



CINQUIÈME
EXCURSION PHYTOGÉOGRAPHIQUE INTERNATIONALE
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GUIDE DES EXCURSIONS EN POLOGNE

XVI. PARTIE

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*PLANTGEOGRAPHICAL EXCURSION TO THE PRIMEVAL
FOREST OF BIAŁOWIEŻA*



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PLANTGEOGRAPHICAL EXCURSION TO THE PRIMEVAL FOREST OF BIAŁOWIEŻA.

The Białowieża-forest forms together with a wooded area situated to the east of the Narew river (Świsłocz forest) one large virgin forest of about 130 thousand ha. The forest is divided into plots of land of one square werst each (a werst is a little over one square-kilometer); the forest of Białowieża contains 1—923, the Świsłocz-forest 1—224 of such plots. Numbered sign-posts are placed at each corner. The sign-posts greatly facilitate orientation even in case we should not consult a map, as the dividing lines between the plots run straight from north to south and from east to west. Each of these corner posts has been marked with four numbers: so for instance we find on the dividing line of the Reservation a sign-post bearing the numbers 369/398, 370/399; as the numerals are increasing from west to east it is easy to perceive that the east is to the right, the west to the left. The numeration beginning from the north-west side of the forest shows that the posts bearing the smaller numbers are situated to the north of those bearing the higher numbers, and that consequently we have the north in front of us and the south behind us.

Guide XVI. 1

The first day.

The goal of the first day's excursion is the Białowieża National Park, the chief forest Reservation of 4595 ha. It is situated between the Narewka river, a tributary of the Narew, and its own tributary, the Hwoźnia river, to the north of the Białowieża glade. The eastern boundary of the Reservation is formed by the Browska road.

The dominant type of trees on this territory are foliage trees, needle trees being relatively less frequently represented. This somewhat monotonous aspect of the Reservation's vegetation is due to the fact that the territory is an extensive plain, a low-land entirely deprived of moraine uplands which we find in other parts of the forest and which give rise to such an admirable variation of plant life. Fir trees (*Abies pectinata*) are completely lacking in the Reservation; about a hundred, though, may be found on a wooded island situated among the swamps of Dżiki Nikor (this islet of 15.9 ha forms a separate small Reservation; plot 562); yew trees (*Taxus baccata*) two bushes of which were found on the „Haunted grounds“ of Nieznanowo (at present they have been destroyed there also) and oak (*Quercus sessilis*) with which three islands in the southern part of the forest are grown.

Among the larger animals, we find in the Reservation, deer, wolves, foxes, wild bears, hares, badgers, martens and squirrels. Red deer may be seen occasionally, but like many other animals they prefer to stay in woods where they find glades and they avoid the great uninterrupted forest tangle. Sometimes small numbers of fallow deer are to be seen in the forest (the Nowo-Jagiellońska forest), however they never penetrate into the Reservation. Sometimes moose (elk) and wild cat (*Lynx*) wander over into the Reservation forest.

The part of the Reservation which lies on the borders



Fig. 1. Forest along the road from Hajnówka to Białowieża.

of the Białowieża glade is grown with foliage trees showing a preponderance of yokeelms (*Carpinus Betulus*) as may be noticed when entering into the Reservation forest. These woods (*Carpinetum*) which are called by the natives „Grud“ strike the eye from far by their lofty crowns of spruce-trees (*Picea excelsa*) which surmount by far the roof of the yoke-elm woods (Fig. 2). In this type of woods spruce-trees develop to imposing proportions but they are not very numerous on account of the special qualities of the substance of the soil, which is given more earthy qualities by the abundance of yoke-elm trees, and the spruce-tree can be therefore considered only as an admixture. The most typical example of such woods is to be found at the entrance to the Reservation, beginning with sign-post No. 398 and 399. On this rich soil which contains a considerable percentage of clay we find, besides the above-mentioned spruce-trees, enormous linden-trees (*Tilia cordata*), beautiful oaks (*Quercus robur*), maples (*Acer platanoides*) and, though rarely, mountain elms (*Ulmus montana*), which oftener appear on more humid soil. Solitary birch and aspen trees may be seen in these woods but their presence indicates always a slight, if only local, deformity of the woods. Amongst the bushes the hazel-bush is the most characteristic (*Corylus Avellana*) which similarly to the oak develops best on humid ground (near the road taken by the excursion, plots 283 and 314).

To the characteristic flowers of the Białowieża „Grud“ (*Carpinetum*) belong: anemones (*Anemona nemorosa*) — (in the early spring when they bloom in great masses the ground seems to be covered with snow), *A. ranunculoides* (single and in patches), *Hepatica triloba* (more abundant in the mixed than in the „Grud“ woods), *Isopyrum thalictroides*, *Dentaria bulbifera*, *Stellaria holostea*, *Asperula odorata*, *Carex pilosa* (in some places in great abundance), *Ranunculus lanuginosus*, *Gagea lutea* (very rare), *Corydalis solida* (rare),

C. cava (very rare), *Equisetum pratense*, *Oxalis acetosella*, *Ajuga reptans*, *Majanthemum bifolium*, *Pulmonaria obscura*, *Polygonatum multiflorum*, *Sanicula europaea*. Occasionally ferns are found in great abundance (*Phegopteris dryopteris*,

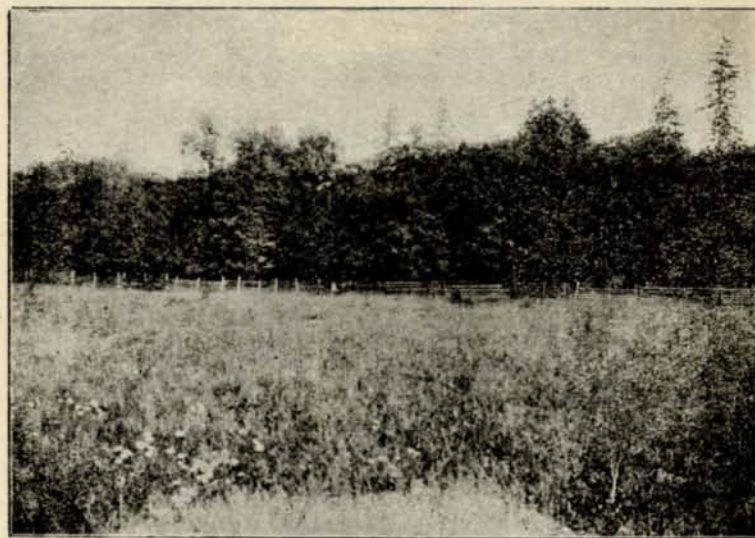


Fig. 2. View of the Reservation from Białowieża glade.

in large patches), *Athyrium filix femina*, *Aspidium filix mas*, *A. cristatum*.

At the entrance to the Reservation (to the left in plot 398) amongst the typical formation of the „Grud“ an area of oak and spruce-tree woods (*Piceeto-Quercetum*) can be noticed and here many of the spruce-trees are considerably less developed than those found in the surrounding „Grud“ woods. The oaks (*Quercus*) are larger than the spruce-trees (*Picea*), but not so beautiful in shape as in the other types of woods. Mixed with these we find birches (*Betula verrucosa*) and aspen-trees (*Populus tremula*) the yoke-elms

(*Carpinus Betulus*) however have disappeared. *Pirola secunda*, *Lycopodium annotinum* (even found once *Lycopodium selago*) and other species typical of the „Grud“ are also found. It is very remarkable that here the division bet-



Fig. 3. Type of forest called „Grud“, in which *Carpinus Betulus* prevail.

ween the „Grud“ and the spruce-trees is quite sudden and clearly marked. In the corner of the plot 369 (by the road) birches appear sometimes among typical „Grud“ woods. We find here a hollow place grown with sword grass (*Carex vesicaria*) amongst which here and there are some birches (*Betula*). All around this hollow the typical marsh-woods of the „Grud“ have disappeared to make room for a small ring-formation of spruce-trees, interspersed with aspen-trees, birches and oaks. Here we find the same type of spruce-

tree (*Picea excelsa*), growth as at the entrance to the Reservation, which has been described before. There is an abundant under-growth of blue-berries (*Vaccinium myrtillus*) also in some places moss-banks (*Polytrichum*) may be found together with small patches of *Sphagnum*, *Trientalis euro-*



Fig. 4. Type of spruce forest.

paea, *Pirola secunda*, all such species found in pine (*Pinus*) and elm-woods (*Alnus*), of which more later on. But not all swamps in the „Grud“ woods are surrounded by such a ring of trees alien to that soil. On the same plot No. 369 we see a marsh, a little larger than the one described before, on the banks of which are growing the typical „Grud“ trees.

The type of „Grud“ woods described here may be found on both sides of the road to the end of plot 398—399.

Turning to the right through nearly the whole plot No. 369 we come across mixed woods [pines (*Pinus*), spruce-trees (*Picea*), oaks (*Quercus*), birches (*Betula*), aspen-trees (*Populus tremula*), yoke-elms (*Carpinus*), appear mostly as undergrowth], the general aspect of the woods, being indeed that of low-growing woods; very seldom maple-trees (*Acer platanoides*) and still more rarely linden-trees (*Tilia cordata*) may be found, the woods as the results of bad husbandry having been nearly transformed into uniform spruce-tree woods (*Piceetum*).

Notwithstanding the abundance of spruce-trees (*Picea excelsa*) the vegetation consisting of elements of *Pinetum* as well as of *Carpinetum* demonstrate, that those are not typical spruce-tree woods (*Piceetum*), but transitory woods (the rejuvenation is based solely on foliage trees, and young spruce-trees so abundant in other types of woods not including typical needle-woods, here are completely lacking).

At the beginning of the plot No. 314 the road is cut by a small river Orłówka, the right hand tributary of the Narewka. Along the banks of this small river on the humid marshy soil alder and ash-tree formations are found („Oles“ = *Alneto-Fraxinetum*). The black alder (*Alnus glutinosa*) and ash-trees (*Fraxinus excelsior*) are the predominant species in these woods. Interspersed with them are, as nearly everywhere in the forest, spruce-trees (*Picea*), more rarely birches (*Betula*), oaks (*Quercus robur*) and yoke-elms (*Carpinus*) and often „Grud“ species as found in all transitory formations. Amongst the bushes we find here *Viburnum opulus*, black-currant-bushes (*Ribes nigrum*), *Evonymus europaea*, hazel-bushes (*Corylus Avellana*) and ivy (*Hedera helix*) the latter is at present already a rare plant. On the banks of the little river great quantities of nettles (*Urtica dioica*) are found together with touch-me-not (*Impatiens noli tangere*), *Chaerophyllum hirsutum* etc. Besides those in the

alder-woods (*Alnetum*) we find the typical bog and marsh plants in big quantities: *Caltha palustris*, *Ulmaria hexapetala*, *Cirsium rivulare*, *C. palustre*, *C. oleraceum*, *Carex remota*, *C. pseudocyperus*, *Juncus effusus*, *Crepis paludosa*, *Solanum dulcamara* (in our country always the herbaceous



Fig. 5. Type of pine forest on peat-bog.

form), *Equisetum silvaticum*, *Calla palustris*, *Lysimachia thyrsiflora* etc. and as a rare specimen *Aruncus silvester*.

Where the Narewka-river is joined by her tributary the Orłówka (plot No. 283) a large belt of hazel-bushes (*Carpinetum corylosum*) extends, there on the humid rock-soil a 100 and more of these great bushes (*Corylus Avellana*) fall to one ha. and the yoke-elm-tree (*Carpinus Betulus*) attain great proportions (the average thickness of a tree amounts in some patches to 44 cm).

Beyond a little glade through which the road passes in the plot No. 314 and in the surrounding yoke-elm tree woods (*Carpinetum*), we find great numbers of stately birches (*Betula*) and occasionally aspen (*Populus tremula*) and pine-trees (*Pinus silvestris*), that means species not typical of „Grud“ woods. It must be observed here, that the interspersation of specimens not typical „Grud“ types with typical „Grud“ undergrowth are to be found in a locality, which has been a field about 150 years ago, and where even now traces of furrows are noticable.

A little farther on the road in the same plot No. 314 we find a mixed spruce-tree growth, which develops in a certain distance from the road into a formation of marsh needle trees (*Pinetum eriophoreto-vaginosum*, Fig. 5.). On a peatground covered with tufts of *Eriophorum vaginatum* we find pine-trees (*Pinus*) which in consideration of the locality are pretty well developed, solitary thin birches (*Betula*) and tiny spruce-trees (*Picea*), which, however do not develop into larger trees, but die.

Among the *Eriophorum* carpet like moss-patches and small quantities of *Sphagnum* are found. Everywhere great abundance of swamp-reeds (*Ledum palustre*) of crauberrries (*Oxycoccus palustris*), and around the pine-trunks on mossy mounds great quantities of blue-berries (*Vaccinium myrtillus*) and here and there *Andromeda polifolia*. A ring-formation of great quantities of birches and small growths of reed (*Phragmites communis*) wellingh encloses these woods. This ring-formation is reminescent of another type of woods (marsh-woods) which grow on soil covered for the greater part with sword-grass (*Carex*), (especcially in the Świsłocka-forest big areas of this grass may be found).

Beyond the belt of birches, between its and the typical „Grud“ growth (*Carpinetum*), among which we find these pine-woods (*Pinetum*), there exists another narrow circle of



Fig. 6. Type of pine forest on dry ground.

mixed spruce-tree growth (*Piceetum*), (spruce-trees, birches, aspen-trees, blue-berries, moss-patches formed by *Polytrichum*).

The road leads farther through mixed woods of the „Grud“ type (*Carpinetum*) in the same plot No. 314 (of typical „Grud“), farther through spruce-tree woods (*Piceetum*), beyond which pine-woods (*Pinetum*) begin, covering the plots No. 284 and 285, at the end of plot 285 are mixed oaks (*Quercus*) and pine woods (*Pinus*) among which pines predominate.

Here we find a beautiful stretch of pine woods (*Pinetum silvestris*) on sandy soil (Fig. 6). Pines are thriving here and the undergrowth is formed by spruce-trees (*Picea excelsa*), which do not reach to the middle of the pine-trunks. Birches (*Betula*) and oaks (*Quercus*) are found occasionally, but little developed. The undergrowth exists of *Pteridium aquilinum* (Fig. 7). *Geranium sanguineum*, *Genista tinctoria*, *Cytisus ruthenicus*, *Scorzonera pumila*, *Trifolium lupinaster*, *Hieracium pilosella*, *Rubus saxatilis*, *Vaccinium myrtillus*, *Polygonatum officinale*, *Pulmonaria angustifolia*, *Arnica montana*, *Hypochaeris maculata*, *Astragalus danicus*, *Antennaria dioica*, *Anthericum ramosum*, *Pulsatilla patens*, *Vaccinium vitis idaea*, *Juniperus communis* etc. which are grouped according to the density of the forest and the sandy formation of the soil. In the Reservation as well as in the main forest, the type of drier pine-woods does not appear at all. We find them only outside of the forest and they are all the result of human husbandry.

Farther down the road which stretches along the dividing line between the plots No. 286 and 255 we find „Grud“ woods formations (*Carpinetum*), between the plots No. 258 and 286 all types of woods, with which we already have been acquainted are to be found. On the plot No. 224 we find a small patch of marsh pine-woods (*Pinus*), the pines of which are less developed than on the plot No. 314. Finally

after passing through a narrow belt of birches and pine-trees we come to a meadow on the Hwoźnia river, which forms the boundary of the Reservation.

Along the road through the Reservation we find besides the customary wood-roads vegetation (*Alnetum* with *Pinus* a. *Betula*), three species of plants not belonging to our forests, namely *Juncus tenuis*, which found on the road itself, in the muddy part of it (this plant is native of America), *Luzula albida* and *Deschampsia flexuosa* (the first a western species, the second belongs to the North) both of them are for the greater part, however not always found on the road itself. These plants however though frequently found on the road and the boundary of the forest, never penetrate into the real forest. The similar habits of both species, which generally are found together, clearly indicate that both of them are aliens in our vegetation and have been brought over.

We intend our return journey to be made either along the same road or directly through the forest, depending on the weather for our choice.

The second day.

In the Reservation, and in the adjoining Hajnowka-part linden trees (*Tilia*) are found among the yoke-elm woods (*Carpinetum*) in considerable numbers, but in other parts of the forests, they are either rare or absent. We find the yoke-elm tree woods (*Carpineta*) deprived of linden-trees (*Tilia*), with preponderance of oak (*Quercus*) and maple-trees (*Acer platanoides*), or mixed „Grud“ woods. Such woods (*Carpineto-Quercetum*) without linden trees, but with oaks on typical „Grud“ soil is found at the beginning of the forest south of the Białowieża glade at the entrance from the side of the Podolany-village between the plots No. 500 and 501. The yoke-elm trees (*Carpinus Betulus*) in these

woods are less developed than in other types of the same soil formation; spruce-trees (*Picea excelsa*) are less in number and poorly developed here, oaks (*Quercus*) on the contrary appear in great numbers and attain considerable size. At the beginning of the promontory we find such an oak belt, there, where on a moraine promontory the house of the chief forest-guard is built. Here we find only oaks (*Quercus*), the yoke-elms (*Carpinus*) and other species all having been felled (on the top of the promontory, the woods have been considerably thinned out and lost their character).

Between No. 528 and 529 we come to the Pruzany high-way, and following it in the direction east-south-east as far as the division lines 618/619 we leave it once more to turn to the right. While following the high-way a swamp-forest should be noticed (in the plot No. 588) where the pines (*Pinus silvestris*) are much less developed than in the swamp-forest in the Reservation. On this large bog, which extends from there up to the little river Perezownica we find, that to the same degree as the *Eriophorum vaginatum* and the *Ledum palustre* gradually disappear the amount of sword-grass (*Carices*) increases and small birches appear in gradually increasing numbers. Solitary specimen of them are growing here and there on this bog even there, where the mixed character of the woods disappears entirely.

In the plot No. 589, on the elevation going up from the little river Pererownica, mixed woods are found (pines, *Pinus*), spruce-trees (*Picea*), oaks (*Quercus*), birches (*Betula*), aspen-trees (*Populus tremula*), yoke-elms (*Carpinus*), even maple-trees (*Acer platanoides*). This type of wood, which has totally lost its primeval character as the result of human husbandry we remarked already yesterday in the Reservation (plot No. 369). Despite its changed appearance the undergrowth is the same in both cases and forms a mixture of „Grud“ (*Carpinetum*) and dry pine-forest (*Pi-*



Fig. 7. Type of pine forest with *Pteris aquilina*.

netum) species, the first kind prevailing. Among the rare plants in these mixed woods, which were transported here from the adjoining-„Grud“-woods (*Carpinetum*) we have to mention *Lappa nemorosa*, which is found only in a few spots in the forest.

After leaving the highway and following the division line 618/619 we enter a forest belt, which is distinguished by the presence of *Dianthus Carthusianorum*. This carnation is found in few localities in the forest, mostly on the moraine promontory called the „Wiskula“ (height 142 m); a little farther to the east appears the highest hill in the forest, called the „Kozia Góra“ (Goat mountain), 202 m high. In this part *Cytisus nigricans* begins to appear in fragmentary growths and invades the southeastern part of the forest (it

is not found in other localities, here, though, it appears sometimes in great quantities in big forest regions.

On the plot 683 we can observe the change in the types of wood in relation to the gradual lowering of the territory forest and mixed growths to higher ground; on lower ground we find beautiful ash and maple-„Grud“ (*Carpinetum-aceroso-fraxinosum*).

In the latter we see beautifully-shaped yoke-elms (*Carpinus Betulus*) which attain a diameter of 85 cm (the average thickness being 38 cm). As these woods are very old, these yoke elms are not very numerous (about 110 trees to one ha., the average number of trees to one ha. being 290). Besides the yoke-elms (*Carpinus*) there are a number of spruce-trees (*Picea excelsa*), some of the larger ones of which are beautifully shaped. Ash-trees (*Fraxinus excelsior*) do not grow densely (about 36 to one ha.), but they are splendid specimen (the average diameter is about 55 cm). This same holds good for maple-trees (*Acer platanoides*) (32 to one ha.); small numbers of mountain-elms (*Ulmus montana*) are found. Sporadically, not having any bearing on the type of these woods, birches (*Betula verrucosa*) are found. Here and there an under-growth of hazelbushes (*Corylus Avellana*) (the average number is 32 bushes on one ha.). The undergrowth is typical of the „Grud“ woods (*Carpinetum*) but with a tendency to the humid type of „Grud“ woods undergrowth (everywhere *Mercurialis perennis* occurs in great abundance; of the more rare plants I mention *Elymus europaeus* and the *Lappa nemorosa*).

Here, between the afore-mentioned maple and ash „Grud“ woods (*Carpinetum-aceroso-fraxinosum*) and the mixed or pine-forest (*Pinetum*) type on higher (also in dry) ground we find a rather narrow belt of oak „Grud“ woods (*Carpinetum-quercosum*). The yoke-elms (*Carpinus*) here are much thinner (diameter 50 cm) but they are of a denser

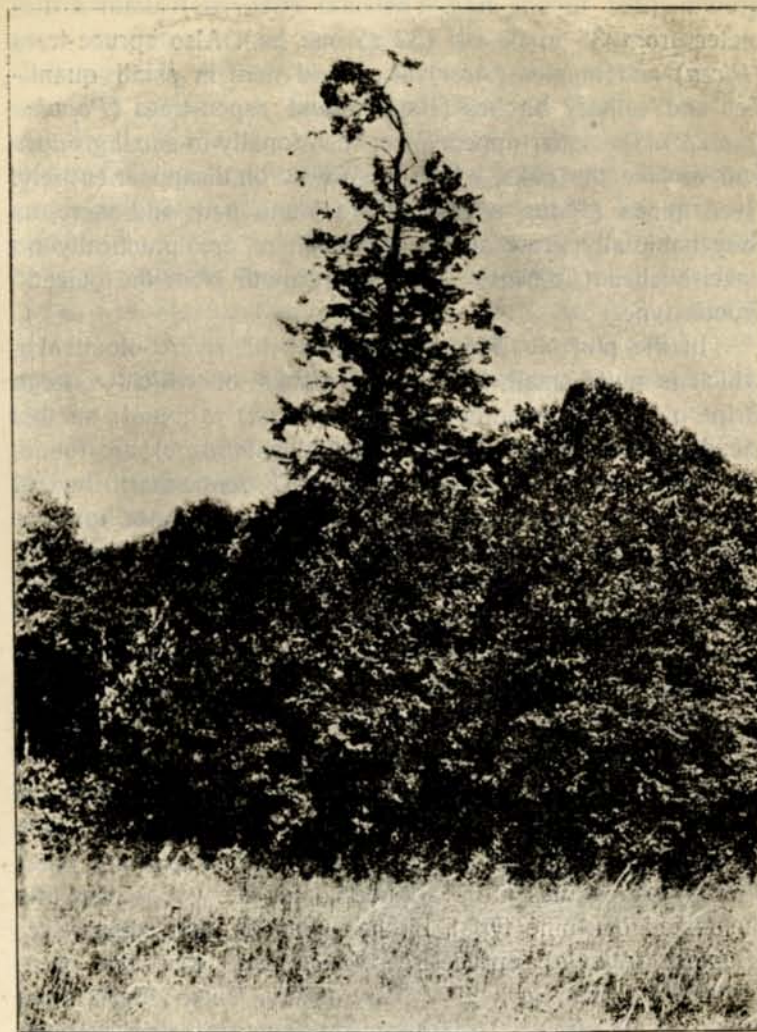


Fig. 8. Old specimen of fir (*Abies pectinata*) on a boundary outpost in the forest of Białowieża.

growth (224 to one ha.). The oaks (*Quercus*) attain a diameter from 35 to 95 cm (32 to one ha.). Also spruce-trees (*Picea*) and maples (*Acer*) are found here in small quantities and solitary birches (*Betula*) and aspen-trees (*Populus tremula*). The latter appear even occasionally in small groups and replace the oaks, which from now on disappear entirely. Even pines (*Pinus silvestris*) are found here and there, as they habitually grow among oaks. There are practically no hazel-bushes (*Corylus*). The undergrowth is of the „Grud“ woods type.

In the plot No. 715 we pass the little river Sołomienka, which is quite small, but on the banks of which a large stripe of marshy meadow-land (*Caricetum*) is found; on this meadow-land solitary birches (*Betula pubescens*) are found, also *Salix aurita* (as a rare specimen *S. lapponum*). Beyond this little river the marsh-woods begin; we shall not however linger to consider these, but turn at once to the woods in plot No. 807, here the forest in some parts is representing the pure type of oak-woods (*Quercus sessilis*).

Particularly beautiful is the part at the junction of the plots No. 807, 806, 779 and 778. These oaks are of different ages, but mostly young trees. Old oaks are comparatively rare their diameter never attains one meter, though the *Quercus robur*, growing on this soil easily could attain such diameter or more. Besides these oaks two different of which occur (*Quercus sessilis* a. *Q. robur*), we find solitary pines (*Pinus*) (sometimes more abundant and the woods pass into the mixed oak-pine type), birches (*Betula*) and aspen-trees (*Populus tremula*). Spruce-trees (*Picea*) are rare, but occasionally a denser growth of them occurs. Their shapes leave much to be desired (diameter-generally not over 40 cm). Undergrowth is generally lacking. The ground-growth is very rich, though inferior to that in ordinary oak-woods, the latter being sunnier. Oak saplings are found in dense growths

sometimes up to 1500 on 100 square meters. Blue-berries grow in considerable quantities (*Vaccinium myrtillus*), also *Calamagrostis arundinacea* which remains infecund is frequent. In greater or lesser quantities we find: *Pteridium aquilinum*, *Anemone nemorosa*, *Potentilla alba*, *Cytisus ruthenicus*, *Convallaria majalis*, *Aquilegia vulgaris*, *Thalictrum aquilegifolium*, *Laserpitium latifolium* and others. The ground-vegetation of these oak-woods (*Quercetum sessilis*) resembles in many respects that of other oak-woods in the Białowieża forest. On the southern end of the plots No. 828 and 829 as well as in the adjoining plots, we find pine-woods (*Pinetum*) where many juniper-trees (*Juniperus communis*) are found.

Here our excursion ends and we are turning back. As there will be plenty of time we propose to make our return-journey more interesting by exploring some of the other plots. However the return-journey can also be made by using the high-way as far as to Białowieża through Gródek.

In case you should prefer the last-mentioned road, I want to draw your attention in particular to an enormous ash-tree (*Fraxinus excelsior*), which stands on the brink of the high-way, there where it forms the boundary line between the *Carpinetum* and *Alnetum* and where it attains the Białowieża-glade.



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ORZĄDZENIE PREZYDENTA