4. Scientific activity.

After having circulated the new Glossary of Terms, Dr. Chalk has taken into consideration several suggestions of our members and settled the definitive text. It will be published in Tropical Woods in due course. We think it will be possible to distribute one free copy to each member of the Association and to collect subscriptions for additional paid copies.
Write for subscription by November 30th 1957 to the Office of the Secretary Treasurer.

The Secretary Treasurer: The Assistant Secretary Treasurer:

A. Frey-Wyssling H.H. Bosshard

INTERNATIONAL ASSOCIATION OF WOOD ANATOMISTS

NEWS BULLETIN 1958 / 1

Edited by the Secretary Treasurer Zürich, Switzerland
Office: Laboratorium für Holzforschung E.T.H., Universitätstrasse 2

EDITORIAL

Your Secretary Treasurer has the honour to announce the publication of a new edition of the "International Glossary of Terms used in Wood Anatomy" by our Committe on Nomenclature. I should like to thank Doctors L. Chalk, B. Huber, M.D. Normand, E.W.J. Phillips and B.J. Rendle for their thorough work. Our gratitude must be especially conveyed to Dr. Chalk, chairman of the Committee, who had to circulate the preliminary list of terms and definitions to all members of the Association and to gather their suggestions. I am also grateful for the publishing facilities for this catalogue in "Tropial Woods" offered by Dr. W.L. Stern. We are glad to enclose a free copy of the new glossary. The next task will be to translate the English edition into other languages in order to create a comparative multilingual glossary.

Our activity in the near future will centre on the International Congress of Botany in Montreal (Canada) in 1959. Negotiations have been initiated with the aim to establish for our Association a similar status as in the Paris Congress 1954, i.e. to become a separate section in the subdivision Forestry Botany with the possibility of joint sessions or symposia with Plant Anatomy, Morphology, Physiology or Palaentology if problems concerning trees are treated there, and to get time for an administrative session of our I.A.W.A.

Members are kindly invited to present suggestions for items to be treated in our scientific or domestic meetings as soon as possible, to the address indicated at the head of this News Bulletin.

SCIENTIFIC REVIEWS

The members are invited to co-operate with us in these "reviews" with short communications regarding their personal research work.

Some aspects of the application of high-frequency heating in wood biology

An article on high-frequency heating dealing with a technological problem is not to be expected in the scientific reviews of our bulletin. Therefore it seems necessary to explain why we think it worth while, to publish articles like that as well. The more wood technology develops, the more the wood anatomist is asked to furnish the technologist with morphological data or even to help the technologist in planning his investigations. Knowing that, we will establish a laboratory for microtechnological wood research where wood anatomy is the fundamental science and microscopic and biological techniques are the necessary tools of the investigation of biological and technological problems. One of these questions is the application of high-frequency heating in biology.

The principle of high-frequency heating

The capacity of a condenser depends on the material placed between the plates. This is indicated by the formula for the capacity C as follows:

$$C = \varepsilon \frac{F}{4\pi d}$$

F = surface of the plates
d = distance between the plates

ε is called the dielectric constant of the material. It is a measure for the increase of capacity of a plate condenser charged with a certain material (= dielectric), compared with the capacity of the same condenser without the dielectric. It is obvious that ε therefore indicates a special property of the material in question - it is a constant of the material. As mentioned above, the dielectric constant of air is defined as 1; in relation to that value the dielectric constants of the following materials can be easily determined:

Material	Dielectric constant
air, vaccum	1
beech wood, dry, fibre axis $\perp$	2.51
beech wood, dry, fibre axis $\parallel$	3.63
oak wood, dry, fibre axis $\perp$	2.46
oak wood, dry, fibre axis $\parallel$	3.64
cellulose, dry	6.7
water	81.0

ε - values for different materials (2)

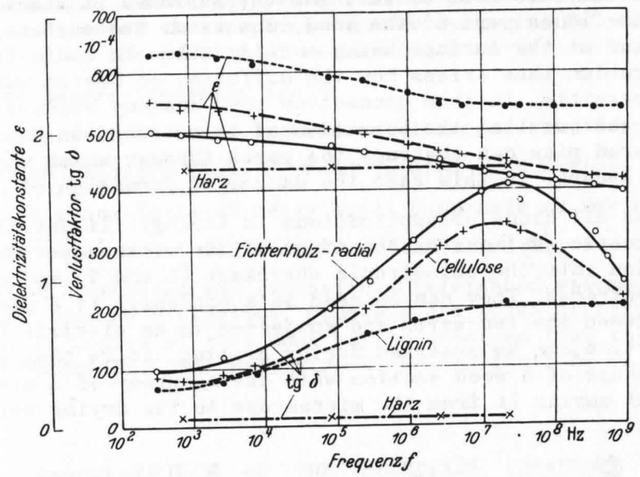
In the table we compare some ε-values of wood with pure cellulose and water. For both beech-wood and oak-wood there exists a remarkable anisotropy regarding the orientation of the fibre axes in the field. The ε-values for dry wood are not as high as for dry cellulose and much lower than for water. Bearing in mind that the dielectric constant is a measure for the molecular polarization of the dipol molecules (1), the facts of the anisotropic behaviour of wood and of the enormous difference between dry wood and water are of very great interest.

Assuming that the dielectric between the plates of a condenser is a pure cellulosic material in a wet condition, there are two types of dipolar molecules: the water molecules in the submicroscopic and microscopic spaces between the cellulose and the cellulosic macromolecules itselves with their polar side groups. In an electric field both types of molecules oscillate in accordance with the polar alteration in the field, e.g. slowly in a normal field of alternating current and very rapidly in a field of high frequency. As a result molecular movement frictional heat is produced which is the higher the more active the molecular movement is. Hence it is obvious that according to the measure of the dielectric behaviour (the dielectric constant) water is heated 12 times as rapidly as cellulose. Therefore we can speak of selective heating in wet cellulose. In the energetic system of our condenser heat may be regarded as transformed electric energy; from this point of view it is a loss directly measurable by controlling the phase angle (tg δ) of the electric system (1 and 4).

The dielectric properties of wood substances

For a homogenous material, the dielectric property is a constant value defined for given conditions, for instance for a given humidity, temperature etc. In an inhomogeneous material, e.g. wood, the dielectric properties change according to the chemical and structural facts.

In his thesis "Ueber dielektrische Untersuchungen an Naturhölzern und deren mechanische und chemische Abbauprodukte im grossen Frequenzbereich", K. Kröner (3) has compared the dielectric properties of spruce wood with pure cellulose, pure lignin and pure resin.



ε - and tg δ -values related to the frequency for wood materials (3)

In a diagram he shows two most interesting results: the dielectric constant ε and the loss factor tg δ change with the frequency.

A low frequency corresponds to low values for ε and tg δ, and a high frequency results in high values for ε and tg δ. The result is obvious, but there is an important aspect: the correlation frequency/dielectric constant and loss factor has a maximum value at a frequency of 10^7 to 10^8 cycles. At higher frequencies the ε - and the tg δ - values become smaller. This is very important for investigations with radio frequency. The diagram shows another important fact: the clear difference between the four different substances. Spruce wood must be regarded as a composition of a number of chemically defined substances. Its dielectric losses are the highest - higher than the tg δ -values for cellulose, much higher than for lignin and resin. It would seem justified to conclued that the cellulosic component of the cell wall is the most important in respect of dielectric losses, while the lignin component is of minor importance. The resin component may be entirely neglected in this connection. But wood is an inhomogeneous material not only from the chemical point of view. It has a clear structural inhomogenity.

J. Vodoz (5) in his paper "Das Verhalten des Holzes während der Trocknung im hochfrequenten Wechselfeld" demonstrates a clearly defined correlation between fibre axis and axis of the electric field. It also appears from his work that the distribution of vessels in hardwood is of great importance as regards the behaviour of wood in the electric field. A more or less regular dispersion of pores in a cross-section causes a corresponding excitation of the strength of the electric field. In ring-porous wood with an irregular distribution of pores and with deviations in pore diameters it can be shown that the strength of the electric field is higher in the portion of early wood with big pores in tangential lines than in the late wood zones.

High-frequency heating and wood structures

In radio-frequency heating the energy penetrates the whole material at once. Concequently water inside a wood cube between the two plates of a condenser

takes up energy at the same rate as water of the surface. It starts to boil at the same time in the inner part of the wood cube as on the surface, or even earlier, heat radiation at the surface being considerable. In radio-frequency heated wood the problem thus arises how the diffusion of heated water from the wood material is possible. In this connection wood anatomy assumes paramount importance. It is obvious that the formation of tylosis or the hardening of pit membranes in bordered pits can obstruct the pores through which vapour formed in the log should escape. In this case the danger of formation of cracks arises.

Radio frequency has all kinds of applications in biology. It may also be used for heating microscopic sections on the stage of the microscope. On the occasion of our investigation into the anisotropic shrinkage (6 and 7) we constructed a stage with two electrodes. They can be used as a condenser if a microtome section is placed between the two wires and subjected to an electric field of high frequency. The section can be observed during heating. It is thus possible to evaluate the shrinkage of a wood section with the accuracy of a microscopic measurement without moving it from the microscope to the drying oven, and back again to the stage.

H. H. Bosshard

Literature:

(1) Yavorsky, J.M. — A review of electrical properties of wood
State University of New York, Technical Publication N. 73, 1951

(2) Landolt-Börnstein — Physikalisch-chemische Tabellen
Berlin, 1923

(3) Kröner, Karl — Ueber dielektrische Untersuchungen an Naturhölzern und deren mechanische und chemische Abbauprodukte im grossen Frequenzbereich
Diss. TH Braunschweig, 1943

(4) Miller, D.G. — Application of dielectric heating to the seasoning of wood
Rep. F.P.R. Soc. Ottawa, 1948

(5) Vodoz, J. — Das Verhalten des Holzes während der Trocknung im hochfrequenten Wechselfeld
Diss. E.T.H., 1957

(6) Bosshard, H.H. — Ueber eine neue Methode zur Messung der Schwindungsanisotropie im Holz
Naturwissenschaften 43, 1956, S. 54

(7) Bosshard, H.H. — Ueber die Anisotropie der Holzschwindung
Holz als Roh- und Werkstoff 14, (1956), S. 285

BOOK REVIEW

Wood for Marine Use and its Protection form Marine Organisms
(ASTM Special Technical Publication No. 200)
6" x 9", Case Bound, 52 Pages, $ 2.00

Six papers, including an introduction and general discussions, make up this symposium concerning the battle of chemists, biologists and engineers to protect wood from the ravages of marine organisms. These minute animals attack and destroy millions of dollars of wood wharves, piers and other marine structures

every year. The symposium, presented at the Second Pacific Area National Meeting, Los Angeles, under the auspices of ASTM Committee D-7 on Wood, discusses several aspects of the problem of conserving wood for marine use.

Among the papers presented are:

The Distribution and Importance of Marine Wood Borers in the United States

Marine Exposure Tests of Wood Treated with Various Preservatives

Performance Tests of Heavy Metal Compounds as Marine Borer Inhibitors

Relationship between Limnoria Species and Service Life of Creosoted Piling.

This well-illustrated and extensively referenced volume is of interest to civil engineers, marine biologists, chemists and those concerned with port and harbor facilities. Copies of this book may be obtained from the American Society for Testing Materials, 1961 Race Street, Philadelphia 3, Pa., at $ 2.00 each.

OFFICE OF THE SECRETARY TREASURER

1. Financial

a) Statement of receipts and expenditures

Receipts	Sfr.	Expenditures	Sfr.
Subscriptions	1.916.86	News Bulletin	151.20
Bank interest	53.16	Glossary of Terms	640.30
		Stationery	170.95
		Stamps	121.95
		Sundry expenses	55.30
			1.139.70
		Profit 1957	830.31
	1.970.01		1.970.01

b) Balance

Balance brought forward	Sfr. 3.559.60	
Profit for the year 1957	Sfr. 870.31	
Balance on 31th Dec. 1957	Sfr. 4.389.91	*)

*) Deposit book No. 4154 of the Swiss Bank Corporation — Sfr. 3.978.15
Postal cheque account — Sfr. 411.76

The profit for 1957 is high, although we have paid for 1000 copies of our Glossary of Terms. This is due to the payment for outstanding subscriptions. Therefore, the profit for 1958 will be much smaller.

2. Membership

a) Subscription: Enclosed with the News Bulletin you will find the account for membership fees for 1958 and, where necessary, for the back years as well. The members are invited to pay their subscription dues by cheque to our bankers:

Swiss Bank Corporation
Oberstrass Branch, Zürich

or by postal money order to

Postal cheque account VIII 50.938

Please pay at your earliest convenience not later than June 30th 1958.

b) Mutations: Dr. F.Y. Henderson, Director, Forest Products Research Laboratory, Princes Risborough, wishes to retire as an active member of the Association.

According to the decision of the Council to exclude members who have not paid their membership fees for more than five years it was necessary to remove the names of 26 unfinancial members from the roster of the Association.

New addresses are announced from

ENGLAND — Prof. Dr. Ing. E.W.E. Mörath
3, Vere Street, Oxford Street, London W 1

INDIA — Mr. S.S. Ghosh
Officer-in-charge, Div. of Forest Botany
Forest Resarch Institute
P.O. New Forest Dehra Dun

HUNGARY — Prof. Dr. S. Sárkány, Director
Institute for Applied Botany and Histogenetics
University of Budapest
VIII Muzeum Körut 4/a, Budapest

USA — Dr. Thomas Kerr
4315 Van Buren Street
Hyattsville, Maryland

Mr. Michael A. Taras, M.S.
117, Park Avenue
Raleigh, N.C.

Mr. Lawrence Leney
Asst. Professor of Forestry
School of Forestry
University of Missouri
Columbia Miss.

We will prepare a new directory of members. Will you please be so kind as to check your address and communicate any changes to your Secretary-Treasurer as soon as possible.

We are pleased to announce the nomination of six new members:

Dr. M.W. Bannan, Asst. Professor of Botany, University of Toronto, Toronto 5, Canada

Dr. Bannan's scientific work is summarized in the following publications:

1) Investigations on the resin system (in Tsuga canadensis and Larix laricina)
Carr.Roy.Soc.Can. 27, Sect. V, 197-202. 1933 / Roy.Soc.Can. 27, Sect. V, 203-217, 1933 / Ann.Bot.48: 857-868, 1934 / New Phytol. 35: 11-46, 1936

2) Investigations on xylem rays (in gymnosperms, especially Chamaecyparis)
Bot.Gaz. 96: 260-281, 1934 / Amer.Jour.Bot. 23: 36-40, 1936 / Ann.Bot. N.S. 1: 171-726, 1937 / Amer.Jour.Bot. 37: 232-237, 1950

3) Investigations on the root system of conifers
Amer.Jour.Bot. 27: 108-144, 1940 / Bull.Torrey Bot.Club, 68: 173-194, 1941
Amer.Jour.Bot. 28: 457-463, 1941 / Amer.Jour.Bot. 29: 593-598, 1942

4) Investigations on wood structure (Thuja occidentalis, Juniperus, Ryania, Libocedrus decurreus, Chamaecyparis, Cupressus)
Bot.Gaz. 103: 295-309, 1941 / Amer.Jour.Bot. 29: 245-252, 1942 / Amer. Jour.Bot. 30: 351-355, 1943 / Amer.Jour.Bot. 31: 346-351, 1944 / Can.Jour. Bot. 30: 170-187, 1952 / Can.Jour.Bot. 32: 285-307, 1954 / Can.Jour.Bot. 32: 466-479, 1954 / Can.Jour.Bot. 35: 327-337, 1957.

5) Investigations on tetraploid Taraxacum kok-saghyz
Can.Jour.Res.C., 23: 131-143, 1945 / C. 24: 81-97, 1946 / Can.Jour.Res. C. 25: 59-72, 1947 / Ca. 26: 115-127, 1948 / Amer. Jour. Bot. 35: 532-539, 1948

6) Investigations on the structure and activity of the cambium (Chamaecyparis, Thuja)
Amer.Jour.Bot. 37: 511-519, 1950 / Can.Jour.Res.C. 28: 341-355, 1950 / Can.Jour.Bot. 29: 57-67, 1951 and 421-437, 1951 / Can.Jour.Bot. 33: 113-138, 1955 / Can.Jour.Bot. 34: 175-196, 1956 and 767-776, 1956 / Tappi 40: 220-225, 1957 / Can.J.Bot. 35: 425-434, 1957

Dr. S. Carlquist, Asst. Professor of Botany, Claremont Graduate School, 1500 North College Avenue, Claremont, California, USA

Dr. Carlquist has devoted his scientific work to a number of aspects of comparative anatomy in compositae; he is investigating the wood anatomy of the family as well.

His publications are to be found in:

Madrono 13: 227-239, 1956 / Amer.Jour.of Bot. 43: 425-429, 1956 / Pacific Science 11: 207-215, 1957 / Trop.Woods 106: 29-45 / Mem.N.Y.Bot.Gard. 9: 441-476, 1957 / Univ.Calif.Publ.Bot. 29: 1-144, 1957 / Amer.Jour.Bot. 44: 696-705 / Mem.N.Y.Bot.Gard. (in press)

Dr. Wita von Jazewitsch, Forstbotanisches Institut München, Amalienstrasse 52, Deutschland

The main work of Dr. Wita von Jazewitsch concerns investigations on annual rings in European trees.

Her publications are to be found in:

Diss. München, 1948 / Forstw.Cbl. 68, 706-715 (mit B.Huber, A.John u.W.Wellenhofer) 1949 / Allg.Forstzeitschr. 5, 443-444 (mit B.Huber) 1950 / Allg.Forstzeitschr. 5, 527-529 (mit B.Huber), 1950 / Allg.Forstzeitschr. 7, 233-235 (mit B.Huber) 1952 / Holzforschung 6, 82-89, 1952 / Forstw.Cbl. 72, 234-247 / Z.d.Ver.f.hess.Geschichte u.Landeskunde 65/66, 55-72, 1955 / Acta Bot.Neerl. 4, 385-388 (mit B.Huber), 1955 / Ber.dtsch.bot.Ges. 69, 128-142 (mit Sieben-list u.Bettag) 1956 / Tree-Ring.Bull. 21, 28-30, 1956 / Holz als Roh- u.Werkstoff, 15, 241-244, 1957

P.D. Dr. W. Liese, Forstbotanisches Institut der Universität Freiburg im Breisgau, Bertoldstrasse 17, Deutschland

Dr. Liese's scientific publications contain:

1) Investigations on impregnation problems and wood preservation
Diss. Hann.-Münden, 1951 / Bitumen, Teere, Asphalte, Peche u. verwandte Stoffe, 2, 276-279, 1951 / Holz als Roh- und Werkstoff, 9, 374-378, 1951 / Schädlingsbekämpfer 5, 16-17, 1953 / "Holzschutz", 140 S. 98 Abb. 1954 (J.u.W.Liese) / Allg.Forstzeitschr. 10, 124-127, 1955 / Brit. Wood Preserv. Assoc. Cambridge, 159-160, 1955

2) Investigations on the submicroscopic morphology of wood
Ber.Dtsch.Bot.Ges. 64, 31-32, 1951 / Holz als Roh- u.Werkstoff 10, 197-201, 1952 / Ber.Dtsch.Bot.Ges. 66, 203-211, 1953 / Biochemica et Biophysica Acta 11, 190-198, 1953 / Ber.Dtsch.Bot.Ges. LXVI, 427-428, 1953 / Holzforschung VII, 97-102, 1953 / Proc.8.Int.Congr.Botanic,Paris,Sekt.9, 1954 / Planta 44, 269-285, 1954 (m.l.Johann) / Die Naturwissenschaften 41, 579, 1954 / Proc.Int.Conf.f.Elektr.Mikroskop, London, 550-554, 1954 / Die Holzindustrie, H.B, 1-6, 1956 / Holz als Roh- u.Werkstoff 14, 417-424, 1956 / Die Natur-

wissenschaften 43, 540-541, 1956 (m.H.Marquardt u.H.Hassenkamp) / Ber.Dtsch Bot.Ges. LXX, 21-30, 1957 / Die Naturwissenschaften 44, 240-241, 1957 / Proc.Forst Europ.Region.Confer.on Electron Microscopy, 276-279, 1956 / Exp. Cell.Research 13, 165-167, 1957 (m.G.Hassenkamp)

3) Investigations in the field of wood anatomy
Arbeitsgemeinschaft Holz, Düsseldorf, 40 S. 1957 / Zeitschr.f.wiss.Mikroskopie 64, 269-275, 1957 (m.K.H.Meyer-Uhlenried) / Der Forst- u. Holzwirt 12 297-298, 1957 / Holzforschung, im Druck (mit U.Ammer)

Mr. Syoji Sudo, Senior Research Worker, Div. of Wood Technology, Government Fores Experiment Station, Meguro, Tokyo, Japan

Mr. Sudo's publications are:

The Wood Anatomical Characters of Styracaceae in Japan.Bull. of Tokyo Univ. Forests No. 45, 1953 (with Taizo Inokuma and Ken Shimaji) / Wood Anatomical Studies on the Genus Picea, Bull.of Tokyo Univ.Forests No. 49, 1955 / Electron Microscopical Studies on the Vestured Pits of Some Woods of Leguminosae in Japan, The Transactions of the 64th Meeting of Japanese Forestry Society. 1955 (with Noboru Xamabayashi and Keigo Kanazawa) / The Use of the Card Sorting Key for the Identification of Japanese Hardwoods. Journ. of the Japan Wood Researc Soc. Vol.3, No.3, 1957

Dr. Martin H. Zimmermann, Lecturer in Tree Physiology, Harvard University, Harvar Forest, Petersham, Mass, USA

Dr. Zimmermann has worked on

1) Paper chromatography of nectar secretions
Experienta 8: 424, 1952 / Schweiz.Bot.Ges. 63: 422-429, 1953 / Experientia 10: 145, 1954 / Experientia 10: 491, 1954 (mit A.Frey-Wyssling und A.Maurizio) Science 122: 766, 1955

2) Translocation of organic substances in trees
Plant Physiol. 32: 288-291, 1957 / Plant.Physiol. 32: 399-404, 1957 / The Physiology of Forest Trees, Cabot Foundation Symposium on Tree Physiology, K.V. Thimann ed Ronald Press, New York (in press) / Plant Physiology (in press)

3. Scientific activity

Decisions concerning an extension of our Glossary as outlined in the publication distributed (Tropical Woods Nr. 107, Oct. 1957, Page 2) will be taken during the Congress of Botany in Montreal, where we hope to meet as many members as possible.

Therefore notes of any errors or omissions and revelant critisism of the Glossary should be submitted to the Secretary Treasurer.

Zurich, 25th of February 1958

Secretary Treasurer: A. Frey-Wyssling

Assistant Secretary Treasurer: H. H. Bosshard

INTERNATIONAL ASSOCIATION OF WOOD ANATOMISTS

NEWS BULLETIN 1958 / 2

Edited by the Secretary Treasurer Zürich, Switzerland
Office: Laboratorium für Holzforschung E.T.H. Universitätstrasse 2

EDITORIAL

Your Secretary Treasurer has the privilege of distributing a presentation copy of the classical memoir:

P. JACCARD
Nouvelles recherches sur l'accroissement en épaisseur des arbres. Essai d'une théorie physiologique de leur croissance concentrique et excentrique. 200 pages avec 32 planches hors texte, 23 tableaux et figures.
Librairie Payot, Lausanne et Genève, 1919.

It was possible to obtain this gift from the stock of the publications of the "Schnyder von Wartensee Foundation", Zurich, which promotes science by offering periodic competitions. In 1916, Prof. JACCARD won a prize with his successful investigations concerning the cambial growth of trees.

In this treatise he approached the problem of the excentric growth of stems and branches experimentally. He investigated the anatomy of artificial loops of shoots and twigs, and of bended, stressed or pressed growing stems. He further prevented lignification in the hinge of a shoot by a constant rocking movement mechanically applied.

It is true that the conclusions concerning the explanation of the formation of tension and compression wood drawn from those experiments are no longer up-to-date since the concept of "reaction wood" has later enabled a new physiological approach to be made. But the facts observed are still valid and ought to be taken into consideration in further discussions on reaction wood.

Prof. JACCARD's publication is seldom found in libraries because the "Schnyder von Wartensee Foundation" possesses only restricted exchange facilities. Therefore, I am glad to offer in its behalf a copy of this rare and valuable publication of my late teacher to the members of our Association.

SCIENTIFIC REVIEWS

The members are invited to co-operate with us in these "reviews" by submitting short communications regarding their personal research work.

A Note on Juvenile and Adult Wood

By B.J. Rendle, Address: Department of Scientific and Industrial Research, Forest Products Research Laboratory, Princes$ Risborough, Bucks, England

In the last issue of the News Bulletin, the Secretary Treasurer invited comments on the International Glossary of Terms used in Wood Anatomy, published in Tropical Woods, No. 107. The object of this note is to suggest that the terms "juvenile wood" and "adult wood" should be defined and included in the next edition.