IAWA BULLETIN

1971/2

OUR COVER

For 1971, the IAWA Bulletin cover consists of photomicrographs (cross- and tangential sections) of a particularly interesting wood, *Trochodendron araliioides* S. et Z., Family Trochodendraceae. The absence of vessels, and the nature of the growth increment boundaries, are significant features.

The slide and specimen (BWC_w) 5941 were borrowed from the Harry Philip Brown Memorial Wood Collection at State University of New York College of Forestry. The sample was received from M. Fujioka, Komaba, Tokyo, Japan, on October 20, 1933. Its source was given as Yamaguruma, Formosa.

EDITORIAL

In this issue the technical material deals exclusively with techniques which may prove to be helpful to a number of readers. It is recognized that in many cases the devices or methods do not meet the exact needs of all. Yet, the ideas suggested can be readily adapted for other applications. For instance, the inexpensive saw described by Dr. Hyland can be modified quite easily for cutting small wood blocks. A variable transformer can be added to reduce the cutting speed as desired, a suggestion which was incorporated in the technical note offered by Mr. Mann.

We wish to thank Dr. D. F. Cutler for his report (see "Wood Anatomy Activities Around the World") about progress being made on a Glossary of Standard Terms for Use in Plant Anatomy. Members interested in this activity should direct inquiries to Dr. Cutler who has agreed to serve as coordinator for IAWA and liaison with the Linnean Society.

Although we have been unsuccessful in our efforts to bring our readers historical notes about the early days of IAWA, we have made some progress toward that objective in this issue. Through the cooperation of Council Member Dr. William Stern we are including a photograph of a group of early members of the Association (see "Association Affairs"). Perhaps with this first step we can encourage the submission of short anecdotes about the "good old days" from members who remember them. Such reports might help to keep IAWA moving in the direction envisioned by our founders.

We are still attempting to determine what our readers would like to see in their Bulletin. Are technique articles like those in this issue suitable? We will gladly publish your "Letters to the Editor" on this or other topics.

W. A. Côté

C. H. de Zeeuw

A MINIATURE SAW FOR THE PREPARATION OF WOODY SPECIMENS IN MICROTECHNIQUE[1/]

Fay Hyland, D. Sc.[2/]

To obtain rapid and complete penetration of killing and fixing fluids used in microtechnique, it is necessary to cut specimens to be processed into thin slices or discs. Little difficulty is encountered with succulent material such as herbaceous stems, fleshy roots, etc., which are sectioned easily with a sharp razor blade. It is the woody or refractory specimens which present problems, especially if the specimen is composed of both soft and hard tissues. A case in point is the woody plant stem and root, in which soft tissues are often badly crushed and torn if cut by a jigsaw or razor blade. Especially is such damage evident in the cambial zone immediately external to mature xylem cells of ligneous, perennial stems at the season of the year when recent cambial activity has formed a broad band of immature xylem and phloem tissue.

To minimize damage to thin discs cut from twigs and small branchlets, and at the same time, to speed up the process substantially, a high speed miniature saw was considered. Fine circular saws employed by jewelers appeared as a likely possibility. By making a few alterations, such saws could be adapted for cutting thin cross-sections of woody stems with minimal damage to either succulent or refractory tissues.

1/ Designed for histological work on Dutch elm disease supported by USDA Regional Research Project NE-25 at the University of Maine and The Elm Research Institute.

2/ Emeritus Professor of Botany, Dept. of Botany and Plant Pathology, University of Maine, Orono, Maine 04473

The assembly (Fig. 1) consists of the following:

1. A 110 V. Universal high speed motor[3/] (A, Fig. 1) 17000 r.p.m. (no load), surplus item E60653, securely mounted in a wooden housing with the shaft 2" (5.1 cm)* above the wooden base, and with metal straps over the top of the motor to keep it in place. An alternate and perhaps simpler way of attaching the motor to the base might be by the use of angle irons which may be attached to the back of the motor by the two projecting bolts.

2. A brass arbor[4/] (B, Fig. 1), No. 801 with 5/16" (.8 cm) shaft, one end of which fits on the shaft of the motor and is secured by two set screws, and the opposite end milled to fit the circular saw which is secured to the shaft by a screw with left hand threads, and a washer.

3. Circular saws of convenient sizes (C, Fig. 1), 1" (2.54 cm) diam., .012" (.03 cm) thickness with 72 teeth, 3/16" (.48 cm) hole, No. 76E;[4/] 1 1/2" (3.8 cm) diam., 3/8" (.95 cm) hole, 160 teeth, .010" (.025 cm) thickness, No. 40-078-H10;[5/] 2" diam. (5.08 cm) diam., 3/8" (.95 cm) hole, 200 teeth, .010" (.025 cm) thickness, No. 40-078-L10.[5/]

Unfortunately, only one or two sizes of saw blades will fit the same arbor. However, an experienced machinist can mill the arbor shaft to fit any particular saw. The saw should be mounted on the arbor with the teeth

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3/ Available from Edmund Scientific Co., 101 E. Gloucester Pike, Barrington, N. J. 08807. Cost approx. $4.00.

4/ Available from Kendrick and Davis, Inc., 12 Water Street, Lebanon, N. H. 03766. Cost of arbor $1.75; cost of saws $8.40 per doz.

5/ Available from Minatec Tools, 435 Hudson Street, P. O. Box 10, New York, N. Y. 10014. 1 1/2" (3.8 cm) saws $2.40 each; 2" (5.08 cm) saws $2.85 each.

* All metric measurements approximate.

pointing ahead (toward the specimen). It may be necessary to insert a thick washer or short hollow shaft between the saw and the screw head in order to hold the saw firmly in place. Saws with thinner blades than those indicated above may vibrate unduly, and those with coarse teeth may not produce a smooth, fine cut.

4. A movable wooden block (D, Fig. 1) serves as a carriage. The block slides between two wooden guides approximately 1" (2.54 cm) square in cross-section, and 8" (20 cm) long, extending at right angles across the width of the base (E, Fig. 1). The carriage is approximately 4" (10 cm) wide, 1 3/4" (4.4 cm) thick, and 8" (20 cm) long. It should barely clear the underside of the end of the arbor, and be capable of being moved along at right angles to the saw with 1/8" (.32 cm) or less clearance from the saw. A flat-bottomed slot or notch should be cut across the block 8/16" (1.3 cm) wide, 3/16" (.48 cm) deep, approximately 2 1/2" (6.4 cm) from one end (F, Fig. 1). Another slot should be made in the block approximately 2 1/2" (6.4 cm) from the opposite end. The second slot should be 8/16" (1.3 cm) wide and 10/16" (1.6 cm) deep. These slots serve to hold twigs or other objects as they are being cut. An alternate method is to cut only one slot and make it deep enough to accommodate the saw blade of greatest diameter. When smaller blades are being used, place thin strips of wood (J, Fig. 1) in the slot until the proper depth is attained. A flat-bottomed slot is preferred to one which is V-shaped because most twigs and branchlets are zig-zag, and the flat surface allows for orientation of the specimen at right angles to the saw. When the small saw with one-inch blade is being used, simply place the twig in the shallow slot and use that end of the block. When using the larger

blades, reverse the block and use the opposite end. It follows that the block must have parallel sides and be capable of being moved easily across the base. If the wood is not well seasoned, it may shrink and fit loosely between the guides. This may be remedied by placing a thin piece of cardboard between the block and the guide to allow for shrinkage. In order to facilitate smooth operation of the block, talc may be added to the sliding surfaces.

It is desirable to glue a thin piece of wood along the side of the block opposite the slots, flush with the bottom (G, Fig. 1). If nails are used instead of glue, be sure that they are below the path of the saw. These wooden strips act as a "back" for the sections as they are being cut, and allow for a complete cut of the twig. They will also keep the discs from being "flipped" away from the base, and perhaps lost. In operating the carriage, hold the twig firmly against the near side of the slot until the cut has been made. It probably is best to switch off the motor between cuts, as a safety measure, at which time the disc may be transferred immediately to the killing fluid.

5. The "base" previously referred to is a piece of plank 1 1/4" (3.18 cm) thick, 8" (20 cm) wide and 24" (70 cm) long (H, Fig. 1). It should be flat and smooth. Radially sawed pieces of soft pine or spruce are satisfactory. It will probably be advantageous to use soft pine for the block (and motor housing, also) because of the ease with which it may be worked.

6. Finally, the electric outlets must be considered, and an electrician should be consulted so that the assembly conforms to safety

regulations. The device shown here (I, Fig. 1) is a metal box which contains a combination switch and grounding receptacle. The 10-foot (304.8 cm) lead-in cord contains three wires so that the motor may be properly grounded.

In this article the names of possible sources of supply are included merely as a convenience. Many other sources might be available. Prices are given to show that the items used are inexpensive. The saw is very simple to construct and operate. As described above, it was designed specifically to cut sections or discs of woody twigs one-fourth of an inch (.64 cm) or less in diameter, free from tissue compaction or tearing, preparatory to being processed in microtechnique. Species ranging in hardness from soft (pine, spruce, basswood) to hard (white oak and black locust) were cut satisfactorily. Only a few seconds were required for each cut. Discs thinner than 1/16" (.16 cm) can easily be made. It appears that by using motors of greater torque and by choosing larger saws, it should be possible to cut much larger specimens.

Although the saw is recommended for cutting objects to be embedded in paraffin or celloidin, we have found that certain gross features of twigs and other plant parts exhibited great detail when the discs were observed either by transmitted or reflected light under low power of the binocular microscope or hand lens, especially when the sections were covered with liquid.

Figure 1

Photograph of Miniature Saw for the Preparation
of Woody Specimens in Microtechnique

Fay Hyland
1971/2

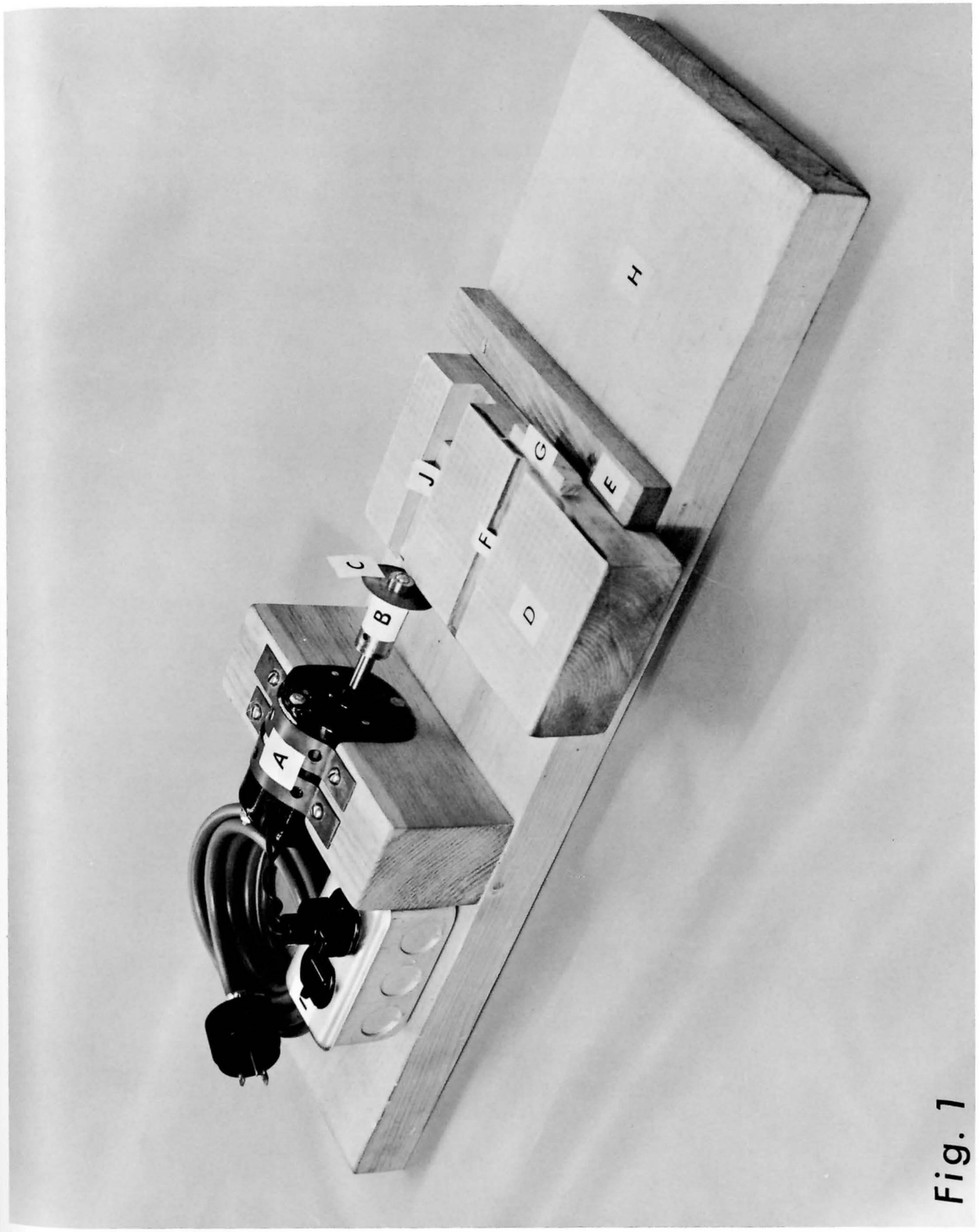


Fig. 1

RAPID METHOD FOR ROUGH-TRIMMING SPECIMEN BLOCKS FOR ELECTRON MICROSCOPY

Paul Mann[1/]

I use a Dremel Moto-Tool (Fig. 1) equipped with a cylindrical carving bit, Dremel No. 194, (Fig. 2) to trim specimen blocks for electron microscopy. The use of flat embedding molds offsets the specimen to one side of the block face which leaves more than half of the face to be trimmed. Previously, a razor blade or a glass knife in an ultramicrotome were used for rough trimming. The former tends to fracture epoxy specimen blocks and the latter is time consuming. Only a few minutes are required to rough-trim a block to a truncated pyramid with a face measuring one millimeter on a side (Fig. 3). The face is further trimmed to the desired size with a glass knife in an ultramicrotome.

At full line voltage, the frictional heat softens the embedding matrix enough for flow to occur. A variable transformer is connected to the Moto-Tool to reduce the speed of the bit, and the heat generated, so that the embedding matrix is ground away. The Moto-Tool rough trims methacrylate and epoxy specimen blocks equally well.

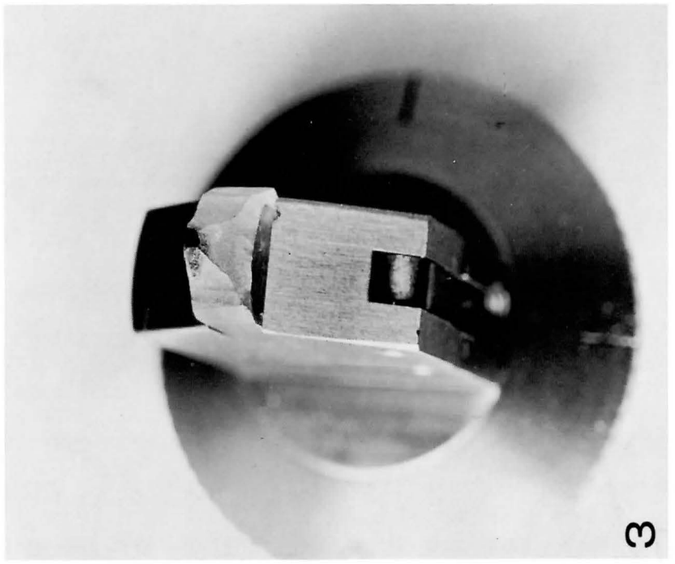
[1/] Graduate Student, Department of Wood Products Engineering, State University of New York College of Forestry, Syracuse, New York 13210.

Figure 1. Dremel Moto-Tool. 1/2X.

Figure 2. Carving bit, Dremel No. 194. 3 1/2X.

Figure 3. Rough trimmed specimen block. 3 1/2X.

Paul Mann
1971/2



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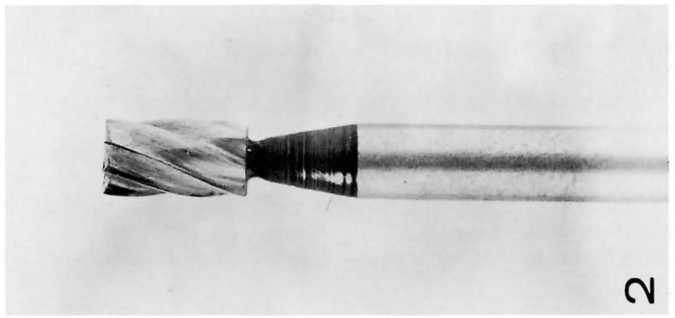

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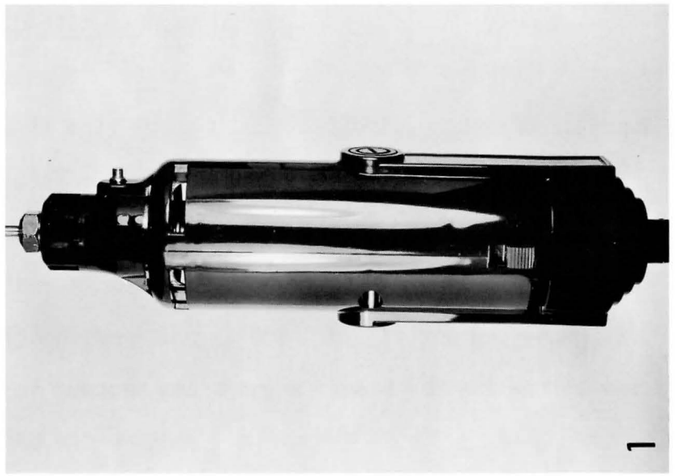

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ASSOCIATION AFFAIRS

By-Laws

As provided in Article XI of the Constitution, the Council is considering the adoption of the following By-Laws:

1. Application for Membership. Persons having the qualifications for Full or Associate membership may apply for admission by submitting the completed "Application for Membership" to the Office of the Executive Secretary. The necessary information may be supplied by letter should application forms not be available.

Membership applications are processed according to the procedures outlined in Article VI of the Constitution.

2. Dues. Membership dues shall be payable on the first day of January. Payment may be made directly to the Office of the Executive Secretary, or to a bank account designated by the Executive Secretary. The amount of dues or subscriptions is established by the Council as provided in Article X of the Constitution. Dues for Associate Members shall be set at one-half the amount paid by Full Members.

Application for Membership

Copies of the new "Application for Membership" are being sent to all members with this issue of the Bulletin. Additional forms may be requested from the Office of the Executive Secretary.

IAWA members who are acquainted with wood anatomists qualified for either class of membership are urged to solicit their application for membership in the Association. This is one way in which IAWA can broaden its base of support and thereby expand its activities and the benefits accruing to all members.

International Association of Wood Anatomists

Attendance at Third Session, Dept. of Forestry Building

Cambridge, England, August 20, 1930

1 2 3 4 5 6 7 8 9 10

11 12 13

1. Prof. H. S. Holden, Nottingham
2. E. H. B. Boulton, Cambridge
3. Jean Collardet, Paris
4. F. W. Jane, London
5. Dr. W. Dawson, Cambridge
6. B. J. Rendle, F. P. L., Princes Risborough, Eng.
7. Prof. S. J. Record, Yale
8. Dr. L. Chalk, I. F. I., Oxford
9. Dr. Paul Ledoux, Brussels
10. C. R. Metcalfe, Kew
11. L. Williams, Field Museum, Chicago
12. S. H. Clarke, F. P. L., Princes Risborough, Eng.
13. S. E. Wilson, England

WOOD ANATOMY ACTIVITIES AROUND THE WORLD

Glossary of Standard Terms for Use in Plant Anatomy

Renewed interest in plant anatomy has been accompanied by an increase in the number of people engaged on comparative and developmental studies. Many students of numerical taxonomy use anatomical data in their analyses.

The wood anatomist is in a fortunate position in having as a standard the Multilingual Glossary of Terms Used in Wood Anatomy. There are many people working on herbaceous material who have no such reference book; they have to search the literature for adequate descriptions of terms. It is evident from the discrepancies that occur between the definitions of a number of terms used in closely related disciplines that a standard work is badly needed. Since the Glossary of Terms for Use in Wood Anatomy is so widely accepted, those who have an interest in both wood anatomy and plant anatomy in the wider sense are anxious that the Multilingual Glossary should form the basis of an expanded glossary. The Linnean Society of London is willing to sponsor the production of an expanded glossary in cooperation with the IAWA.

This will undoubtedly be a long-term project, and I am seeking the cooperation of all those interested. I am willing to act as coordinator in this project and suggest that the Jodrell Laboratory, Royal Botanic Gardens, Kew, should be used as a collecting point for information. In order to gather information in a form which can be readily processed, a suggested format for 15 x 10 cm index cards is shown.

CHARACTER:

FIELD OF STUDY:
(e.g., General, Pteridophytes, Wood, etc.)

AUTHOR:

PUBLICATION:

DATE:

VOL:

PAGE:

NOTES: (including references, if any, & earlier works)

It is hoped that members coming across new terms, or publishing, or modifying definitions, will fill in an index card and send it to be incorporated in the collection. This glossary is to be limited to anatomical terms used in describing Angiosperms, Gymnosperms, Pteridophytes and Bryophytes. It will contain terms relating to cells and tissues and the larger cell contents (crystals, silica-bodies, etc.). Please include even those terms which you have doubts about. A final selection can eventually be made by a small group. In the event of one term having several definitions, it may be possible to select a preferred definition. The preferred definition will be listed first, followed by either less frequently used or obsolescent definitions. This will help those wishing to use a standard term, or those wanting to find the original definition of a term when it is used in the older literature.

To date several people with particular anatomical interests have been asked to provide definitions for terms used in their own field. Among these, several people have agreed to examine between them terms included in selected works, which I list here, in order to prevent excessive duplication of records:

Bower	The Ferns
DeBary	Comparative Anatomy
Esau, K.	Anatomy of Seed Plants
Fahn, A.	Plant Anatomy
Goebel	Organographie
Haberlandt	Physiological Plant Anatomy
Metcalfe & Chalk	Anatomy of the Dicotyledons I & II
Nageli	in Z. Wiss. Bot.
Oxford Dictionary	
Sanio	in Bot. Ztg.
Schwendoner	Mech. Prinzip.
Solereder	Systematic Anatomy of the Dicotyledons
Strasburger	Textbook of botany

In order to give the project some momentum, I shall be pleased to receive from members cards relating to the following items:

Abscission zone	Anisocytic stoma
Accessory or subsidiary cell	Anomocytic stoma
Actinostele	Apical cell
Aerenchyma	Apposition
Albuminous cell	Asterosclereid
Amphicribal vascular bundle	Atactostele
Amphiphloic	Axial organ
Amphivasal vascular bundle	

Progress will be reported from time to time in the Bulletin, and when sufficient data have been accumulated for processing to begin, a small working committee will be called together comprising members of the Association and the Linnean Society of London.

Dr. D. F. Cutler
Plant Anatomy Section
Jodrell Laboratory
Royal Botanic Gardens
Kew, Richmond, Surrey
ENGLAND

Report on Utilization of Foreign Woods in Maine

Your editors recently received copies of a report which may be of interest to many members of IAWA. "Foreign Woods Utilized in Maine--1969" is in the form of an illustrated 64-page booklet. The authors are Dr. Norman P. Kutscha, Assistant Professor of Wood Technology, and L. E. Emery, graduate student, both at the School of Forest Resources, University of Maine. Although some of the information included in the publication appears in other sources, its compilation in the form of this report will expand its availability. Of special interest is the nature of the survey on which the report was based.

Copies of this publication are available without charge by requesting Technical Bulletin 45 from:

Mail Service
PICS
University of Maine
Orono, Maine 04473 U. S. A.

Dr. Kutscha is a member of the International Association of Wood Anatomists.