ANDRZEJ ŚRODOŃ

VITIS SILVESTRIS GMEL. IN THE INTERGLACIAL FLORA AT SUSZNO ON THE RIVER BUG (EAST POLAND)

Vitis silvestris Gmel. we florze interglacjalnej w Susznie nad Bugiem

INTRODUCTION

In 1957 J. Trembaczowski described an interesting profile of the Pleistocene deposits found at Suszno, a locality about 2 km north of Włodawa (Fig. 1). In this profile Trembaczowski distinguished interglacial peat and deposits overlying it estimated as glacial residua. Later investigations at the site carried out by Mojski and Trembaczowski (1961) led to a closer dating of the above-mentioned deposits. The topmost deposits were regarded as coming from the Middle Polish Glaciation (Saalian) and the peat from the decline of the Interglacial preceding it. An analogous stratigraphical estimate was adopted by Stachurska (1961), the author of a palaeobotanic study of the Suszno profile. The results of these investigations have, however, provided unconvincing premisses for the dating of the above-mentioned deposits on the basis of palaeobotany.

POLLEN ANALYSIS AND MACROSCOPIC PLANT REMAINS[1]

Quaternary deposits are exposed at Suszno for a distance of about 200 m in the left bank of the river Bug which is 9 m high on the average. In Profile 4, the most complete of those described by Mojski and Trembaczowski (1961), there occurs the following succession of leading layers: below the soil (0·0—1·1 m) and the sands (1·1—2·1 m) are

[1] In 1963, thanks to the kindness of Dr. J. E. Mojski from the Institute of Geology in Warsaw, I had the opportunity of visiting the interglacial site at Suszno. The text of the present paper is based on the material then collected.

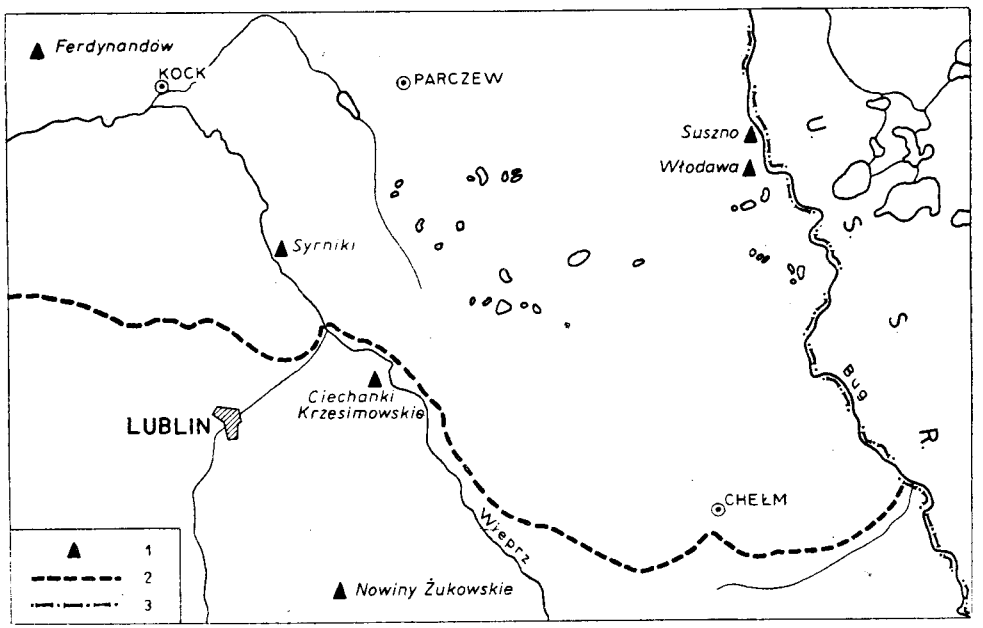


Fig. 1. Map showing the localities of interglacial deposits (Masovian, Holsteinian) in the Lublin—Włodawa area:

1 — localities of interglacial deposits, 2 — limit of the Middle Polish Glaciation (acc. Jahn 1956), 3 — the border of Poland.

Fig. 1. Mapa rozmieszczenia stanowisk osadów interglacjalnych (Masovian, Holsteinian) na obszarze Lublin—Włodawa:

1 — stanowiska osadów interglacjalnych, 2 — południowa granica środkowopolskiego zlodowacenia (wg Jahna, 1956), 3 — granica Polski

found grey-green muds devoid of macroscopic plant remains (2·1—4·0 m); then come dark grey muds with an admixture of plant remains and lenses of sand (4·0—7·0 m), dark-brown, strongly compressed peat (7·0—8·4 m), and finally sands with small crystallic gravels and flints (8·4—9·1).

At the place shown to me by Dr. J. E. Mojski, from where the material studied by Stachurska (l.c.) came, I took four samples for pollen analysis and a lump of peat about 18 dcm^3 for macroscopic analysis. The three samples for microscopic studies came from the peat lying at points 10, 35 and 85 centimetres from the border of the peat with the sand layer underlying it. The fourth sample represented the overlaid mud at a point about 160 cm from the border of the sand and peat. The peat for macroscopic studies came from the bottom section of the peat layer bordering on the sand.

Macroscopic analysis. The dark brown, almost black, well humified and strongly compressed peat contained a considerable amount

of wood fragments (mainly of deciduous trees) and many fruits and seeds. Some 500 macroscopic plant remains were extracted and identified, among them the seeds of the yew (*Taxus baccata*) and the wild vine (*Vitis silvestris*).

The following is a list of the identified plants:

Abies alba Mill.	— 1/2 needle
Alnus glutinosa (L.) Gaertn.	— 37 fruits, 1 fruit scale, 1 cone axis and 1 wood fragment [1]
Cerasus avium (L.) Moench.	— 3 fruit-stones
Salix sp.	— 23 wood fragments
Rubus idaeus L.	— 15 fruit-stones
R. cf. *plicatus* W. et N.	— 13 fruit-stones
Sambucus ebulus L.	— 9 seeds
S. racemosa L.	— 3 seeds
Taxus baccata L.	— 6 seeds
Vitis silvestris Gmel.	— 4 seeds
Carex sp. div.	— 106 fruits
Mentha cf. *aquatica* L.	— 1 fruit
Nymphaea candida Presl.	— 1 seed
Ranunculus lingua L.	— 2 fruits
Rumex cf. *hydrolapathum* Huds.	— 1 fruit
Solanum dulcamara L.	— 8 seeds
Typha sp.	— 4 seeds
Urtica dioica L.	— 262 fruits
Amblystegium riparium (Hedw.) Br. eur. [2]	
Campylium sp. (*polygamum* or *elodes*)	

Microscopic analysis of the peat and overlaid muds. Pollen analysis of the four samples whose location in the profile was described above was carried out by Dr. J. Oszast. The results obtained are assembled in the table of the absolute amounts of found sporomorphs (Table 1) and in the pollen diagram (Fig. 2). In this diagram the total absence of the pollen of exotic trees is striking. This fact is stressed because in the whole pollen diagram worked out by Stachurska there occur small amounts of the pollen of exotic trees (*Keteleeria, Pterocarya, Carya, Juglans*) to which the author ascribes stratigraphical significance. The composition of the vegetation represented by the diagram from Suszno does not, in my opinion, permit of such an interpretation. The pollen of exotic trees does undoubtedly occur here in the secondary bed and the probable source of this contamination are Neogene loams and sands with brown coal underlying the quaternary deposits in this area (cf. Trembaczowski 1963, p. 140—141).

[1] Wood fragments were identified by Mrs. B. Pawlikowa.

[2] The mosses were identified by Prof. B. Szafran.

Table 1

ABSOLUTE NUMBERS OF THE GRAINS OF THE POLLEN AND SPORES DETERMINED IN THE FOUR SAMPLES OF THE DEPOSIT FROM SUSZNO

Tabela 1

Ilości bezwzględne ziarn pyłku i spor stwierdzonych w czterech próbach osadu z Suszna

	1	2	3	4
Pinus	255	218	160	153
Picea	5	15	10	3
Abies	52	9	3	1
Betula	9	38	19	165
Salix	4	1	4	7
Alnus	52	71	7	6
Carpinus	6	10	—	—
Corylus	9	12	—	1
Quercus	1	11	—	—
Tilia	1	4	1	1
Ulmus	3	2	—	—
Artemisia	—	1	5	58
Caryophyllaceae	—	—	1	6
Centaurea	—	—	1	2
Chenopodiaceae	—	1	1	2
Compositae	5	—	1	5
Cruciferae	—	2	—	—
Cyperaceae	—	32	5	2
Epilobium	—	—	1	—
Equisetum	1	1	—	—
Ericaceae	1	—	1	1
Gentiana	—	—	—	2
Gramineae	—	15	5	19
Lycopodium	—	1	1	—
Polygonum	—	—	—	1
Polypodiaceae	227	534	19	32
Potamogeton	—	5	—	—
cf. *Potentilla*	—	1	—	—
Ranunculaceae	10	1	—	3
Rubiaceae	1	1	—	—
Thalictrum	—	—	—	3
Typha	2	—	—	—
Umbelliferae	—	2	1	2
Varia	5	6	2	1
Sphagnum	—	50	34	20
Pediastrum	—	—	14	208

THE AGE OF THE DEPOSIT

According to Mojski and Trembaczowski (1961) the peat and overlaid muds came into being at the end of the Masovian Interglacial (Holsteinian) and the beginning of the Middle Polish Glaciation (Sa-

alian). Fundamentally, this estimate does not conflict with the results of palaeobotanical investigations (S t a c h u r s k a 1961) indicating a cool climate in the whole profile. What is incomprehensible in S t a c h u r s k a's diagram (l. c.), however, is the course of the pollen curves of *Alnus* and *Corylus* indicating that a climate favourable to trees with higher climatic requirements prevailed at the top and not at the bottom of the profile.

The pollen analysis of the four samples provides data which seem to show that at Suszno we are indeed dealing — in accordance with the geologist's opinion — with deposits which came into being at the end of the Masovian Interglacial. A proof of this is the relatively large percentage of fir pollen (max. 13·1 per cent) and the presence of this tree among macroscopic remains. The fir occurring in such considerable amounts in an interglacial deposit lying near the eastern border of Poland in principle eliminates the Eemian Interglacial (cf. Ś r o d o ń and G o ł ą b o w a 1956). The dominance of the pine, large quantities of spruce and the increasing share of the birch with a simultaneous decline of deciduous thermophilous trees is also in accordance with the composition of vegetation known as characteristic during the decline of the optimal phase of the

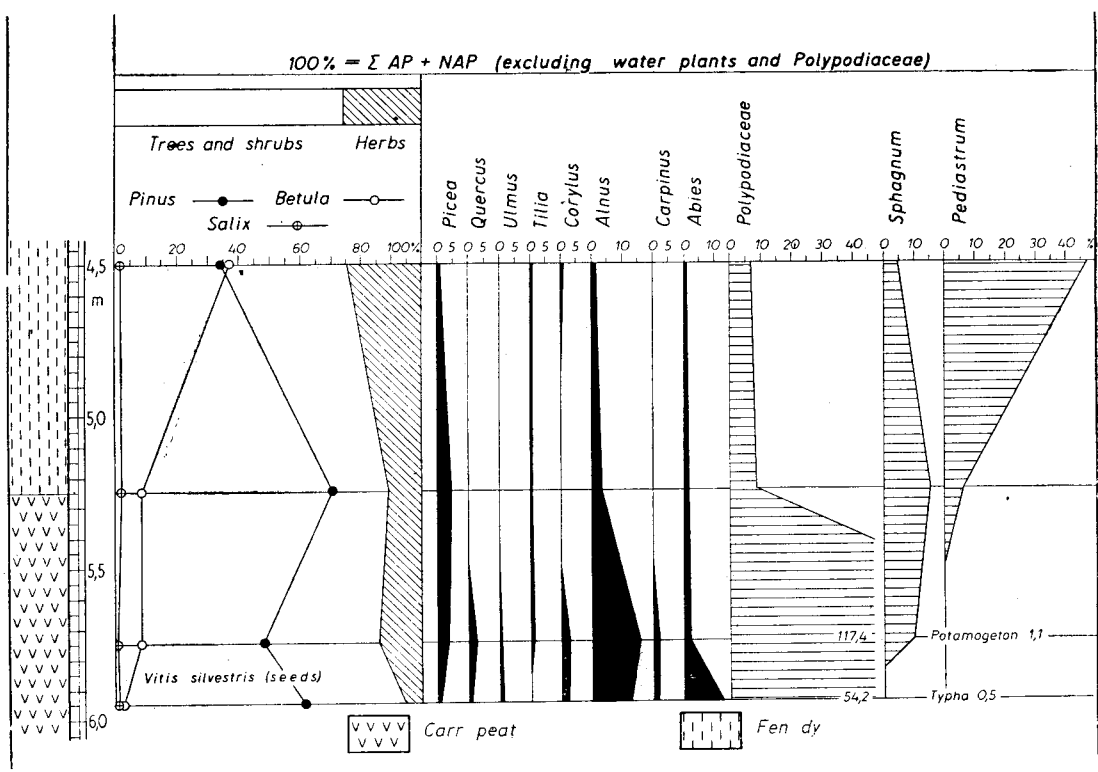


Fig. 2. Suszno. Pollen diagram including the layer of peat with *Vitis silvestris*.
Fig. 2. Suszno. Diagram pyłkowy obejmujący warstwę torfu z *Vitis silvestris*

Masovian Interglacial. This is easily confirmed by the study and comparison of the pollen diagrams of the deposits from that period obtained at the sites at Nowiny Żukowskie (Dyakowska 1952), Ciechanki Krzesimowskie (Brem 1953) and Syrniki (Sobolewska 1956a), all in the western vicinity of Suszno. The discovery of the seeds of *Vitis silvestris* in the peat from Suszno is of considerable stratigraphical significance. In the Quaternary deposits of Poland this plant has so far been found only in the Masovian Interglacial sediments of the Wieprz valley at the sites in Syrniki (Sobolewska 1954, 1956a) and Ciechanki Krzesimowskie (Brem 1953). The wild vine, together with *Pterocarya fraxinifolia and Azolla filiculoides,* is reckoned among the plants distinguishing that Interglacial from the Eemian one (Środoń 1962).

The pollen spectrum of the fourth sample no longer contains even traces of thermophilous trees but is characterized by an increasing share of the pollen of birch, willow and herbaceous plants, especially *Artemisia* and *Gramineae.* This spectrum represents a totally different vegetation reminiscent, as regards its composition, of communities of park tundra. From the stratigraphical point of view this tundra already belongs to the early phase of the Middle Polish Glaciation.

VEGETATION CHARACTERISTICS

Pleistocene seeds of the vine are known in Poland from the sites in the neighbouring valleys of the Bug and Wieprz and from sediments of the same age and the same declining forest phase. These sediments were investigated by means of pollen analysis and the macroscopic analysis of plant remains. The results obtained enable an opinion to be formed as to the type of forest in which, probably for the last time in Poland, the wild vine was found. For this purpose the results obtained by means of pollen analysis have been presented uniformly in the form of pollen diagrams of Ciechanki Krzesimowskie, Syrniki, and Suszno, which included those profile sections where the seeds of *Vitis* were found (Figs. 2, 3 and 4). In addition, a list of the plants identified on the basis of macroscopic plant remains extracted from the sediments included in these diagrams was made (Table 2). The forest community with the vine contained also the ivy (Syrniki) and probably *Pterocarya fraxinifolia* and *Ilex aquifolium.* The pollen of these last two trees has already been noted several times in deposits of the Masovian Interglacial and, almost as a rule, in the fir-hornbeam phase (Środoń 1955, 1957; Stachurska 1955, 1957; Sobolewska 1952, 1956b; Jurkiewiczowa and Mamakowa 1960; Janczyk-Kopikowa 1963).

The pollen diagrams and plants listed in Table 2 represent together not one but several communities of varied requirements. On the youngest, low and fertile terraces there grew a forest with *Vitis* whose composition

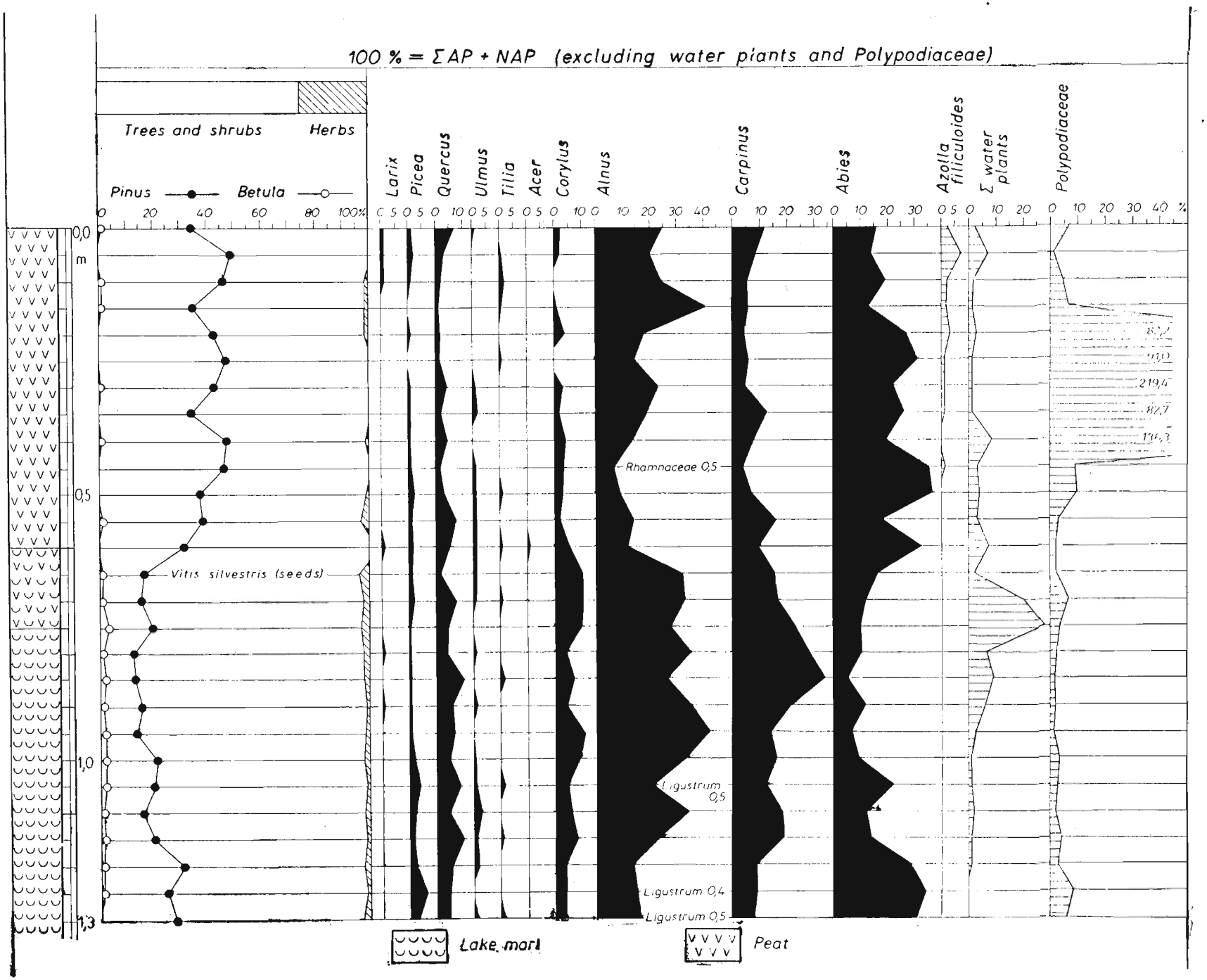


Fig. 3. Syrniki — Exposure II (Sobolewska 1956a). Pollen diagram including the layer of peat with *Vitis silvestris*.

Fig. 3. Syrniki — odkrywka II (Sobolewska 1956 a). Diagram pyłkowy obejmujący warstwę z *Vitis silvestris*

is reminiscent of the contemporary associations of the class *Alnetea glutinosae*. Among the trees, apart from *Alnus glutinosa*, an important part was played by willows (numerous wood fragments in the Suszno sediment), shade loving yew, spruce and several other species of trees and shrubs identified on the basis of preserved macroscopic remains. Among herbaceous plants at Suszno, numerous fruits of *Urtica dioica* and seeds

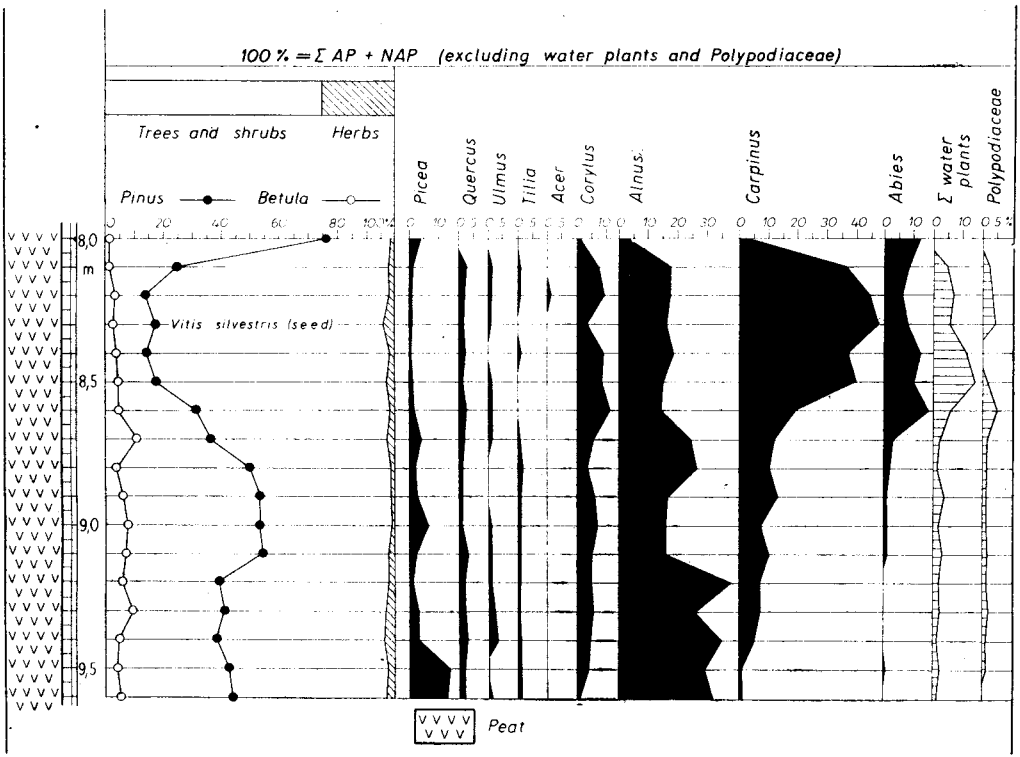


Fig. 4. Ciechanki Krzesimowskie (B r e m 1953). A section of the pollen diagram including the layer of peat with *Vitis silvestris*.

Fig. 4. Ciechanki Krzesimowskie (Brem 1953). Odcinek diagramu pyłkowego obejmujący warstwę torfu z *Vitis silvestris*

of *Solanum dulcamara* are worthy of mention, both species reaching a high degree of constancy in the composition of this type of vegetation. While the Bug was at flood level the forest at the Suszno site was periodically inundated as evidenced by layers of fine sand occurring in the peat (T r e m b a c z o w s k i 1957, p. 352).

The long list of aquatic plants indicates that the forest with *Vitis* was in the immediate neighbourhood of an open pool (an abandoned meander) dominated by the communities of the class *Potametea*. A feature of them were *Azolla filiculoides* and *Brasenia Schreberi*, plants which have no natural habitats in Europe today. The littoral swamp communities of the

Table 2

THE LIST OF PLANTS IDENTIFIED ON THE BASIS OF PRESERVED MACROSCOPIC PLANT REMAINS IN INTERGLACIAL DEPOSITS CONTAINING THE SEEDS OF *VITIS SILVESTRIS*. ONLY THOSE PLANTS ARE MENTIONED WHOSE REMAINS WERE EXTRACTED FROM THE PROFILE SECTIONS INCLUDED IN THE POLLEN DIAGRAMS (FIGS. 2, 3 AND 4)

Tabela 2

Lista roślin stwierdzonych na podstawie zachowanych szczątków makroskopowych w osadach interglacjalnych zawierających nasiona *Vitis silvestris*. Wymienione są tylko te rośliny których szczątki zostały wydobyte z odcinków profili objętych diagramami pyłkowymi (fig. 2, 3 i 4)

	Ciechanki Krzesimowskie (Brem 1953)	Syrniki (Sobolewska 1956)	Suszno (Stachurska 1961) —(+) completed —(++)
Abies alba	+		++
Juniperus sp.			+
Larix sp.	+		+
Picea excelsa	+		+
P. omorikoides	+		
Pinus sp.			+
Taxus baccata	+		++
Alnus glutinosa			++
Alnus sp.		+	++
Betula „alba"	+		+
Carpinus betulus	+	+	
Cerasus avium			++
Cornus sanguinea			++
Padus avium	+		
Rubus idaeus	+	+	++
R. cf. *plicatus*			++
Salix sp.			++
Sambucus ebulus			++
S. racemosa			++
Aldrovanda vesiculosa	+		
Azolla filiculoides		+	
Batrachium sp. div.	+		+
Brasenia Schreberi	+		
Carex sp. div.	+	+	+
Caryophyllaceae			+
Ceratophyllum demersum	+		+
C. submersum	+		
Galium sp.			+
Hippuris vulgaris			+
Mentha cf. *aquatica*			++
Menyanthes trifoliata	+		+
Myriophyllum alterniflorum	+		
M. spicatum	+		
Myriophyllum sp.			+
Najas marina	+	+	+
N. flexilis	+		+

	Ciechanki Krzesimowskie (Brem 1953)	Syrniki (Sobolewska 1956)	Suszno (Stachurska 1961)—(+) completed —(++)
N. minor	+		
Nuphar luteum	+	+	
N. pumilum	+		
Nymphaea candida	+	+	+ +
Potamogeton alpinus			+
P. filiformis			+
P. fluitans			+
P. mucronatus			+
P. praelongus			+
P. pusillus			+
P. rutilus			+
P. vaginatus			+
P. Zizii			+
Potamogeton sp. div.	+	+	
Ranunculus lingua			+ +
Rumex cf. *hydrolapathum*			+ +
R. maritimus	+	+	
Sagittaria sagittifolia	+		
Scirpus lacustris	+		
Scirpus sp.		+	
Solanum dulcamara			+ +
Sparganium sp.			+
Stratiotes aloides	+	+	
Trapa natans	+		
Typha sp.			+ +
Urtica dioica			+ +
Zannichellia palustris			+
Amblystegium riparium			+ +
Calliergon trifarium	+		+
C. stramineum	+		+
Campylium sp.			+ +
Drepanocladus Sendtneri	+		+
D. Sendtneri f. *aristinervis*	+		+

class *Phragmitetea* are represented by *Typha sp., Scirpus lacustris, Sagittaria sagittifolia, Sparganium* sp., *Rumex* cf. *hydrolapathum,* and several others.

Drier sites located nearer the banks of river valleys were probably occupied by the fir with spruce, and higher on older deposits (Cretaceous and Tertiary) and in the moraines left by the Cracovian Glaciation (Elsterian) there grew a hornbeam forest with oak, pine, hazel, and several other forest trees.

The role of alder forest in the forest communities of the Masovian Interglacial was particularly important as evidenced by a high proportion of the pollen of *Alnus* in all the pollen diagrams of that period. This

immense expansion of alders is understandable when one considers that after the recession of the Cracovian Glaciation almost the whole territory of Poland was one vast lake-land favouring the development of alders.

The composition of the discussed plant communities suggests a warm and markedly moist climate of the declining phase of the Masovian Interglacial (cf. Środoń 1957). This is indicated by several aquatic and swamp plants (*Aldrovanda vesiculosa, Azolla filiculoides, Brasenia Schreberi, Trapa natans*), and the presence of trees and shrubs with such high temperature and moisture requirements as *Taxus baccata, Ilex aquifolium, Pterocarya fraxinifolia, Vitis silvestris,* and *Hedera helix.* The remains of these plants discovered in the interglacial sediments on the Wieprz and Bug, thus well beyond their contemporary range, indicate that the influence of the oceanic climate on our country was stronger than it is today and extended farther east into the territories characterized at present by a rather high degree of continentality. It is worth remembering here that proximate changes in the quality of climate occurred also at the end of the Eemian Interglacial.

Institute of Botany, Polish Academy of Sciences, Kraków
Department of Palaeobotany

BIBLIOGRAPHY

Brem M., 1953. Flora interglacjalna z Ciechanek Krzesimowskich (Interglacial flora from Ciechanki Krzesimowskie by Łęczna). Acta Geol. Polon. 3: 475—480.

Dyakowska J., 1952. Roślinność plejstoceńska w Nowinach Żukowskich (Pleistocene flora in Nowiny Żukowskie on the Lublin Upland). Biul. Inst. Geol. 67: 115—181.

Jahn A., 1956. Wyżyna Lubelska. Rzeźba i czwartorzęd (Geomorphology and Quaternary history of Lublin Plateau). Prace Inst. Geogr. PAN nr 7, str. 420.

Janczyk-Kopikowa Z., 1963, Analiza pyłkowa osadów czwartorzędowych z Ferdynandowa (Pollen analysis of the Quaternary deposits from Ferdynandów — NW of Kock). Kwart. Geol. 7: 639—645.

Jurkiewiczowa I., Mamakowa K., 1960, Interglacjał w Sewerynowie koło Przedborza (The Interglacial at Sewerynów near Przedbórz). Biul. Inst. Geol. 150: 71—103.

Mojski J. E., Trembaczowski J., 1961. Przekrój geologiczny utworów czwartorzędowych w Susznie koło Włodawy nad Bugiem (Geologic cross-section of Quaternary deposits at Suszno near Włodawa on the Bug river). Biul. Inst. Geol. 169: 131—153.

Sobolewska M., 1952. Interglacjał w Barkowicach Mokrych pod Sulejowem (Interglacial at Barkowice Mokre near Sulejów). Biul. Państw. Inst. Geol. 66: 245—284.

Sobolewska M., 1954. Dzika winorośl (*Vitis silvestris* Gmel.) w plejstocenie polskim (*Vitis silvestris* Gmel. in the Polish Pleistocene). Biul. Inst. Geol. 69: 159—166.

Sobolewska M., 1956a. Roślinność plejstoceńska z Syrnik nad Wieprzem (Pleistocene vegetation of Syrniki on the river Wieprz). Biul. Inst. Geol. 100: 143—192.

Sobolewska M., 1956b. Wyniki analizy pyłkowej osadów interglacjalnych z Olszewic (Pollen analysis of the Interglacial deposits of Olszewice). Biul. Inst. Geol. 100: 271—289.

Stachurska A., 1955. *Pterocarya* w interglacjale z Włodawy (*Pterocarya* from the Interglacial deposits of Włodawa). Acta Soc. Bot. Polon. 24: 567—569.

Stachurska A., 1957. Roślinność interglacjalna z Włodawy nad Bugiem (Interglacial flora from Włodawa on the Bug river—Lublin Upland). Biul. Inst. Geol. 118: 61—89.

Stachurska A., 1961. Schyłek interglacjału mazowieckiego w Susznie koło Włodawy nad Bugiem w świetle analizy pyłkowej (Decline of the Masovian Interglacial at Suszno near Włodawa on the Bug river in the light of botanical analysis). Biul. Inst. Geol. 169: 155—173.

Środoń A., 1955. *Pterocarya* cf. *fraxinifolia* Spach. w polskim plejstocenie (*Pterocarya* cf. *fraxinofolia*. Spach. in the Polish Pleistocene). Acta Soc. Bot. Pol. 24: 635—637.

Środoń A., Gołąbowa M., 1956. Plejstoceńska flora z Bedlna (Pleistocene flora of Bedlno — central Poland). Biul. Inst. Geol. 100: 7—44.

Środoń A., 1957. Flora interglacjalna z Gościęcina koło Koźna (Interglacial flora from Gościęcin near Koźle — Sudeten Foreland). Biul. Inst. Geol. 118: 7—60.

Środoń A., 1962. O niektórych zagadnieniach dotyczących paleobotaniki i stratygrafii czwartorzędu w Polsce (On some problems of Quaternary palaeobotany and stratigraphy in Poland). Kwart. Geol. 6: 679—694.

Trembaczowski J., 1957. Utwory czwartorzędowe okolic Włodawy (Quaternary formations in the vicinity of Włodawa — eastern Poland). Biul. Inst. Geol. 118: 343—370.

Trembaczowski J., 1963. Stratygrafia utworów czwartorzędowych okolic Włodawy. Polesie Lubelskie, Materiały z sesji nauk. Polsk. Tow. Geogr. Lublin, str. 205.

STRESZCZENIE

VITIS SILVESTRIS GMEL. WE FLORZE INTERGLACJALNEJ W SUSZNIE NAD BUGIEM

Osady interglacjalne, odsłaniające się w Susznie w wysokim brzegu Bugu (fig. 1), były studiowane zarówno pod względem geologicznym (Trembaczowski 1957, 1963; Mojski i Trembaczowski 1961), jak i przy pomocy metod paleobotanicznych (Stachurska 1961). Na podstawie kryteriów głównie geologicznych osady te zostały zaliczone do schyłkowej części interglacjału mazowieckiego oraz do zlodowacenia środkowopolskiego. Ponieważ dotychczasowe wyniki badań paleobotanicznych nie dostarczyły przekonujących dowodów, że w Susznie rzeczywiście mamy do czynienia z interglacjałem mazowieckim, autor przepro-

wadził dodatkowe badania na materiale zebranym osobiście w 1963 roku.

Profil geologiczny osadów w Susznie poosiada następujący układ warstw przewodnich (profil nr 4 według Mojskiego i Trembaczowskiego 1961): pod glebą (0,0—1,1 m) i piaskami (1,1—2,1 m) występują mułki zielonawosiwe pozbawione makroskopowych szczątków roślin (2,1—4,0 m), mułki ciemnoszare z domieszką resztek roślin i soczewkami piasku (4,0—7,0 m), torf brunatnoczarny silnie sprasowany (7,0—8,4 m), piaski szarobrunatne (8,4—8,5 m) i piaski z drobnymi żwirkami krystalicznymi i krzemieniami (8,5—9,1 m).

Do badań makroskopowych pobrano bryłę torfu (18 dcm^3) ze spągowego odcinka warstwy torfu. Próby do analizy pyłkowej pochodzą z torfu w odległości 10, 35 i 85 cm od granicy z podścielającym go piaskiem. Czwarta próba została pobrana z nadległego mułku ciemnoszarego z punktu położonego o 160 cm od granicy piasku z torfem.

Z torfu wydobyto i oznaczono około 500 szczątków makroskopowych roślin, a wśród nich nasiona *Taxus baccata* i *Vitis silvestris*. Lista oznaczonych roślin zestawiona jest na str. 35, a wyniki analizy pyłkowej wykonanej przez dr J. Oszastówną podane są na tab. 1 oraz za pomocą diagramu pyłkowego (fig. 2).

Wyniki analizy pyłkowej dowodzą, że w Susznie rzeczywiście mamy do czynienia ze schyłkiem interglacjału mazowieckiego. Potwierdza to również odkrycie nasion *Vitis silvestris*, rośliny znanej z czwartorzędu Polski tylko ze schyłku tego interglacjału na stanowiskach położonych w sąsiedniej dolinie Wieprza (Sobolewska 1954, 1956a; Brem 1953). Spektrum pyłkowe próby czwartej reprezentuje roślinność przypominającą swym składem zbiorowiska tundry parkowej.

Końcowy ustęp zawiera uwagi o klimacie i niektórych zbiorowiskach roślinnych, jakie występowały na omawianym obszarze u schyłku interglacjału mazowieckiego. Charakterystyka tych zbiorowisk oparta jest na jednolicie zestawionych diagramach pyłkowych z Ciechanek Krzesimowskich, Syrnik i Suszna, obejmujących odcinki profili, w których były znalezione nasiona winorośli dzikiej (fig. 2, 3 i 4). Temu samemu celowi służy lista roślin oznaczonych na podstawie szczątków makroskopowych, które zostały wydobyte z osadów objętych tymi diagramami (tab. 2).

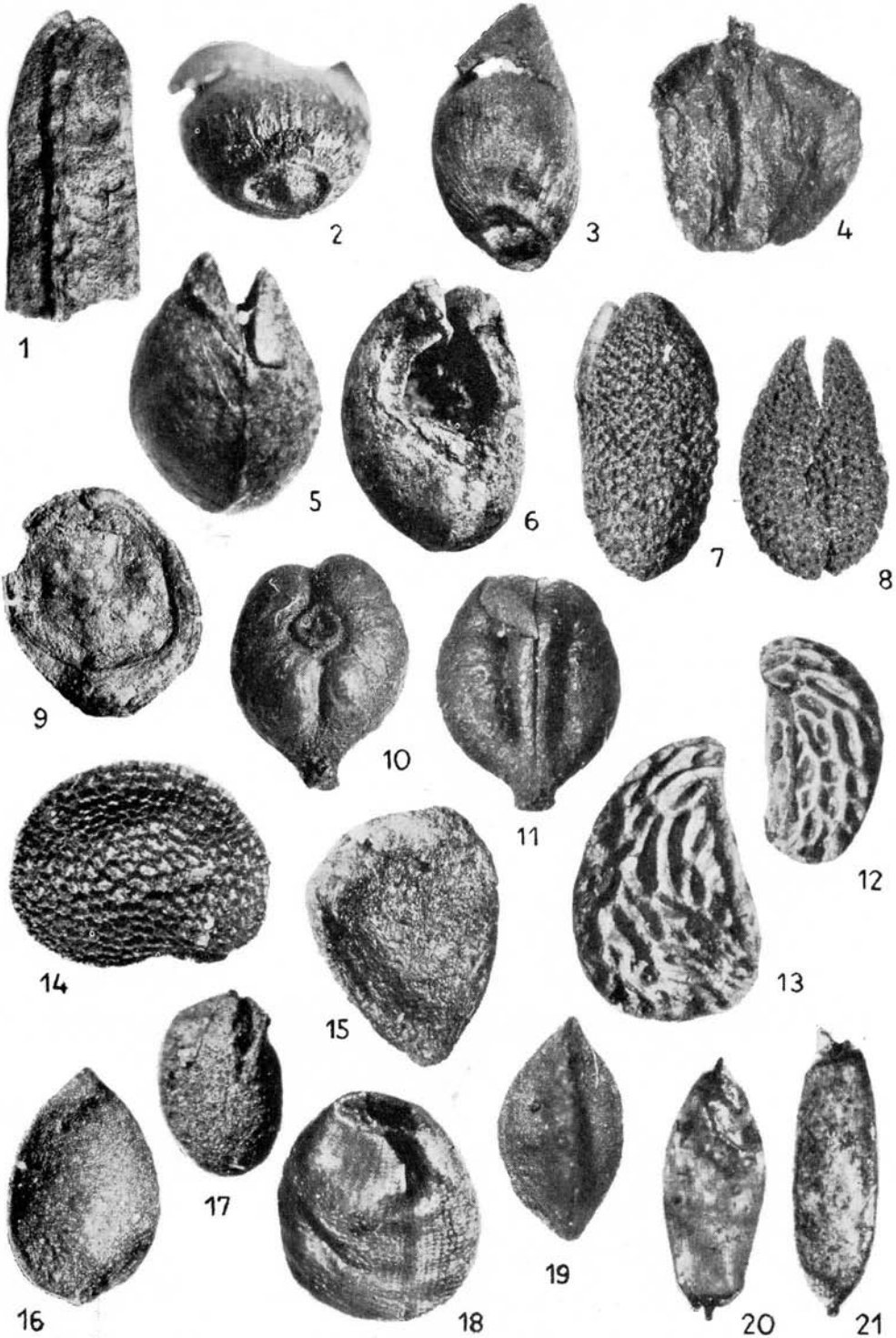
PLATE

Plate I

1. *Abies alba* Mill. — leaf; × 10
2—3. *Taxus baccata* L. — seeds; × 5
4. *Alnus glutinosa* (L.) Gaertn. — fruit; × 15
5—6. *Cerasus avium* (L.) Moench. — fruit-stone; × 5
7. *Sambucus racemosa* L. — seed; × 10
8. *Sambucus ebulus* L. — seed; × 10
9. *Cornus sanguinea* L. — partition-wall of fruit-stone; × 5
10—11. *Vitis silvestris* Gmel. — seeds; × 5
12. *Rubus idaeus* L. — fruit; × 15
13. *Rubus* cf. *plicatus* W. et N. — fruit; × 15
14. *Solanum dulcamara* L. — seed; × 15
15. *Ranunculus lingua* L. — fruit; × 10
16. *Urtica dioica* L. — fruit; × 30
17. *Mentha* cf. *aquatica* L. — fruit; × 30
18. *Nymphaea candida* Presl — seed; × 15
19. *Rumex* cf. *hydrolapathum* Huds. — fruit; × 10
20—21. *Typha* sp. — seeds; × 30

Tablica I

1. *Abies alba* Mill. — liść; × 10
2—3. *Taxus baccata* L. — nasiona; × 5
4. *Alnus glutinosa* (L.) Gaertn. — owoc; × 15
5—6. *Cerasus avium* (L.) Moench. — pestka; × 5
7. *Sambucus racemosa* L. — nasienie; × 10
8. *Sambucus ebulus* L. — nasienie; × 10
9. *Cornus sanguinea* L. — przegroda pestczaka; × 5
10—11. *Vitis silvestris* Gmel. — nasiona; × 5
12. *Rubus idaeus* L. — owoc; × 15
13. *Rubus* cf. *plicatus* W. et N. — owoc; × 15
14. *Solanum dulcamara* L. — nasienie; × 15
15. *Ranunculus lingua* L. — owoc; × 10
16. *Urtica dioica* L. — owoc; × 30
17. *Mentha* cf. *aquatica* L. — owoc; × 30
18. *Nymphaea candida* Presl — nasienie; × 15
19. *Rumex* cf. *hydrolapathum* Huds. — owoc; × 10
20—21. *Typha* sp. — nasiona; × 30



A. Środoń
Acta Palaeobotanica VI/1

Phot. by *S. Łuczko*
Fot. *S. Łuczko*