TADEUSZ POKLEWSKI-KOZIEŁ, TOMASZ WAŻNY

THE ŁĘCZYCA EVIDENCE OF PLANTING AN INDUSTRIAL FOREST ABOUT THE YEAR 1590

Since the appearance of the species, humans have lived in symbiosis with the forest. At the beginning, this was a relationship of subjugation and dependence, where, however, the privilege of using the forest’s resources gradually prevailed. In the forest, people found edible plants and animals, building materials for their huts and subsequently houses as well as other materials used for making numerous indispensable everyday objects, particularly parts of tools and weapons. The forest provided firewood, huge amounts of which were used by workshops, especially furnaces.

The situation remained unchanged at the beginning of the Middle Ages, when people cultivated the land, lived in the fields and ate farm produce and the meat of farm animals on the one hand, but they still lived in timber houses and used mainly wooden objects in their everyday life on the other. Contemporary man still exploited the forest for wood, hunting, mushrooms and fruit as well as used it to graze his animals. At the beginning of the Middle Ages, in Central and Eastern Europe, woodland was such an important source of food and materials that many of them, like skins of some wild animals, were used as money. Currency of this type, particularly the skins of martens and grey-squirrel skins, was most widespread in Rus. It should also be noted that the kuna (the marten) still remains the basic monetary unit in Croatia.

Although forests were heavily exploited, no attempts were made to manage or regenerate them. For contemporary Central European society, woodland constituted, and was to remain, a rich source of all sorts of material goods.

In Poland, the situation lasted throughout the Middle Ages to the end of the fifteenth century and did not change much in the sixteenth and the seventeenth centuries. Meanwhile, Western Europe had already suffered the consequences of excessive forest exploitation. The fact that forest resources were not unlimited was made clear as early as 1068, when the great survey of England was made by order of William the Conqueror and recorded in Domesday Book. Rackham calculated according to this account that only 15 percent of the area of eleventh-century England was covered in forest. The general landscape consisted of farmland with islands of forest.

It is known that the first instruction regarding cutting down forests, which included regulations governing the preservation of some forest areas, was introduced as early as 1226. From the fourteenth to the seventeenth century, instructions of this type regarding public property as well as public and private areas adjacent to rivers were issued regularly and usually followed a change of the ruler or even the royal government official responsible for this branch of the economy. In Teutonic Prussia, the threat of excessive cutting down of forest areas was noticed as early as the fourteenth century and as a result, during the following century the Grand Masters issued regulations governing the economical use of forests.

---


2 The records of royal estate surveys of 1564-1565 and 1628-1632 conducted in Great Poland and Kujawy best reflect this situation.


4 A. Zabko-Potopowicz, Zarys rozwoju wiedzy leśnej do pierwszej wojny światowej (A Brief History of Forestry Development to World War I), Wrocław-Warszawa-Kraków 1968, pp. 35-44.

5 M. Arsyński, Drewno jako budulce w Prusach Krzyżackich-przyczynka do badań nad rolą drewna w budownictwie.
This was also the case with the Austrian and Hungarian Habsburg domains, where the methods of cutting down and replanting forests were delineated as early as the sixteenth century. Penetration and clearing as well as regeneration by means of planting seed-trees and seedlings grown in forest nurseries in clearings were recorded. Forest nurseries and young groves had to be surrounded by fences so that the little trees were not destroyed by wild animals. It might therefore be assumed that the basics of modern forestry formed in great European domains during the fifteenth and the sixteenth centuries. However, the rules and regulations regarding the forest economy were often limited to the protection of royal game. As far as the British Isles are concerned, in his standard work, *Trees and Woodland in the British Landscape*, Oliver Rackham writes: “other countries have forestry policies and laws, to which students of forest history devote inordinate attention, but in England these are few and unimportant.”

Unfortunately, we have at our disposal no similar information about great Polish domains belonging to the king, lords or church authorities. Forests are often mentioned as a source of materials for building houses and boats as well as firewood. A document of 1381 can serve as an example here. It was issued by Władysław, Duke of Opole, and it is one of the oldest documents being evidence of forest exploitation. The document burdens the peasants from the village of Opatów on the bank of the Prosna River with the duty to participate in the building of the castle in nearby Bolesławiec-on-Prosna and to construct bridges leading to the fortress. The modern village of Opatów is still adjacent to a large area of woodland owned by the state, which, in the sixteenth century, was the property of the successor to the throne of the Kingdom of Prussia. At the time when the document was issued, the inhabitants of Opatów belonged to St. Vincent’s Benedictine Abbey in Wrocław, but the castle in Bolesławiec was the duke’s investment and the duke had the right to burden the peasants with a duty to participate in the castle’s construction.

Our knowledge about forests and forest exploitation in the fourteenth and the fifteenth centuries is scanty. Publications dealing with the customs and tariffs levied at the Gdansk harbour are very significant in this respect. According to them, during the fifteenth century, the export of timber for building boats was gradually becoming the second largest export of Poland. In some years of the seventeenth century, over 80 percent of the wood shipped across the Baltic Sea and through the Danish straits to the North Sea came from Gdańsk. More detailed information can be found in, among others, Danish customs books, where all the ships sailing through the Strait of Sund as well as the cargo they carried were recorded.

Polish historians have at their disposal a very special record containing information about, among other things, the character and economic value of royal property at the beginning of the second half of the sixteenth century. This is the summary of a survey of royal property made by order of the Sejm (legislature) in coordination with the monarch and the Senate. In Great Poland, including the District of Łęczyca and the District of Sieradz, as well as in Kujawy the inventories were completed in the years 1564-1565. Inventories of nineteen districts governed by starostas (provincial royal officials) were made. The records included castles, manors and villages owned by the king. They also mentioned the incomes of the districts governed by starostas, earned from, for example, cultivating the land, keeping animals, running mills and wild bee-keeping. The expenses connected with maintaining buildings, paying royal officials and servants as well as the costs of services were also included. No expenses connected with managing the woods are recorded though there was a primeval forest or woodland in the vicinity of many of the places. The forests are mentioned only if there were swarms of bees in the trees, which were a natural source of honey. However, the best illustration of the attitude of the royal property authorities and the surveyors’

6 A. Zabkow-Potopowicz, op. cit.
8 Dokument opatowski z 1381 r. (The Opatów Document of 1381), [in:] Metryka Koronna 71.

---

10 N. E. Bang, Tabeller over skibsfart og varetransport gennem Kresund 1497-1660, København 1922.
attitude to the forest economy was the description of the village of Lubianka situated near Ujście on the Noteć River. "Puszczej mil 4, borów i dąbrów, z których żadnego pożytku nie masz pieniężnego (four miles of wilderness, forest and oak woods, which do not generate any profit)" says the record\(^{11}\). Among all the inventories there are only two mentions containing information about any form of active forestry. In Sokolniki, provincial District of Wieluń, there was "urzędnik samowotory co roboty i lasow przegląda", (an officer and his helper who look after the work and the forests)\(^{12}\). Therefore the local woods in the area were under constant control and the officer was one of the best-paid officials in the starosta’s district. The second mention refers to a small forest in Winiary near Kalisz, which was grown to supply wood for building fences probably surrounding fields and grazings\(^{13}\). The last mention is of great significance to us. Fences are usually built from poles made from young trees, less than twenty years old. The existence of such a grove might mean that a special species of tree, most probably the pine, was selected to be planted or seeded and subsequently cut down and replaced with new seedlings. Such procedure would suggest that some steps of economic value, consisting in purposeful planting and cutting down trees at the right stage of the cycle of forest development, were taken in the case of the woodland in question. It could, however, be assumed that this was a sporadic practice or that such cases were hardly ever mentioned in written sources. Thus, this instance of conscious management cannot be considered evidence of the fact that forestry consisting in planting or seeding vast areas of woodland, at least 1 hectare in area, in order to harvest commercial timber, was widespread in sixteenth century Poland. It should also be noted that it would have taken more than a hundred years for the trees to grow\(^{14}\).

However, it appears that the above reservation can be questioned. In the autumn of 2004, during renovations to the attic of St Andrew’s parish church in Łęczyca, Łódź province, central Poland timber samples were taken for dendrological and dendrochronological analysis. The samples came from the roof timbers of the church and they were obtained thanks to the kindness and consideration of Rev. Zbigniew Łuczkac, the dean of Łęczyca and the local parish priest. The aim of the analysis was to establish the precise age of the roof rafter framing as well as to characterize material used to build it. Classical dendrochronological methods, whose application to dating architectural monuments has frequently been described by Hoffsummer\(^{15}\), Simpson and Litton\(^{16}\), Ważyń\(^{17}\), Wrobel and others\(^{18}\), were used.

Let us examine the research procedure and its results in detail.

**Research material and methods**

Dendrochronology is a method based on the analysis of tree-ring sequences. In the case of timber structures, samples with visible tree-ring width variability from the youngest, circumferential, to the oldest, central, should be analyzed. In order to obtain reliable material, samples were taken by means of specialized cylindrical borers for dry wood from selected sections of the rafter framing. The core samples were subsequently analyzed in the laboratory. Measurement areas were selected and prepared for analysis and tree-ring widths were measured by means of LINTAB measuring stage. The accuracy of the measurement was 0.01 mm. The tree-ring sequences were synchronized and compared with standard chronologies using the following programs: CATRAS v. 4.20 (ANIOL 1980-2003), TSAP (Rinn 1996) and DENDRO for WINDOWS (Tyters 2004). A comparison of a

---


\(^{12}\) Ibidem, p. 80.

\(^{13}\) Ibidem, p. 213.

\(^{14}\) According to modern norms for pine timber used in building.


\(^{17}\) T. Ważyń, *Dendrochronologia obiektów zabytkowych w Polsce (Dendrochronology of Historic Objects in Poland)*, Gdańsk 2001.

tree-ring sequence and the corresponding standard makes it possible for the researcher to establish the year when the tree was cut down as long as the outside surface has been preserved intact. A total of sixteen structural elements were examined. The whole rafter framing was made from Scots pine (Pinus sylvestris L.).

A complete list of samples and detailed analysis results are shown in Table 1 below.

**Dendrochronological results and their interpretation**

Among the sixteen wood samples, fourteen were successfully dated and the age of seven of them was established with one-year accuracy. Most of the timbers used in the rafter framing over the presbytery were chopped down in the autumn of 1729 or the winter of 1729/1730. The youngest structural part, namely truss beam no. 10 is evidence that the structure was built in 1732.

The dating results suggest that the building materials were gathered for several years from 1728 onwards. Corner rafter no. 13 comes from the year 1710, which might mean that timber could be reused or that pieces of timber which had not been used before came in handy during the present construction works. The span of ring sequences is illustrated in the timber diagram shown below (Fig. 1).

---

**Fig. 1. Dating structural parts of the rafter framing from the church at Łęczyca.**

Dating the oldest annual rings of the samples preserved and the estimated distance of these rings from the pith leads to the conclusion that the pine trees used in the building of the church were about 140 years old. In addition, while calculating the age of a tree, the distance of the place from which the sample was taken from the tree trunk base must be taken into consideration. As a result of a tree's growth, the age of the pith decreases in relation to the tree's height. This parameter is much more difficult to establish but as a rule the samples were taken from the places which were biggest in diameter so that the maximum number of annual rings could be obtained. These places were usually the ones closest to the tree base. The only exceptions were the timbers where the bark ring was missing. In such cases, samples were taken from places which were further away from the tree trunk base.

Let us now examine in detail the way the trees grew. The tree-ring rhythm is illustrated in the following diagrams (Fig. 2). In the case of annual ring sequences, the classical age trend resulting from the fact that as the diameter of the tree trunk was growing with age, the growth in thickness was gradually decreasing and the amount of wood mass remained the same, was clearly visible. The rings from the early years were very wide (over 4-5 mm), which means that the young trees grew freely and had unlimited access to daylight. No symptoms of competition between the trees or signs of domination by other, older trees were found. In 1616, all the young trees as well as the whole woodland area were affected by some harmful factors, which is visible as a characteristic peak in their ring sequence curves. In the years 1648-1649, there was a serious decrease in the growth of the trees, which was reflected in unusually narrow rings. In the case of the trees from which samples 7 and 8 were taken, the fall continued in 1650. The fact that in the case of beam 7, one ring from the years 1648-1650 is missing is evidence of the strength of the stress-causing factor. Under the circumstances, the tree was unable to produce a new ring.

A number of beams made from pine trees which seeded themselves or were planted over a few years around 1590 can be found in the roof structure of St Andrew's church in Łęczyca. The trees were all cut down in the autumn of 1729 and the autumn and winter of 1729-1730, that is to say, in the period most suitable for cutting down trees to be used as timber. We are of the opinion that the above situation might be considered evidence of planned forestry. It is known that trees which are exactly the same age and grow in the same woodland area differ in size in the same growth period. Consequently, a group of a dozen or so footing beams identical in length and diameter made from a number of trees being the same age were only part of the whole tree population in question. It should be assumed that in the woodland area from which the footing beams used for the structure came, there must have been more pine trees of the
forests by planting new trees or using the remaining seeds of the old ones has been found in the relevant Polish literature so far. However, the pine trees used as timber in Łęczyca seem to have come from a one-species forest seeded in a previously cleared area presumably dating back to about 1590. Thus, it is possible that supplies of high-quality timber were needed and that the forest was planted with this end in view. The building material was ready for use after 140 years of cultivation.

Unfortunately, we have at our disposal no invoices for the construction or renovations to the roof of St Andrew’s Church in Łęczyca soon after 1732. As a result, we do not know who sold the timber in question and can find no trace of the owner of the forest, who had grown the timber for nearly six generations. The building material might have come from some royal estate, though no such woodland was mentioned in the records of the surveys of 1628-1632 and the forests must have existed at that time. It is highly improbable that such a forest was part of one of the relatively small estates belonging to the local gentry. The forest might have been owned by the Church, particularly the archbishop, as Łęczyca belonged to the Bishopric of Gniezno at that time. However, St Andrew’s Church was a small municipal parish church and the archbishop was under no obligation to support it. In conclusion, although the qualities of the building material suggest that the timber came from, generally speaking, the vicinity of Łęczyca, it is impossible for us to establish the forest’s exact location.

In France, it is said that a farmer plants grapes for himself, because he can expect a harvest after five years and a vineyard is a source of income for fifteen years. Then the old vines are removed and replaced with new ones. An olive grove, however, is planted for his son and grandsons, because an olive tree starts to fruit when it is seven years old, becomes a source of income when it is thirty-five years of age and crops until it is 150 years old. As a result an olive grove planted by a grandfather remains a source of income for up to five generations. In southern France, the fact that a forest tree is planted is still considered evidence of ownership.

---

A. Żabko-Potopowicz, op. cit.

---

21 M.-C. Amouretti, G. Comet, L’Olivier en Provence, Aix-en-Provence 1979, p. 11.
stabilization and a manifestation of the owner’s trust in the relevant legal regulations. It might therefore be assumed that a venture consisting in regular complete clearings and one-species reforestations carried out in order to produce timber to be sold in the remote future was also a manifestation of trust in the legal system and ownership regulations over a long period of time, even three times as long as in the case of an olive grove. The owner neither thins nor robs the forest with no consideration whatsoever for the interests of his heirs. On the contrary, he regenerates it and leaves it to his successors, who make profits after, for example, 140 years.

There is no evidence to suggest that the above-discussed case is representative of a general situation. The forest in the vicinity of Łęczyca, which was deliberately regenerated about 1590, could have been an exception. The instructions issued by King John III Sobieski regarding the Białowieża Forest at the end of the seventeenth century, are evidence of the fact that the local woodland was plundered of industrial wood and other materials, which were subsequently sold. The foresters contracted to manage the forest were not obligated to cover the costs of reforestation. Thus, the situation in Łęczyca seems to be highly unusual for the time being. It may, however, be considered a sign of significant changes to forest management and Polish forest owners’ attitude to their property. The surveys of 1564-1565 and 1628-1632 conducted in Great Poland and Kujawy best reflect this situation.

Translated by Zuzanna Poklewska-Parra