

“About the Use of Forest Trees – Renewable Raw Materials Standing out from the Ordinary.”

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There is growing awareness from the part of international forest science and policy as regards the significance and relevance of local and indigenous knowledge about forests and traditional possibilities of utilisation, as well as the need to take account of this knowledge in the development of political strategies which aim at sustainable forest management. The protection, documentation, and utilisation of forest-related, tradition-based knowledge is in the focus of numerous political discussions held within national, regional and international organisations and forums.

The development of a society practicing sustainable management is one of the great challenges with which industrial nations are faced at the beginning of the 21st century. One of the hopes of the “sustainable economy” is the material wood, which has numerous well-known positive characteristics, is renewable without limitation and available in large quantities, moreover CO₂-neutral, biodegradable and water vapour permeable, has an optimum relation of load-carrying capacity to its own weight and other particular characteristics. Apart from the traditional areas of utilisation, wood has enormous, not yet exhausted potentials which might open up new possibilities of use. From its structure, wood is characterised by an irregular chemical composition and, in essence, consists of approximately 40 to 50% cellulose, 20 – 30% lignin, and 15 to 20% hemicellulose. Other wood composites occurring in traces include resins, waxes, terpenes, phenols, tannins, colouring matters, fats, sugar, protein, and minerals.

For several years research in the field of wood chemistry has met with growing interest and sustainable industrial solutions have been developed on the basis of wood, a raw material which is rich in tradition and trend-setting. Cellulose is not only used as a starting material for paper, cellulose and various textiles, but can also serve as a basis for areas which are presently still dependent on crude oil. Other potential projects for the future are for example the utilisation of so far unused barks or the possibilities of use of other wood components. Parts of them have already been used in the past, among them the wood extracts wood oil, turpentine and tar as traditional natural wood preservatives or resin, which, among other things, served for disinfection and preservation, or as sealing material in shipbuilding. Turpentine oil and colophony, the two main products from resin, enjoy great appreciation even today, as turpentine oil provides the basic material for colours and varnishes, wood and leather conditioners. Colophony was, and still is, indispensable for any violinist and was - and still is - useful in the production of soap and oleo-resinous varnish, of printer's black and common black pitch.

The meeting “About the Use of Forest Trees – Sustainable Raw Materials Standing out from the Ordinary”, which was held from 14 - 17 September at Baden, Lower Austria, was jointly organised by the Ministry of Life, the Chamber of Agriculture of Lower Austria, the Working Group “Forest History” of the Austrian Forest Association (Österreichischer Forstverein), LAND&FORST Betriebe Österreich, IUFRO Research Unit 6.07.00 Forest and Woodland History, and the Departments of Material Sciences and Process Engineering, as well as of Forest and Soil Sciences of the University of Natural Resources and Applied Life Sciences. The purpose of the meeting was to draw the attention of a large number of participants to the fact that - in addition to wood - one can derive a wide variety of products

from forest trees, with many traditional processing techniques being known only in rare cases in the practice and having fallen into oblivion to a wide extent. The organisers of the event aimed at drawing the attention to the fact that also today active substances for pharmaceutical products and cosmetic products are obtained from forest trees, but that – off the ordinary – also new fields of use and products can be created. Some of these products which were for a long time mostly in a discrediting manner referred to as “by-products”, for example tree saps, which are interesting for pharmacy, food technology or the chemical industry, were discussed during the meeting. It aimed at providing information about the state-of-the-art and the technology and to furnish ideas on how new products could be created based on the historical use of wood, not least in order to strengthen the economy (and forestry) in the region and to give it new impetuses. The organisers of the event see the meeting also as a way of implementing the IUFRO Task Force “*Traditional forest related knowledge*“. This world-wide research project aims at bridging the gap between forest science and the traditional forest-related knowledge and its application in the practice. It takes efforts towards a comprehensive understanding between the two areas and tries to clarify which political and social framework conditions are necessary to promote a fruitful cooperation between science, practical life and politics in order to ensure sustainable forest management also in the future.

The region in which this meeting took place is today one of the sluggishly developed areas, but was highly industrialised in the past (iron industry, household industry, the craft of pitch production from Austrian black pine, called “Pecherei”). It is located in a natural black-pine area, where the share of black pines has been raised since the 16th century, primarily to improve the quality of life of the local, often needy population (with respect to climate, soil and economy) and to ensure people a sufficient income thanks to the promotion of resin utilisation. Today the approximately 80,000 hectares large area between Mödling and the Schneeberg is one of the largest closed natural black pine areas in the whole world. Numerous publications point out the important role of resin utilisation and processing in this region which was practiced from the 18th century to about 1970 and from that time largely disappeared, as the products manufactured began to be replaced by oil derivatives. In the course of the past decades utilisation has decreased dramatically; at present, only one pitch-boiling plant still exists at Hernstein, which still employs 7 pitch-makers. However, due to the rising prices of fossil raw materials resin is becoming more interesting again as a renewable resource.

The event was with over 60 participants well attended, participants coming from most different fields: from research, authorities and the economy (forest and production), industry, forest-related extension services, but included also representatives of public relations in the forest sector, teachers, biologists and other interested groups of the population like the resin makers themselves, were in the audience. In this way one of the declared goals of the organisers has been achieved, namely to conduct the discussion on as broad a basis as possible and on an interdisciplinary basis and to let representatives of forestry (forest enterprises, practitioners, authorities) as well as producers and scientists get a word. The contribution of science, in particular of the University of Natural Resources and Applied Life Sciences, was directed towards new products, of which resin is but one. Many of these products are obtained anyway in the chemical decomposition of wood (cellulose industry) and could be better used in the future (in former days they went to the waste water, nowadays they are in most cases incinerated). It is encouraging that today large amounts of research funds are devoted to biomass; it is regrettable, however, that still much too little is invested into the development of these alternative products.

The objective of organising this meeting was to promote the interdisciplinary networking of scientific research and application, the communication among stakeholders, and the establishment of networks. This objective faced participants with a challenge, namely

to go into and engage in terminologies and disciplines outside one's own specialty. The speakers came from the fields of research, authority, economy (forest and production), industry, forest-related extension services. What was remarkable was that all speakers tried hard to present their special subjects in a comprehensible way, which all of them did very well.

The contributions comprised the fields of food-pharmacy (wood extracts in foods, wood composites and possible uses, medicine from the forest), old and new products of the chemical industry (cellulose and lignin, high-tech materials from renewable resources, utilisations of Austrian black pine (*Pinus nigra* Arnold), oil from Austrian black pine and resin from European larch, as well as colophony), they informed about the most recent research projects on resin and the sustainable use and production of other raw materials obtained from plants in the future. The look into the history of international resin production at its prime and in recent times in Germany led up to the present role which resin utilisation is still playing in the region. The two-day event was supplemented by an excursion which showed, on the one hand, the traditional (still practiced) utilisation of resin at Hernstein and, on the other hand, the development of large-scale industry (away from resin) with possible partial utilisation of the traditional raw material for specific areas. The opportunities and limits of a sustainable forest management with a small-scale ownership structure under the given economic framework conditions were further priorities of the excursion. Cultural highlights of the event were the presentation of the book "Die Schwarzföhre in Österreich" (editor: Herbert Kohlross), which was attended by about 250 persons, and a reading and chamber music "Über's Pech im Piestingtal" organised by the market town of Piesting at the end of the excursion day, which met with enthusiasm both of the local population and of the excursion participants.

Which conclusions can be drawn from this event?

- ⇒ For practical life: Information about new trends in the research field of wood and its components
- ⇒ For science: Finding of partners in the implementation of certain partial projects
- ⇒ For the region (politically, socio-economically):
 - ⇒ Social regeneration of the still existing structure
 - ⇒ Driving forces for the future use and utilisation of the products
 - ⇒ Strengthening of the tradition
 - ⇒ Raising the awareness for the culture which is connected with the traditional craft
 - ⇒ Songs, poems, way of life, living together in the village, adaptation to sustainable use of the resources (e.g. minimum girth of the trees from which resin is obtained)
 - ⇒ Products: Resin: Export of colophony world-wide
 - ⇒ Reference to the multifarious possibilities of using the wood of Austrian black pine (floors in continuation of the floors so far produced for stages (Vienna State Opera), panels and wainscots, furniture, etc.
- ⇒ For forestry:
 - ⇒ Ideas with a view to sustainable forest management (establishment of forest management communities for joint forest tending, utilisation and marketing of the wood of Austrian black pines) with the technical extension service of the District Chamber of Agriculture

- ⇒ Production of alternative products by launching forestry and cultural initiatives (traditional use in connection with tourism) (Pecherhof Hernstein).

This meeting was on the one hand a historico-cultural initiative taken in order to avoid that the meanwhile rare craft of the pitch maker and the traditional ways of resin utilisation, which are of cultural and historical interest, fall into oblivion. On the other hand, it was intended to enhance the economic activities of the local population that are linked to sustainable forest management by reminding a broad range of the population of the old tradition beyond regional borders and drawing the attention to already existing tourist activities connected with this traditional utilisation in Greater Vienna (walkways providing information about the pitch-maker's craft, or excursions demonstrating resin production). This may open up new markets (organic products in skin care, oils, home remedies which are made from pine resin and can be successfully used against various injuries to health). For already Greeks and Romans were familiar with the effect of tree resins against inflammations of the muscles and joints.

That the networking of forest and timber science with traditional forestry raises, or can raise, great interest is evident from the fact that numerous high-ranking opinion-leaders, like the Deputy Head of Department at the Ministry of Life, Dr. Schima, the IUFRO Executive Secretary Dr. Mayer and, as representative of the Chamber of Agriculture, the member of the Provincial Chamber of Agriculture, Ehrenhofer, were present. Although some 70 years ago 150 times the amount of resin was produced than is extracted today, resin production is for many reasons still of high importance. The Pecherhof Hernstein is meanwhile one of the few enterprises in Central Europe still obtaining and processing resin and thereby helps to maintain this old utilisation technology. Economic utilisation aside, it thereby makes a valuable historico-cultural contribution, namely to keep a craft with hundreds of years of tradition from finally dying out. Yet not only to look to history is interesting and of importance in this context. Recent scientific works deal for example with the "Utilisation of renewable resources" (2000) or "Folk medicine and modern physiotherapy" (2005). Corresponding to the trend of our time not only cosmetic products and essential oils, of which high-quality products are processed in as unadulterated a way as possible from natural raw materials (pine and larch resin), could experience a renaissance, but also other parts of trees, like cellulose, could form the basis for areas which presently still largely depend on crude oil. Wood composites hold a huge, in many respects still unused potential; for example, they can provide the basis for packaging materials, foils, paints, and many more. There appear to be hardly any limits set to the potential uses of wood and its composites; resin is only one important part of them, others are still the subject of timber research. However, this could also be a valuable contribution to the maintenance of the cultivated landscape outside the city of Vienna to which black pine gives a special southern charm.

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