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TYPE REGION P-u: BALTIC SHORE

The south Baltic shore (Pu) contains three landscape elements: ground-morainic plateau as flat or slightly undulated Pleistocene upland, sandy areas mainly covered with coastal dunes and valleys of different origin filled mostly by peats. The northern edge of Pleistocene uplands are often formed in a steep cliff-wall with a narrow shore. The morainic forms cover brown soils, partly leached and acidic. On the cliff-slopes are sometime regosols. Poor sandy areas are characterized by podsolic soils and podsols.

The sea shore reference area lies in a subatlantic climate distinctly modified by the influences of the Baltic Sea. The average annual temperature range between 8.7°C on the west to 7.5°C on the eastern part. The annual precipitation is ca. 700 mm with a maximum during a summer.

The recent vegetation including floristic elements containes numerous plants of euand subatlantic distribution. Among forest communities the most important belongs to *Empetro nigri-Pinetum*, divited into four subassociations. The remnants of deciduous forests are comprised for the most part of beech.

Reference site „Niechorze" (Ralska-Jasiewiczowa & Rzętkowska 1987): 15°03′E, 54°0′N elevation 5 m a.s.l., age range ca. 12000-ca. 9000 B.P., fossil lake.

Pollen, plants macrofossils, Diatoms, Cladocera were analysed. Material for study was taken from the sea cliff. Results of C^{14} dating are not univocal, hance the limits of particular levels and chronostratygraphy of this profile cannot be described:

N-I bis-1, *Hippophaë-Salix* paz
(C^{14} dating: 12010±150
12150±100
11980±180
11880±110)
N-I bis-2, *Betula nana-Gramineae* paz
N-I bis-3, *Artemisia-Chenopodiaceae* paz
N-I bis-4, *Juniperus* paz
N-I bis-5, *Filipendula-Umbelliferae* paz
N-I bis-6, *Pinus-Filipendula Equisetum* paz
N-I bis-7, *Betula nana-Empetrum* paz
N-I bis-8, *Pinus-Polypodiaceae* paz

Reference site „Żarnowiec peat-bog" (Latałowa 1982a, b) (Fig. 1): 18°7′N, 54°43′E, elevation c. 5 m a.s.l., age range 11000—1500 B.P., peat-bog.

The peat-bog is situated in a glacial channel of Żarnowieckie Lake surrounded by high hills, attaining 100 m a.s.l. Accumulation of sediments within the core has relatively equal rate, thus the dating of particular parts of the profile is reliable. Negative feature of palinological material is the poor state of preservation of sporomorphs and probability of selective decomposition. The whole deposit was built almost only by rushes assemblages.

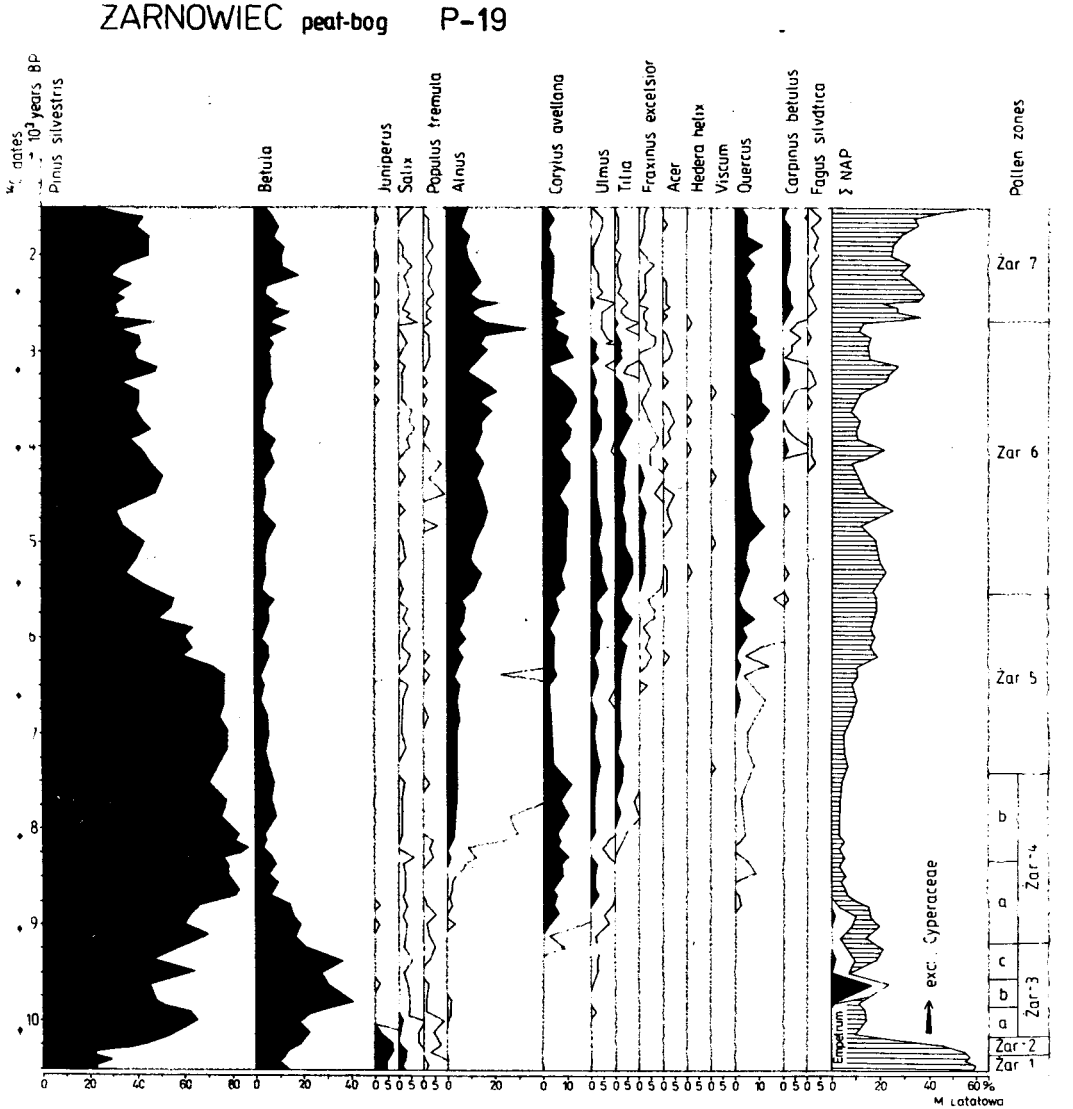

Fig. 1

7 „site pollen assemblage zones" with 5 subzones have been described:

Żar-1, ? — c. 10300 B.P., *Pinus-Juniperus*-herbs paz
Żar-2, c. 10300—10000 B.P., *Juniperus-Pinus-Betula* paz
Żar-3, 10000— 9100 B.P., *Pinus-Betula* paz
Żar-3a, 10000— 9800 B.P., *Pinus-Betula-Filipendula* pasz
Żar-3b, 9800— 9560 B.P., *Betula-Empetrum* pasz
Żar-3c, 9560— 9100 B.P., *Pinus* pasz
Żar-4, 9100— 7400 B.P., *Corylus-Pinus* paz
Żar-4a, 9100— 8340 B.P., *Corylus* pasz
Żar-4b, 8340— 7400 B.P., *Corylus-Alnus* pasz
Żar-5 7400— 5580 B.P., *Tilia-Ulmus-Pinus* paz
Żar-6, 5580— 2740 B.P., *Quercus-Corylus* paz

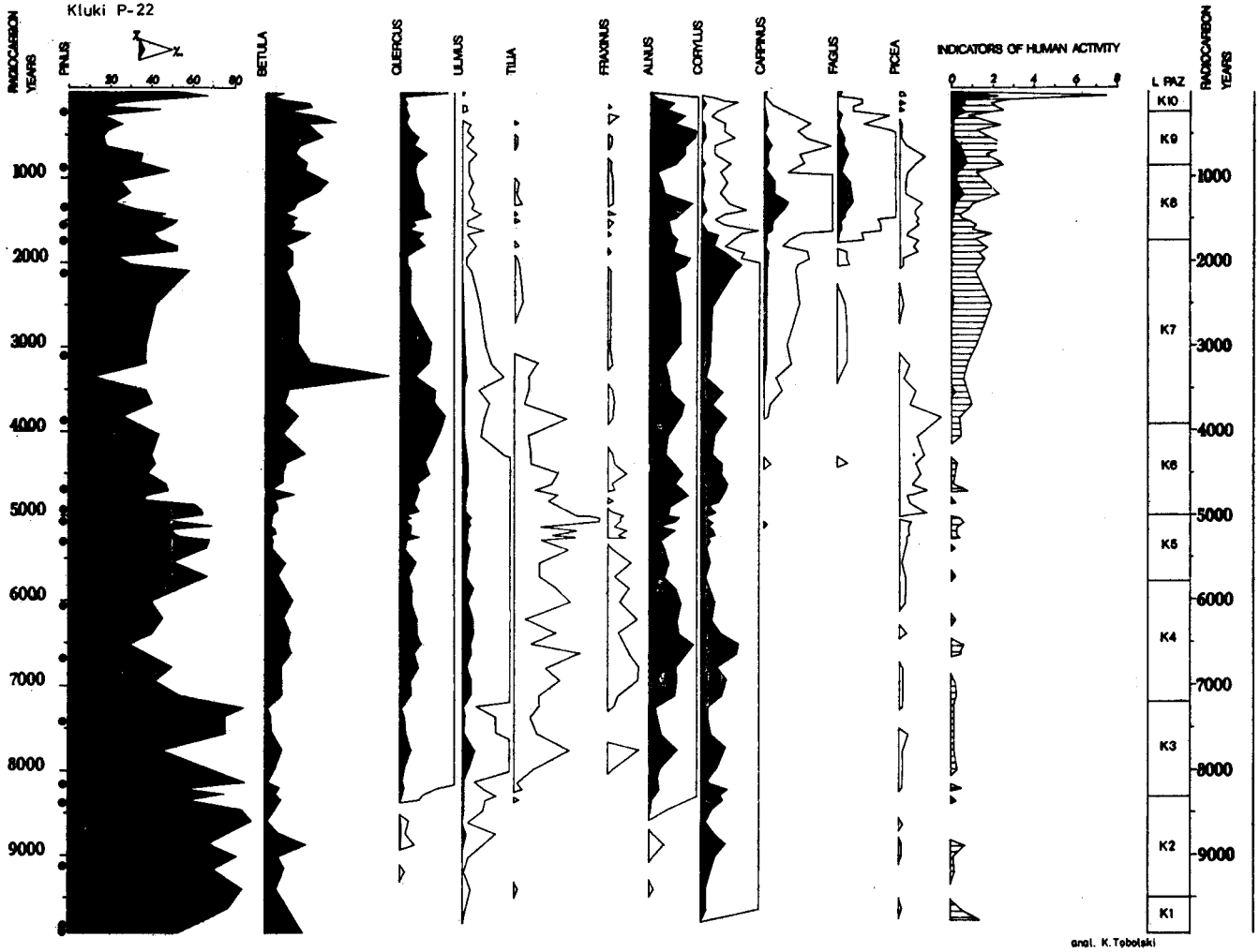

Fig. 2. Kluki. Simplified pollen diagram (anal. K. Tobolski)

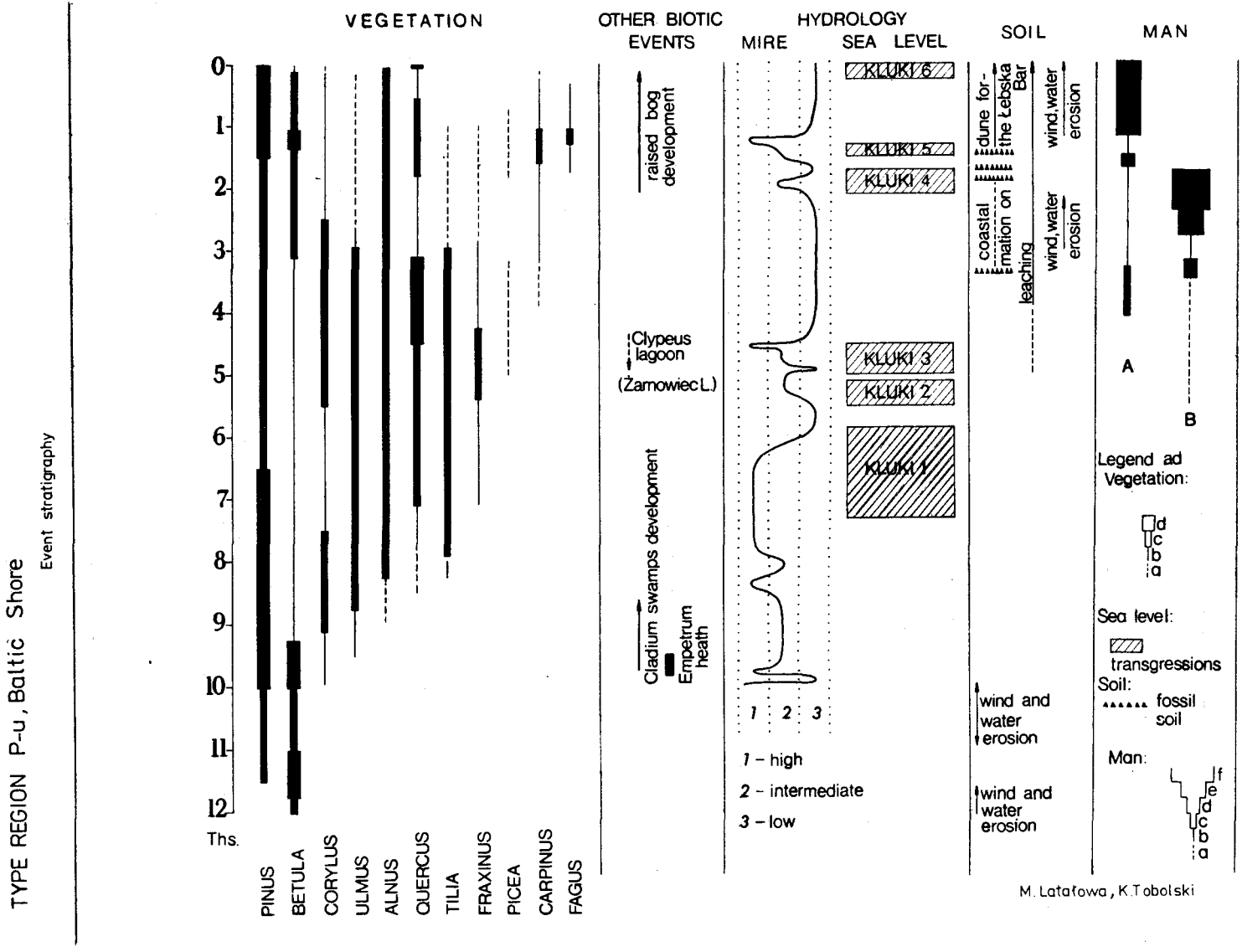

Fig. 3. Correlation table. Vegetation: a — hypothetical or slight, b — present, c — common, d — abundant; man: a — hypothetical or slight, b—f — different stages of activity

Żar-7, 2740—? *Quercus-Carpinus* paz

Reference site P-22 — „Kluki" (Tobolski 1982, 1987) (Fig. 2): 17°19'E, 54°40'N, 2,1 m a.s.l., age range c. 10000—0 B.P. Mire complex on the west and south-west shore of Łebsko Lake.

The following local pollen assemblage zones have been recognized:

K-1, c. 10000—9570 B.P., *Betula-Pinus* paz
K-2, 9570—8320 B.P., *Pinus-Corylus* paz
K-3, 8320—7200 B.P., *Pinus-Ulmus* paz
K-4, 7200—5790 B.P., *Alnus-Cladium* paz
K-5, 5790—5010 B.P., *Thelypteris* paz
K-6, 5010—3920 B.P., *Quercus-Corylus* paz
K-7, 3920—1750 B.P., *Carpinus* paz
K-8, 1750— 865 B.P., *Fagus* paz
K-9, 865— 230 B.P., *Alnus-Sphagnum* paz
K-10,$_2$ 230— 0 B.P., *Pinus-Cerealia* paz

General patterns of the vegetational history (Fig. 3):

Late Glacial

The oldest late glacial sediments are pre-Alleröd age and contain elements of shrub and dwarf-shrub tundra. The forest cover started at the beginning of Alleröd. Well developed younger Dryas sediments contain many species characteristic of „dryas floras" i. e. *Dryas octopetala*, *Betula nana*, *Arctostaphylos alpina*, and are characterized by low percentage values of *Juniperus* pollen and the presence of *Empetrum* remnants.

Holocene

A cold climatic oscillation was recognized in Preboreal period (Youngest Dryas) which caused development of *Empetrum* heath. Throughout the Holocene, the share of pine was substantial, whilst that of deciduous trees was not so significant. Rushes with *Cladium mariscus* were widely distributed plant communities in river valleys and lake channels in the period from 9000—2400 B.P. Most of raised bogs appeared on the turn of Subboreal period.

Anthropogenic changes: in a coastal region prehistoric settlement was differentiated; this being confirmed by distinct differences in pollen diagrams. There was relatively low intensity of settlement in the vicinity of „Kluki" site where the earliest traces were noted about 4100 B.P. and increase of anthropogenic intensity was not before about 1200 B.P. First traces of settlement in the region of Żarnowieckie Lake however, came from early Neolithic (5500 B.P.). At the time of Pomorska culture, strong anthropopression was found, which caused complete destruction of forests in more fertile stands. On the whole area cultivation of cereals was of importance only in the early Middle Ages.

Hydrological changes: the hydrology of the littorial zone was always connected with the influence of the Baltic Sea. A distinct drop in the water level was noted in the early Holocene, and since the middle Atlantic period well marked increase of sea level was present. Littorial and post- littorial transgression stages, found on the Gardno-Łeba plain, showed clear concurrence with fluctuations in the water lever in the „Kluki" bog. Traces of littorial transgression in the shape of Clypeus laggoon contain sediments of Żarnowieckie Lake and some coastal lakes.

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