the development of the vegetation in the Preboreal, Boreal, Older Atlantic and Subatlantic periods show:
— c. 10 000 B.P., the heliophilous communities were superseded by pine woods with birch; spruce was gradually becoming more important, larch was present;
— c. 9 300 B.P. spruce, elm and hazel (9 200—9 100) were expanding rapidly in woodland;
— from c. 8 800 B.P. the proportion of pine gradually declined and deciduous woodland communities increased in importance; lime, ash, oak and alder were expanding;

— the importance of woodland communities with pine decreased c. 7000 B.P.;
— during the initial phase of the Subatlantic period (2 420±70 and 2 300±70 B.P.) *Carpinus*, *Fagus* and *Abies* formed close-conopied woodland phytocenoses.

3. Indisputable traces of human activities are present only in the topmost part of the diagram and are associated with the Iron Age. The noumerous fragments of burnt plant remains found in the profiles are probably traces of presence of Palaeolithic and Mesolithic man.
4. Local hydrological changes:
   — there were low-water phases on the peat-bog during the Alleröd, Younger Atlantic and Subboreal periods probably because of intensified river capture;
   — the influence of moving-waters on the peat-bog vegetation is seen at the start of the Holocene, despite the water level remains low.

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