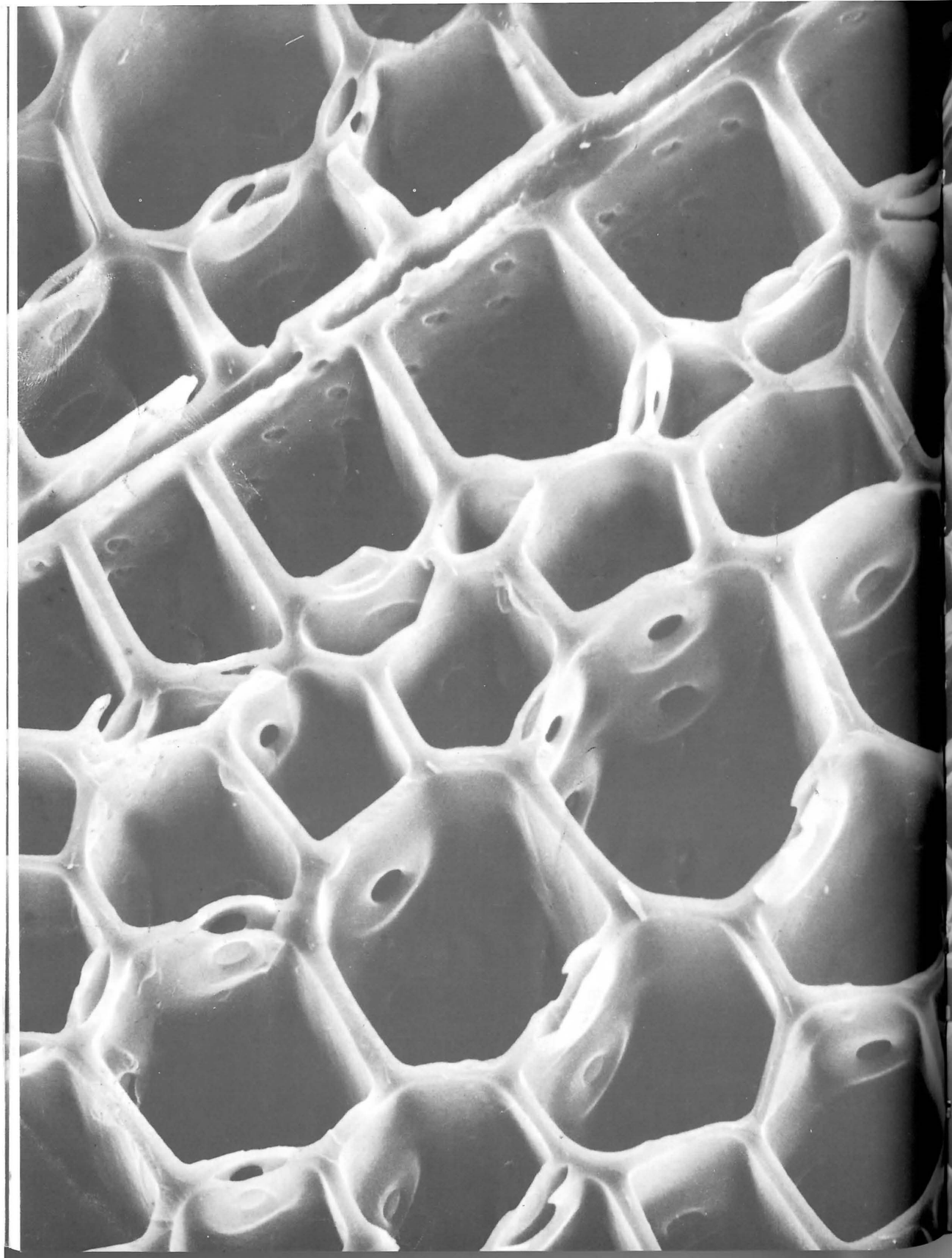

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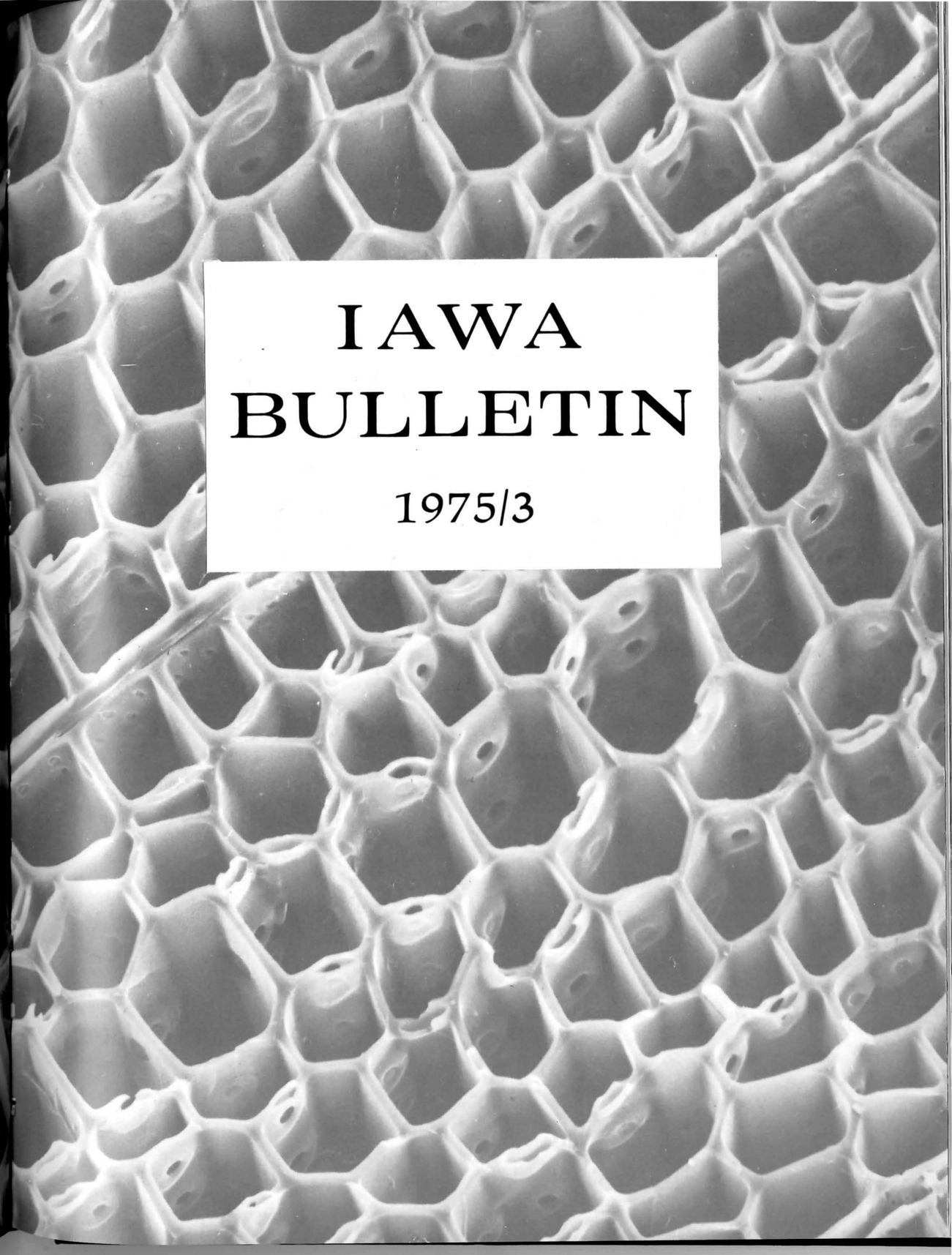

EDITORIAL

Your editors continue to pursue future changes that would be desirable in the format, content, title and coverage of the IAWA Bulletin. We have received no suggestions or replies to the questions posed in the editorial for 1975/2. However, these points were raised in the business meeting of the Association during the International Botanical Congress.

According to a report just received from Leningrad, the limited number of IAWA members who attended agreed on the suggestion offered by Dr. Ifju: "WOOD STRUCTURE, Bulletin of the I.A.W.A." Rejected for various reasons were: "WOOD ANATOMY, Bulletin of the I.A.W.A." and "JOURNAL OF WOOD STRUCTURE".

At the close of the meeting, someone noted that there already exists a Japanese publication, "WOOD STRUCTURE". If this is so, it might be advisable to use the title, "WOOD ANATOMY, Bulletin of the I.A.W.A." This is not as accurate a name perhaps, in view of the fact that we have published a number of articles which are not strictly anatomical in nature. Also, if the proposals of the business meeting with regard to overall objectives of the Association (see report under Association Affairs) are adopted in the future, the name of the journal should be broadly inclusive of other wood structure interests besides anatomy.

So the question remains unresolved for the present. We still need ideas, letters to the editor, and other forms of comment with which the Council can arrive at a proposal for membership approval. This is your publication, so please send us your thoughts as soon as possible.

W. A. Côté
C. H. de Zeeuw

SIMPLE TO SCALARIFORM COMBINATION PERFORATION PLATES IN *Vitex lucens* KIRK (VERBENACEAE) AND *Brachyglottis repanda* J. R. et G. Forst (COMPOSITAE)

by
B. G. Butterfield[1] and B. A. Meylan[2]

Although many woods have exclusively simple or exclusively scalariform perforation plates between their vessel members, a number of woods have more than one perforation plate type present. Where only one perforation plate type is present, the opening in the end walls of adjacent cells normally coincide exactly in a simple-to-simple or scalariform-to-scalariform arrangement. However, where more than one perforation plate type is present, the openings between adjacent cells may not be coincident, and a perforation plate may consist of a single opening in the end wall of one vessel member corresponding with a series of scalariform or reticulate openings in the end wall of the adjacent vessel member. Such perforation plates are usually referred to as combination perforation plates (Meylan and Butterfield, 1973). Simple-to-scalariform combination perforation plates have been illustrated by Meylan and Butterfield (1973) and Ohtani and Ishida (1973) and other forms of simple to multiperforate combination plates by Gottwald and Parameswaran (1964), Müller-Stoll and Suss (1969) and Parameswaran and Liese (1973).

During a recent survey of the occurrence of simple, scalariform and combination perforation plates in the New Zealand woods (Meylan and Butterfield, 1975), we observed a wide range of combination plates in 22 different woods belonging to 9 angiosperm families. These included: simple-to-scalariform, simple-to-part-scalariform, simple-to-reticulate and scalariform-to-reticulate plates. Since submitting these observations for publication, we have made observations on combination perforation plates in *Vitex lucens* Kirk and *Brachyglottis repanda* J. R. et G. Forst that we believe could prove significant.

To date, no pattern has been discerned in the distribution of combination perforation plates within any one wood. It appears that where a wood has predominantly simple perforation plates, it occasionally happens that an individual vessel member may develop a multiperforate half plate at one end, giving it a normal simple perforation plate at one end and a simple-to-multiperforate combination plate at the other, or it may produce multiperforate half plates at both ends giving it combination plates at both ends. Similar situations occur in woods with predominantly scalariform perforation plates where occasional simple plates are found.

Vitex lucens, a member of the Verbenaceae endemic to New Zealand, is a tree growing up to 20 m high with a trunk up to 1.5 m in diameter. It occurs naturally in lowland forests in the northern areas of New Zealand. In transverse view the growth rings of its wood are usually distinct with the vessels arranged either solitary or more commonly in radial multiples of 2-4 cells. More rarely they occur in oblique tangential pairs. The individual vessel members are interconnected mostly by simple perforation plates in their end walls (Fig. 1). Some simple-to-scalariform combination plates also occur (Fig. 2). The wood of *Vitex lucens* has been fully described by Patel (1974), although he did not report observing any scalariform perforation plates. Perforation plates of irregular form including reticulate, irregular reticulate and branched scalariform have, however, already been illustrated for other species of *Vitex* by Gray and de Zeeuw (1974).

Brachyglottis repanda, a member of the Compositae, is also endemic to New Zealand. It grows as a shrub or small tree up to 6 m high with stems up to 35 cm in diameter. It occurs naturally in coastal and lowland forests throughout the North Island and the northern half of the South Island of New Zealand. In transverse view the growth rings of this wood are indistinct to slightly distinct with the vessels arranged either solitary or in radial multiples of 2 - cells. Again the vessel members are interconnected by mostly simple perforation plates (Fig. 5), although some simple-to-scalariform (Fig. 6) and even scalariform perforation plates also occur.

The observations in these woods that we consider interesting are that in the radial face all the vessel members of a radial multiple that are derived from the same fusiform cambial initial have identical arrangements of simple (Figs. 3 and 7) or combination (Figs. 4 and 8) perforation plates. This suggests that the tendency of a particular vessel member to produce a different perforation plate type in its end wall is

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determined by genetic factors transmitted to the daughter cells of each deviant cambial fusiform initial. This pattern can only emerge in woods where the vessels remain in radial multiples and where all the cells in the radial file have been derived from the same fusiform initial. Only further observations on a number of similar woods will confirm or reject this possibility.

The occurrence of combination perforation plates in members of the Verbenaceae and the Compositae is in itself an interesting observation. Both of these families are considered to be advanced in an evolutionary sense while scalariform and combination simple-to-multiperforate perforation plates are normally considered to be primitive or transitional states in vessel evolution.

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FIGURE LEGENDS

FIGURES 1—4: *Vitex lucens*

Fig. 1. A simple perforation plate between two vessel members in tangential longitudinal view. Pitting is mostly intervessel. (× 560).

Fig. 2. A simple-to-scalariform combination perforation plate between two vessel members. (× 1500).

Fig. 3. Simple perforation plates interconnecting individual vessel members in radial longitudinal view. Note the large vessel to ray cross field pits. (× 300).

Fig. 4. Three vessels in radial longitudinal view. The three vessel members in the centre of the micrograph are probably derived from the same fusiform cambial initial and have developed scalariform half plates at each end to form combination perforation plates with adjoining vessel members. Again note the cross field pitting. (× 320).

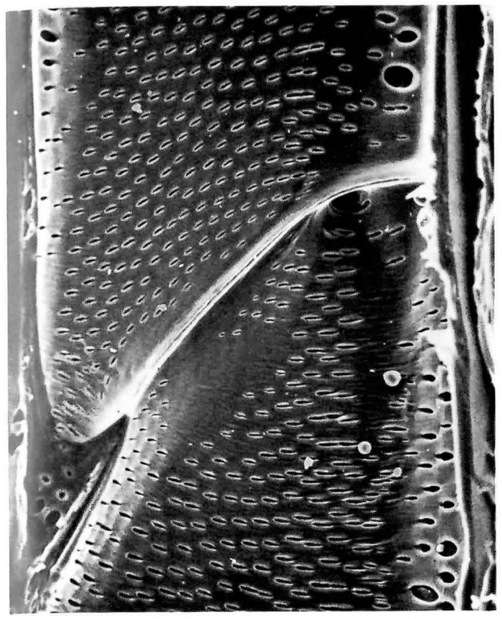
FIGURES 5—8: *Brachyglottis repanda.*

Fig. 5. A simple perforation plate between two vessel members. (× 1950).

Fig. 6. A simple-to-scalariform combination perforation plate between two vessel members. (× 1650).

Fig. 7. Simple perforation plates interconnecting individual vessel members in radial longitudinal view. (× 370).

Fig. 8. A number of vessels in a radial file with scalariform-to-simple perforation plates at each end. (× 240).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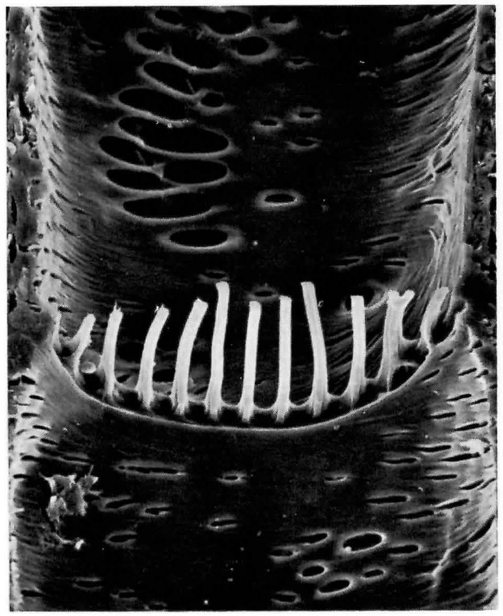
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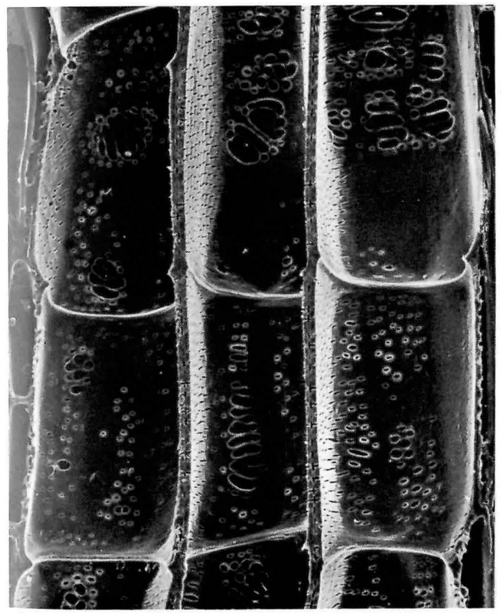
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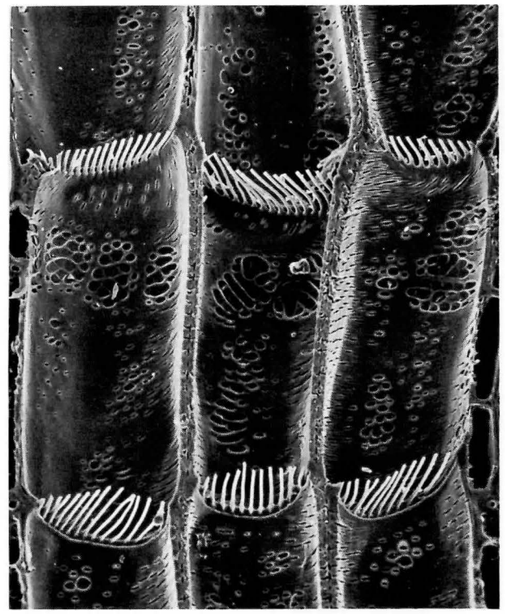
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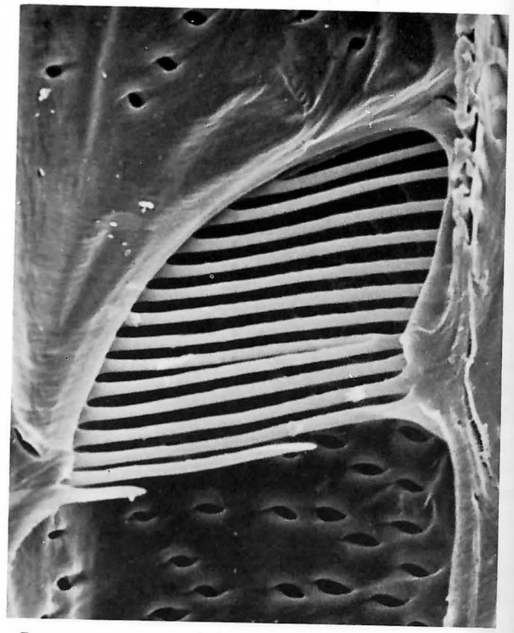

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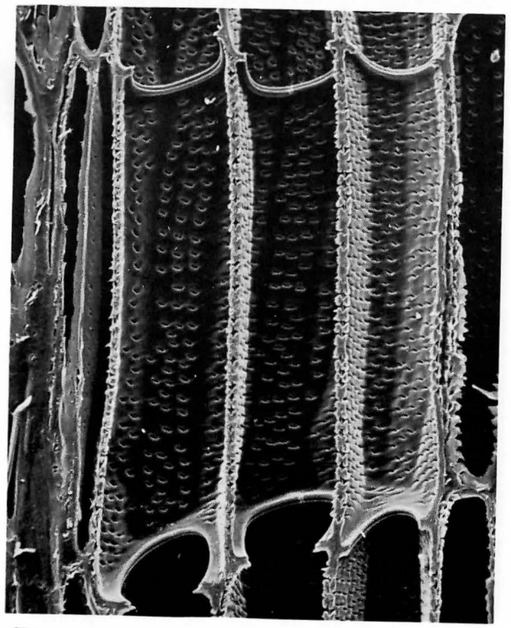

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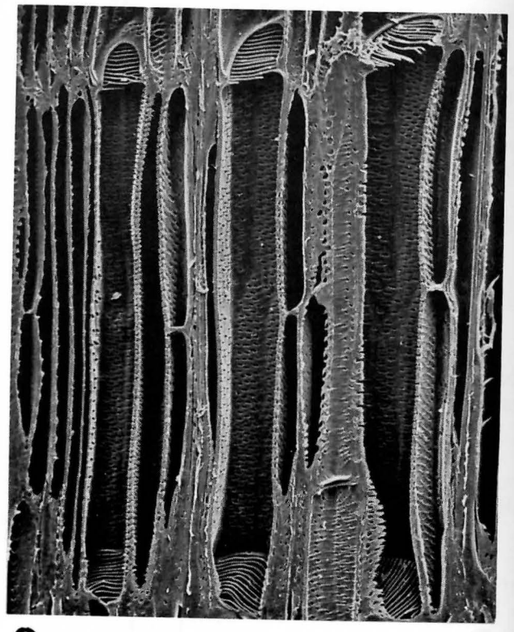

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RAY TISSUE PERCENTAGES IN WOOD OF YUGOSLAVIAN HARDWOODS

by
B. Petrić and V. Ščukanec[1]

It is well known that the types and proportions of anatomical elements in wood structure influences the technical properties of the wood. Ray tissue in wood influences the anisotropic transverse shrinkage, swelling and permeability of wood as well as other properties.

One primary function of the stem in living trees is conduction. Conductive tissue in stems of trees consists of secondary xylem, i.e. wood, and secondary phloem, i.e. living bark. Wood conducts water and inorganic mineral salts dissolved in water from root to leaves where photosynthesis takes place. Products of photosynthesis are conducted through the secondary phloem from leaves to the roots. The connection between wood and living bark is through radially oriented tissue, i.e. the phloem and wood ray tissues. Consequently, wood, though a single tissue, comprises two conductive systems, the axial and the radial conductive systems. The radial conductive system consists of wood ray tissue.

According to ray restraint theory, the transverse anisotropic shrinkage and swelling of wood is conditioned by the effect of ray tissue. This theory is based on the assumption that ray tissue shrinks or swells radially less than the longitudinal tissue and therefore restrains radial shrinkage or swelling of wood (1, 2, 9, 11, 14, 17, 18).

Also it is considered that the ray tissue influences the radial permeability of wood, since it represents more or less the only conducting paths for radial movement of liquids in wood (4, 8, 21).

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Table 1 Volume Proportion of Wood Ray Tissue in Percent

Species	$\underline{X}$	±	$\sigma_{\overline{x}}$	σ	±	f_σ
Acer campestre L.	15.369	±	0.247	0.781	±	0.175
Aesculus hippocastanum L.	13.225	±	0.211	0.666	±	0.149
Alnus incana Moench.	13.683	±	0.850	2.688	±	0.601
Betula verrucosa Ehrh.	10.120	±	0.301	0.952	±	0.213
Carpinus betulus L.	15.741	±	0.360	1.138	±	0.254
Castanea sativa Mill.	12.239	±	0.219	0.692	±	0.155
Fagus silvatica L.	18.163	±	1.029	3.254	±	0.728
Fraxinus excelsior L.	14.706	±	0.348	1.102	±	0.246
Juglans regia L.	16.231	±	0.180	0.569	±	0.127
Morus alba L.	18.227	±	0.468	1.480	±	0.331
Ostrya carpinifolia Scop.	23.485	±	0.351	1.111	±	0.248
Platanus orientalis L.	25.565	±	0.602	1.904	±	0.426
Populus nigra L.	11.802	±	0.179	0.566	±	0.126
Prunus avium L.	16.384	±	0.168	0.530	±	0.118
Prunus domestica L.	26.306	±	0.242	0.766	±	0.171
Pyrus pyraster Medic.	21.681	±	0.270	0.855	±	0.191
Quercus ilex L.	34.084	±	1.360	4.300	±	0.961
Quercus robur L.	20.569	±	0.930	2.940	±	0.657
Robinia pseudoacacia L.	19.037	±	0.545	1.725	±	0.386
Salix alba L.	9.175	±	0.227	0.718	±	0.160
Tilia platyphylla Scop.	7.810	±	0.118	0.372	±	0.083
Ulmus procera Salisb.	20.778	±	0.290	0.916	±	0.205

$\underline{X}$ = arithmetic mean of sample

$\sigma_{\overline{x}}$ = standard deviation of the arithmetic mean

σ = standard deviation of the means (standard error of mean)

f_σ = standard error of standard deviation

Wood species with higher proportions of ray tissue therefore should possess a greater radial permeability and greater anisotropy of transverse shrinkage and swelling of wood. Anisotropy and radial permeability are also influenced by other characteristics of rays such as shape of wood rays, their microscopic structure, chemistry and submicroscopic structure of their cell walls (5, 6, 12).

Purpose of Investigation

Data on the proportional volume of ray tissue in wood structure of hardwoods, particularly those grown in Yugoslavia, are scarce (3, 7, 13, 19, 20). Therefore the purpose of the present investigation was to determine the percentages of ray tissue in wood of the most important home-grown hardwoods.

Materials and Methods

Material used in this investigation came from the permanent histological wood preparations of a collection in the Wood Structure and Preservation Section, Forestry Faculty, Zagreb University.

The percentages of ray tissue in wood were measured on tangential sections by means of a Leitz integration instrument in the manner already described in an earlier article in this publication (10, 16). All of the data were processed statistically in the usual manner.

Results and Discussion

The results of measurements of the percentages of ray tissue in the wood of selected home-grown hardwoods are presented in Table 1. The results obtained correspond fairly well to data reported by other researchers (3, 7, 13).

It is interesting to note that among home-grown hardwoods the smallest percentage of ray tissue was found in soft (low density) broadleaved species. The percentage of ray tissue in wood of these hardwoods amounts on an average to 17% which corresponds with the mean values of North American and tropical hardwoods (3, 13).

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Forthcoming Elections

The terms of office of our current Council Members expire at the end of this calendar year, December 31, 1975. According to the provisions of the Constitution, Council Members are elected for three-year terms and may be re-elected for a second term. They may not serve a third term without a lapse of at least one three-year term.

The present members are all eligible for re-election except the Executive Secretary, Dr. W. A. Côté. He will have served six years at the end of 1975. Consequently, in the elections to be held in October - November, at least one new member must be elected.

A Nominating Committee consisting of Dr. G. Ifju, Dr. N. Parameswaran, and Dr. B. Butterfield has been asked to prepare a slate of nominees for the elections. Their nominations will be circulated with a ballot to all voting members in early October. It will then be the responsibility of the new Council to select one of its members to serve as the new Executive Secretary.

Members are urged to review Articles VII, VIII, and IX of the Constitution prior to casting a ballot.

Membership Recruitment

With each issue of the Bulletin, the Office of the Executive Secretary is able to announce the enrollment of a few new members. It is clear that there are many wood scientists who would be eligible for membership even under our current, somewhat restrictive, guidelines. Should the Constitution be amended as suggested during the Leningrad business meeting, our potential membership would be very large indeed.

Every member should be alert to the possibility of recruiting a new member. A larger organization can have greater strength not only in terms of financial base, but also in its ability to provide greater opportunities for exchange of ideas, wood and herbarium samples, and also for promoting this phase of wood science.

Membership applications are available from the Office of the Executive Secretary.

Multilingual Glossary of Terms Used in Wood Anatomy

The Association still has a large supply of soft cover copies of the "Glossary". Although we all recognize that there is a need for changing some of these terms which were published in 1964, most of the terminology remains valid and useful for students and professionals alike.

The sale of this publication provides a small but steady source of income. Non-members pay $3.00 plus postage per copy and members may purchase extra copies (one is provided free to all new members) at $2. Special lower prices can be offered for quantity purchases.

BUSINESS MEETING

The first business meeting of the Association to be held since the International Botanical Congress at Seattle, Washington in September, 1969 is reported here. It was held during the 12th International Botanical Congress in Leningrad (U.S.S.R.) on July 8, 1975. Dr. P. Baas served as Chairman of the session on behalf of the Executive Secretary who was unable to participate in the Congress. The report is based largely on minutes taken by Dr. W. C. Dickison. Besides the IAWA members listed below, abou twelve non-members having genuine interest in Association affairs were also in attendance. The one hour meeting included lively discussions on each topic of the agenda.

Members Present

P. Baas (Netherlands); J. Bauch (BRD); H. H. Bosshard (Switzerland); D. F. Cutler (UK); W. C. Dickison (USA); D. Eckstein (BRD); A. Fahn (Israel); A. Frey-Wyssling (Switzerland); H. R. Höster (BRD); G. Ifju (USA); J. G. Isebrands (USA); C. T. Keith (Canada); Z. Koran (Canada); N. P. Kutscha (USA); W. Liese (BRD); A. Mariaux (France); A. M. W. Mennega (Netherlands); B. A. Meylan (New Zealand); V. Nečesaný (Czechoslovakia); N. Parameswaran (BRD); R. J. Thomas (USA); G. Tsoumis (Greece); P. Wagenführ (DDR); A. B. Wardrop (Australia); A. A. Yatsenko-Khmelevsky (USSR).

Welcome to Participants

After opening the business meeting, the chairman welcomed the non-IAWA members in attendance. It was made clear that discussions and votes were reserved for members. It was also stressed that the meeting was of an opinion sensing, rather than of a decision making nature. None of the members present wished to add other topics to the agenda.

The Establishment of Regional Groups Within IAWA

The chairman read the explanatory comment of the agenda: "In order to extend the activities of the IAWA it seems useful to establish regional nuclei in, for instance, America, Europe and the Pacific area. Such groups could be in a better position to arrange symposia or conferences, and could also promote the aims of the Association by carrying out an active policy of increasing the membership within their region. Proposal: During the meeting small committees should be formed for the regions involved, in order to explore the possibilities of such units, in collaboration with the office of the Executive Secretary and Council". The chairman elaborated on this theme, also indicating possibilities for collaboration with other societies and organizations in the different regions. Dr. Cutler spoke in favor of regional groups, and made reference to the highly successful joint Linnean Society/IAWA symposium on Applied Plant Anatomy in London last June. Dr. Isebrands also spoke in favor, pointing out the viability of such a regional group in North America. The meeting unanimously voted in favor of the establishment of regional groups, and the following "committees" were established to act as activating nuclei with their region:

Drs. Isebrands and Dickison: The Americas

Drs. Meylan and Butterfield: The Pacific Region

Drs. Baas and Mennega: Europe and Africa (Subgroup Western Europe)

Dr. Nečesaný: Europe (Subgroup Eastern Europe)

Dr. Liese (BRD) urged the committees to formulate and define their aims before the end of the Congress (see Appendix). The chairman pointed out that all activities of the subgroups would be communicated to the Executive Secretary and Council.

The IAWA Bulletin

The members in attendance agreed with the desirability of changing the present numbering of volumes, and also felt the need for a name change coinciding with adopting a new format to start with volume I. Dr. Ifju's suggestion of the following name, "WOOD STRUCTURE, Bulletin of the IAWA" was generally agreed on (two negative votes), after several other possibilities such as "Journal of Wood Structure" and "Wood Anatomy, Bulletin of the IAWA" had been rejected as either too "pretentious" or "not sufficiently appealing" to several wood scientists. (After closure of the business meeting, several members pointed out the existence of a Japanese journal, "Wood Structure", so that the second best recommendation of the meeting is "WOOD ANATOMY, Bulletin of the IAWA".)

IAWA Membership

The chairman elaborated on the comments in the agenda, "According to the Constitution, IAWA members "shall be scientists who are actively engaged in the study of wood structure and related fields". Without altering the scope of the objectives of the Association, one could broaden the membership by changing the definition for members as "persons who are interested in the study of wood structure". One might consider to abandon all formalities (membership committee, etc.) involved in admission as a member".

In a general discussion on this theme, all speakers appeared to be in favor of this gradual and logical change of policy towards a completely open association. It was pointed out by our former Executive Secretary, Dr. Frey-Wyssling, that such policies had in the past not been adopted because of strong opposition by some Council members, but that such a change was now desirable and compatible with the wish to extend the activities of the Association. Drs. Liese and Cutler spoke in favor of abolishing the membership committee, and could speak of it from experience as a "useless" organization. Dr. Dickison supported both suggestions, and added a proposal to abolish the category of Associate Member, but at the same time provide students a reduced membership fee. This motion, together with the proposals of the agenda (redefining the membership and the abolishing of the membership committee) were unanimously approved of by vote.

Financial Affairs

A brief report of the financial condition of the Association was presented. It was pointed out by the chairman that although financially sound, our balance hardly allows for extra expenditure, such as the move of the records of the IAWA to another country, or extra costs of a new format of the Bulletin. Once more members were therefore urged to actively recruit new members, and to promote the sale of the Bulletin subscriptions to libraries. This was generally agreed on. The question was raised of present facilities provided at Syracuse, and it was recommended that the financial implications of this should be considered by the Nominating Committee in case of a move of the office of the Executive Secretary. Dr. Frey-Wyssling stressed the importance of continuity and consistency of lay-out for the new Bulletin format.

Announcements

The chairman announced that a resolution was contemplated to found an International Association of Plant Anatomists, its scope not overlapping with the IAWA. (This resolution has meanwhile been accepted at the final plenary session of the Botanical Congress). A proposal by Dr. Cutler to send greetings and convey our feelings of deep appreciation for the great amount of preparatory work by our Executive Secretary, Dr. W. A. Côté, was gladly accepted by the whole meeting. The Chairman, before closing the meeting, thanked Professor Dr. Yatsenko-Khmelevsky for the excellent arrangements and hospitality during the Wood Anatomy sessions and the business meeting.

APPENDIX

Regional Groups Within IAWA

After the business meeting of the IAWA, the appointed committees agreed on the following "rules, tasks and aims".

1. The regional committees may be expanded. Other regional committees may be formed where the number of IAWA members is sufficient to do this (e.g., Japan and Southeast Asia and a separate committee for New Zealand, Australia and Papua, New Guinea, instead of a single committee for the Pacific).

2. The task of the committees shall be: A. To explore the possibilities for meetings concerning wood anatomy in their region, either as a purely IAWA event or in collaboration with other organizations or societies (e.g., IUFRO, Botanical Societies, etc.) B. To carry out an active recruitment policy in order to increase the membership of the IAWA.

3. All major activities of the regional committees shall be reported to the Executive Secretary and made known to the membership at large through the periodical publication (Bulletin) of the IAWA.

The initial activities of the committees will probably consist of active correspondence with members in their region in order to explore the possibilities for meetings and seek collaboration from all members in recruiting new members.

Pieter Baas

WOOD ANATOMY ACTIVITIES AROUND THE WORLD

A Report from Leningrad

With about 35 papers on wood anatomy, the XIIth International Botanical Congress in Leningrad from July 3 - 10, 1975, provided an interesting and unique opportunity for wood anatomists from all over the world to come together and communicate. The abstracts of these papers and of those 16 which were not read because of absence of the author, or because of other reasons, are readily available in the 2 volumes containing the impressive number of 3260 abstracts of all papers submitted to the organizing committee of the Botanical Congress. Besides the interesting diversity of wood anatomical subjects, there was much more to the Congress than just these formal scientific communications. For wood anatomists outside Soviet Russia it must have been revealing to learn how much wood anatomical work is going on in the USSR, and perhaps this revelation worked both ways. It is sad to have to realize what a language barrier and the use of different letter types has brought about in the mutual isolation of different groups of research workers interested in the same problems. Let us hope that by bringing the two subgroups together, eventually something like "hybrid vigor" in the plant world will result for our wood anatomical disciplines. Particularly the wealth of descriptive wood anatomical knowledge on the rich and diverse Soviet Russian woody flora, would provide an essential extension of our general understanding of wood anatomical diversity, of relevance in systematic and ecological anatomy.

As a representative of the Executive Secretary, Dr. W. A. Côté, I have had the opportunity to urge our Russian colleagues on several occasions to share their interesting results by at least adding comprehensive summaries in English, French or German to their papers. I think that meanwhile the wood anatomists outside Russia should try to learn to read some Russian.

With a constant attendance for all sessions of well over 50 people, there has been ample opportunity to contact colleagues and make arrangements for future exchange of reprints, wood samples and correspondence. In my opinion, this most important aspect of any congress was further stimulated by a lavishly laid out banquet in the Gorki House of Scientists, on July 9, organized by our Russian colleagues for the IAWA members. Besides many members, about 20 non-members participated. Speeches containing good wishes were made by Professor Yatsenko-Khmelevsky, Professor Frey-Wyssling and myself, and the party finalized by singing or humming Russian and American songs in alternation. The following day we were shown around the Arboretum and the Department of Plant Anatomy and Plant Physiology of the Leningrad Forest Academy, where Professor Yatsenko-Khmelevsky was our hospitable host. It should be mentioned here also that during the congress Dr. E. D. Lobjanidze from Tbilisi, Georgia, U.S.S.R., presented the IAWA with 4 sets of wood samples from Georgia. These sets will be sent to institutional wood collections where their scientific interest will be safeguarded.

Looking back on the whole successful occasion, it is all the more appropriate to record here the appreciation of all those who enjoyed the wood anatomical scene in Leningrad to the organizers, Dr. W. A. Côté, our host Professor Yatsenko-Khmelevsky, and to Dr. E. S. Chavchvadze and their numerous Russian assistants.

Pieter Baas