

Summary Of Proposals
For
International Cooperation
In The Field Of
Tree-Ring Research

INTERNATIONAL WORKSHOP ON DENDROCLIMATOLOGY

Laboratory of Tree-Ring Research

University of Arizona

Tucson, Arizona

April 15-26, 1974

Summary Of Proposals
For
International Cooperation
In The Field Of
Tree-Ring Research

Made During the Concluding Sessions, April 25-26, 1974

Summarized by Karen S. Babcock

PREFACE

During April 15-26, 1974, an International Workshop on Dendroclimatology was held at the Laboratory of Tree-Ring Research at the University of Arizona, to discuss the use of tree rings in studying climate. Twenty-seven invited scientists attended from England, Northern Ireland, France, West Germany, Finland, Sweden, Poland, Israel, Canada, Belgium, and the United States, and approximately 30 staff members of the Laboratory of Tree-Ring Research assisted with and participated in the program. Some of the scientists brought their own materials and worked for one or more weeks before or after the scheduled sessions, processing their data using the library of computer programs at the Laboratory. All who did so found this experience to be exceptionally valuable.

The following summary includes 1) a detailed schedule of the Workshop sessions, 2) a summary of the concluding sessions, including discussions, proposals, and recommendations for international cooperation, 3) summaries of current activities of individual participants, 4) a list of participants in the Workshop, and 5) a list of other scientists expressing interest in the international dendroclimatology program.

Financial and technical considerations prohibit a complete transcript of the Workshop. However, many of the technical matters which were discussed either are, or soon will be, available in articles or books.

The Workshop was made possible by a grant (GA-40560) from the National Science Foundation and a contract (AFOSR 74-2624) from the Air Force Office of Scientific Research, Department of Defense. This support, along with the enthusiasm and cooperation of all participants, has launched an international effort of cooperation, and the discussion at the Workshop has served as an important first step in establishing some standardization of basic methodologies of this very promising field.

I wish to express appreciation on behalf of the Laboratory of Tree-Ring Research, the College of Earth Sciences, and myself, to both the grantors and participants for their cooperation, interest, and support of this initial effort. All of us hope that there will be similar meetings with increasing regularity and that those unable to attend this first session will be able to participate in the meetings of the future. Those wishing to keep in touch with the discipline will do well to join the Tree-Ring Society so that they may receive the new Newsletter as well as the scientific journal, the Tree-Ring Bulletin.

Harold C. Fritts
Professor of Dendrochronology
and Organizer of the International
Workshop on Dendroclimatology

December, 1974

INTERNATIONAL WORKSHOP ON DENDROCLIMATOLOGY

Laboratory of Tree-Ring Research

Monday, April 15--Friday, April 26

MONDAY
April 15

8:00 Registration. Coffee and doughnuts.
9:00 Welcome:
 Dr. John P. Schaefer, President of the University
 Dr. A. R. Kassander, Vice-President for Research
 Prof. H. Odishaw, Dean, College of Earth Sciences
 Dr. B. Bannister, Director, Laboratory of
 Tree-Ring Research
Coffee Break

MORNING SESSION--B. Bannister, Chairman
10:30 Objectives of the Workshop
 Principles of Dendroclimatology--H. C. Fritts
12:00 Opening Luncheon (all participants)

AFTERNOON SESSION--H. C. Fritts, Chairman
2:00 Introduction to Climate--J. M. Mitchell
3:00 The Need for Paleoclimatic Reconstruction--W. L. Gates
4:00 Discussion and Comment

TUESDAY
April 16

MORNING SESSION--J. S. Dean and M. A. Stokes, Chairmen
8:30 Collection--Tools, Techniques, Site Conditions
 Open Discussion
10:00 Coffee Break
10:30 Crossdating
 Open Discussion
12:00 Lunch Break

AFTERNOON SESSION--C. W. Stockton and L. Drew, Chairmen
2:00 Data Preparation and Measurement
2:30 Computer Processing
3:15 Basic Tree-Ring Statistics
4:00 Alternative Statistics and Approaches

6:30-8:30 Cocktail party at home of Dr. and Mrs. Bryant
 Bannister
 Leave from Plaza International by bus.

WEDNESDAY
April 17
8:30 Santa Catalina Mountains Field Trip
Leave from Plaza International by car.
9:00 Sabino Canyon Visitor's Center
"The Many Climes of Mt. Lemmon"--Mr. J. D. Salyer

THURSDAY
April 18
MORNING SESSION--J. M. Mitchell, Chairman
Participants: Mitchell, Wendland, Berger, Blasing

8:30 Climatic Variation
10:00 Coffee Break
10:30 Techniques of Climatic Analysis
12:00 Lunch Break

AFTERNOON SESSION--B. Becker, Chairman

2:00 Estes
2:20 Pons and Serre
2:40 Berger
3:00 Wendland
3:20 Break
3:30 Swain
3:50 Lawson
4:10 Hughes
4:30 Waisel
4:50 Hari

FRIDAY
April 19
MORNING SESSION--M. K. Hughes, Chairman

8:20 Coffee
8:40 Baillie
8:55 Eckstein
9:10 Discussion
9:20 Becker
9:35 Pilcher
9:50 Discussion
10:00 Munaut
10:20 Terasmae
10:40 Parker
11:00 Adjourn for Field Trip

12:30 Load bus at Plaza International
12:40 Depart on Field Trip to Northern Arizona

SATURDAY &
SUNDAY
April 20 & 21

Northern Arizona Field Trip
See Field Trip Log in Folder

MONDAY
April 22

MORNING SESSION--B. Jonsson, Chairman
8:30 Biology of Growth Response to Climate
8:30 Fritts
8:50 Serre
9:10 Waisel
9:30 Hari
Discussion
10:00 Coffee Break
10:30 Statistical Modeling--Response Functions
Fritts and Jonsson
12:00 Lunch Break

AFTERNOON SESSION--D. Eckstein, Chairman
2:00 Bednarz
2:20 Brubaker
2:40 Applegate
3:00 Stockton
3:20 Break
3:30 Jonsson
3:50 Dean
4:10 Wiseman
4:30 LaMarche
4:45 Woods

TUESDAY
April 23

MORNING SESSION--C. W. Stockton, Chairman
Climate Calibration / Reconstruction / Verification
Examples of Various Approaches
8:30 LaMarche
8:50 Stockton
9:10 Douglas
9:30 Fritts
Discussion
Climatology: Mapping of Past Climate
10:00 Fritts
11:00 Blasing
11:30 Discussion

TUESDAY
April 23

AFTERNOON SESSION--V. C. LaMarche, Chairman
Exotic Techniques

2:00 Introduction
2:05 Waisel--X-ray Microprobe Analysis
2:25 Eckstein--Anatomical Studies
2:45 Microdensitometry--General Background
2:50 Woods--Gamma Ray Densitometry
3:10 Parker--Wood Density and Climate
3:30 Break
3:40 V. C. LaMarche--Stable Isotopes
4:10 Tour of X-ray Laboratory
4:30 Technical Session on Densitometric Techniques,
Equipment, and Application

WEDNESDAY
April 24

MORNING

8:30 Field Trip
Leave Plaza International for Arizona-Sonora Living
Desert Museum

AFTERNOON

1:00 Old Tucson (optional)

5:00 Leave Plaza International in Plaza bus for barbeque
dinner at home of Dr. and Mrs. Valmore LaMarche

THURSDAY
April 25

MORNING SESSION--International Cooperation
H. C. Fritts, Chairman

8:30 Introduction
Computer Aspects of a Data Bank--Dr. John Moffatt
10:00 Coffee Break
10:30 Where we are now--Pilcher and Terasmae
Specific Discussions: 1st Round
a. Organization (type and extent)
b. Data Bank (do we want one?)
c. Scientific Journal (can we support one?)
d. Other
12:00 Lunch

AFTERNOON SESSION

2:00 Results of Workshop Analyses--
B. Becker, Chairman
3:30 Coffee Break
3:40 Specific Discussions: 2nd Round and
appointment of Subcommittees to Draft
Recommendations

FRIDAY
April 26

MORNING SESSION--International Collaboration
8:30 Specific Discussions: 3rd Round
B. Bannister, Chairman
Reports of Subcommittees
Discussion
10:00 Coffee Break
10:30 Final Discussion and Consideration of
Formal Plans--J. Pilcher, Chairman
12:00 Lunch

AFTERNOON--Open for continued discussion, individual
conferences, swimming, or sleep.

The Laboratory of Tree-Ring Research wishes you a
bon voyage home. We have learned much from you all and it
has been a joy having you here for these sessions. We look
forward to your return and to meetings and associations in
the future.

International Workshop on Dendroclimatology

April 15-26, 1974

SUMMARY OF PROPOSALS FOR INTERNATIONAL COOPERATION
IN THE FIELD OF TREE-RING RESEARCH

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WHERE WE ARE NOW--I

April 25, 1974

Dr. Jonathan R. Pilcher
Paleoecology Laboratory
The Queen's University, Belfast

"I think we can see a little bit where we've got to and a little bit where we should be going. We have established contact between people with very widely differing basic interests, very widely differing backgrounds. We've got botanists, anthropologists, archaeologists, climatologists, foresters--all people with different approaches and different backgrounds, but all using tree-ring techniques in one form or another and all, at least at the moment here, trying to direct these to climatic study.

"The problem is: We've learned a lot of techniques, we've exchanged ideas, we've exchanged methods; what are we going to do now? Are we going to go home, inspired by other people, and try new techniques and make, we hope, progress? Then what do we do? Do we come back and exchange these ideas, or do we go our own ways, publishing them in obscure journals--Belfast Applied Meteorology, or whatever--and let the advantages that we've gained here gradually fritter away?

I think the sort of thing we have to consider today is: Can we make some basis for continued contact and cooperation? This could come in

a variety of forms. We could have some simple idea--like exchanging a newsletter--or some formal plans for a society or something like that. These are the sorts of things we have to think about. I think we've gained enormous amounts from this workshop in meeting people and in exchanging ideas, and I think we need to follow this up in some way or other.

"The other thing is, we have, some of us more than others, a very big public relations job to do. In this part of the world tree rings are fairly respectable; in some areas tree rings are only semi-respectable. They are on the verge of science or on the verge of I don't know what--mysticism or something. We have a job to do, I think particularly in Europe, to sell tree rings as an important technique, and we have to sell it clearly to the people who pay us money. This is an important factor in any research. You have to sell your subject to grant agencies, and we might find this public relations job easier if we have some more formal basis from which to do it, rather than individuals working in our own areas in our own countries. So, this is another thing which maybe we should consider today.

"We are going to go home and start either collecting new data or having new thoughts about the data we already have on the basis of this workshop, and we should come up with quite a lot of new ideas as a result of this. What we will need, then, I think anyway, is another similar workshop sometime in the future to discuss the results of

what we've done in the meantime with the inspiration we've got from here. I hope that we will be able to make some solid suggestions on this matter.

"I think that's all that I want to say. I again thank all those who have contributed, because particularly to those of us who are fairly new to this field, this has really been extremely valuable. I hope that we can lay some plans over the next two days to make this valuable contact continue in some way or another."

WHERE WE ARE NOW--II

April 25, 1974

Dr. Jaan Terasmae
Department of Geological Sciences
Brock University, St. Catherines, Ontario

"I support what Jon has said. There is no question in my mind but that we've had a most profitable time here. Jon mentioned the matter of communication, of keeping in touch with one another in different fields, and of letting others know exactly what we are doing. Perhaps, then, we should think and talk about what the mechanics of that exchange might be. I think we should seriously consider that we already have the potential means of doing this sort of thing through the Tree-Ring Bulletin, under the same name or under a different one if we wish. The publication could perhaps be enlarged into a newsletter function; it's a possibility. I wish you would give some thought to this potentiality; for communication, in my mind, is of vital importance.

"I would like us not to assume that we already have enough knowledge about techniques. Beyond what we have discovered and what we are capable of realizing now, I think there are improvements that can still be made, including refinements of some new techniques. I think we're very short of basic information in terms of what one might describe or

summarize as tree physiology. We know some things about some species and their response to the environment and climatic factors, but there are many other species we know really nothing about, or about which we assume we know something. I'm not sure we have sufficient knowledge in this very basic area and I think we should encourage our colleagues and ourselves to devote more time and energy to that important basic field. I know this is very difficult to do because quite often, as Jon said, you have to sell what you're doing and this selling is much easier if you emphasize a certain application that happens to be in line with a particular mission, e.g. of a government department. Although money may be available in this sense, attaining funds for doing basic research that must be accomplished isn't always--in fact is rarely--an easy undertaking. However, we may be able to promote this aspect. We should, perhaps, give some thought to using newer applications to attract funds which can then be employed to promote some of the basic tree-ring studies.

"I think we should give some serious thought to the importance of tree-ring study in the Southern Hemisphere. Val [Dr. V. G. LaMarche] said never mind the Northern Hemisphere, the action is all in the Southern Hemisphere. I might have some arguments there, but I think it does point out the lack of and the resultant need for information from that area. Furthermore, such a study relates to the building of models which we are attempting to construct. There are some available, which are, true enough, based mostly on the Northern Hemisphere. But I believe that if we have good information from one of the hemispheres, if the models are

global, if we understand them and we can again feed data into one part of the model, then we can also improve the other part. But it still is, I think, a valid point that we should encourage our colleagues as best we can and also do the work ourselves when we have the opportunity to work in new areas, geographically speaking.

"I also feel that we can and should certainly continue to encourage cooperation with our colleagues in other fields, such as climatology and mathematics. I think that we don't have as much interaction with these fields as we should, yet this goal is not very difficult to achieve because I believe the environmental and political climate is right for this type of cooperation. Some of the newer fields that were mentioned in which we can do some more work are dendrohydrology; dendroecology; chemical scanning of tree-ring records (which I think ties in very nicely with the very important field of pollution or environmental monitoring of conditions that trees respond to). We also very briefly heard a new term--not officially or formally proposed--called dendrographics, which I thought was an interesting approach where one could in effect create the visual picture of changes that can be derived from tree-ring studies. I think there are potentially new applications still feasible, besides, of course, dendrochronology and dendroclimatology which are, I think, quite well established. We should search for possible new applications. I think there is a rather wide field that we have not fully utilized up to this point and I believe there is a good deal more to learn. These are some of the things that come to mind.

"I just want to finish without belaboring the point: We should keep in very close touch in terms of data processing, what we do with the information, and how we present it; and this comes right back to what was discussed here the first thing this morning [i.e. the possibility of an international tree-ring data bank]. If we wish to store the data somewhere, it is quite important to do so in the same way and not in different ways, which complicates the matter. I think we have given some thought to this problem and let us keep our minds open to further discussion. These are the sorts of things that have occurred to me. There are many more I'm quite sure. Basically, I think we're at the point in this field of tree-ring research where there is no question that our undertaking is not simply an interesting thing to do, but it's a necessary task, and with a little bit of a public relations job-- which it is up to us to do--we can, I think, do an even better job than we've done so far with tree-ring research. I'm very much encouraged by what's going on here and hope to transmit this encouragement to some of the funding agencies and government departments in Canada that are waking up to the potential use of tree rings and are beginning to know what can be done with this sort of tool."

TREE-RING SOCIETY

April 26, 1974

Summary of Recommendations and Comments

An ad hoc committee within the International Workshop on Dendro-climatology, with Dr. Richard Phipps as chairman, made the following report and recommendations. Committee members were André Munaut, M. A. Wiseman, Marion Parker, and Jaan Terasmae.

- 1) The Tree-Ring Society should continue to function and should involve as many people, disciplines, and countries as possible.
- 2) An interim Executive (Working) Committee, existing for a period no longer than one year, should be charged with a number of duties, which should include:

Revising the present Tree-Ring Society by-laws
(printed in Vol. 2 of the Tree-Ring Bulletin).

Submitting a slate of nominations for officers
as defined in the by-laws.

Selecting topics for the Tree-Ring Society to pursue
via committees. (Permanent committees suggested
previous to Dr. Phipps' report were: Executive,

Editorial, and Data Bank, the last being an autonomous group made up of contributors only.)

The interim executive officers recommended were:

President, Dr. Dieter Eckstein, Universität
Hamburg, Hamburg, West Germany.

Vice-President, Dr. Wayne M. Wendland, University
of Wisconsin, Madison, Wisconsin.

Corresponding Secretary, Dr. Jeffrey S. Dean,
University of Arizona, Tucson, Arizona.

Membership Officer (Treasurer), Mrs. Helen McQuay,
University of Arizona, Tucson, Arizona.

Editor of Tree-Ring Bulletin, Dr. William J.
Robinson, University of Arizona, Tucson, Arizona.

It was suggested that the committee delegate work to different people in different regions and different disciplines.

Dr. Frank Woods moved that the report be accepted, and in a vote of Tree-Ring Society members the motion carried.

DISCUSSION

Interim President, Dr. Eckstein, noted that he would accept the position, but that he does not have secretarial help and will be somewhat limited as to what he can accomplish. He said that he would only accept this interim presidency. Jon Pilcher reminded the group that a society should have meetings, e.g. the upcoming conferences in Mainz, Leningrad, and Manchester. The interim Executive Committee should consider when and where the group can meet.

Dr. Bryant Bannister agreed to contact the present Tree-Ring Society President, Dr. John McGregor, and ask that he step down to make way for the new officers after they are nominated by the interim Executive Committee and elected by vote of the Tree-Ring Society.

It was agreed that the Editorial Committee should not exceed five members and should be appointed by the editor, with the advice and consent of the Executive Committee. The editor will still retain the freedom to use other reviewers.

The group voted to publish a Tree-Ring Society Newsletter with Dr. Michael Baillie and Dr. Jon Pilcher of The Queen's University in Belfast as the first editors. It was suggested that such a newsletter might be published quarterly and be a chatty broadside, discussing such things as personnel changes, meetings, problems arising in work, who is doing what, etc.

The Newsletter will only be sent to individuals (i.e. not to institutions) and news contributions will not be personally solicited; they must be sent in without request. It was further agreed that the Tree-Ring Society should help with publishing costs.

The group voted to have the Tree-Ring Society offer sponsorship to the newly formed International Tree-Ring Data Bank, leaving the acceptance of such sponsorship up to the autonomous contributor-based Data Bank Committee.

IN SUMMARY, the Tree-Ring Society proposes to:

- Hold an election of new officers.
- Arrange meetings within other conferences, e.g. archaeological, meteorological, botanical, etc., and perhaps arrange other international workshops on dendrochronology.
- Publish the Tree-Ring Bulletin.
- Publish the Tree-Ring Society Newsletter.
- Offer sponsorship to the International Tree-Ring Data Bank.

TREE-RING BULLETIN

April 26, 1974

Summary of Recommendations and Comments

An ad hoc committee within the International Workshop on Dendroclimatology, with Dr. Dieter Eckstein as chairman, made the following proposals in regard to the Tree-Ring Bulletin. Committee members were Zdzisław Bednarz, Marion Parker, and William Robinson.

- 1) The Tree-Ring Bulletin should continue to be published and should develop as a journal for all tree-ring workers in all possible applications.
- 2) From 1975 on there should be at least one issue published per year.
- 3) New subscription rates should be established at \$5.00 for individuals and \$10.00 for institutions.
- 4) The Bulletin should offer the opportunity for non-English-language articles to be summarized by their authors in English.
- 5) The Bulletin should make publishing space available for articles which were published in other magazines, particularly those published in other languages. In the case of previous publication

in another language, the author would have to do his own rewriting.

- 6) The language of publication should remain English, but perhaps with abstracts of the articles in French, Russian, English, and German.
- 7) The Editorial Board should be enlarged to include more language and geographical regions. Suggestions of coverage were:

North America, western: Dr. William J. Robinson,
University of Arizona, Tucson.

North America, eastern: Dr. Jaan Terasmae, Brock
University, St. Catherines, Ontario.

Europe, eastern: Dr. Zdzisław Bednarz, Akademia
Rolnicza, Kraków.

Europe, French language regions: Dr. André Munaut,
Université de Louvain, Héverlee-Louvain.

Europe, German language regions: Dr. Dieter Eckstein,
Universität Hamburg, Hamburg.

Asia: Could we get someone from Japan?

Dr. Frank Woods moved that the report be accepted in principle, and by vote of Tree-Ring Society members the motion carried.

In response to the committee report, the following ideas were offered.

---The Tree-Ring Bulletin should list publications available in the field of dendrochronology.

---There should be people on the Editorial Committee who can write good English for editing translations.

---Australia and New Zealand may be able to more readily supply a dendrochronologist for the Editorial Committee than Japan.

---The British publication Forestry Abstracts summarizes articles from all over the world and has a dendrochronology section, which might be searched for references and abstracts to be printed in the Tree-Ring Bulletin.

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Dr. William J. Robinson, editor of the Tree-Ring Bulletin, said that with the presently used IBM MTST printing process, great flexibility is possible in size, format, and content of the Tree-Ring Bulletin. However, increased manuscript submissions are greatly needed. It was suggested that with increased manuscript and proper funding, the Tree-Ring Bulletin could slowly rebuild to two or possibly four issues per year. Funds will be necessary to support at least some part-time paid help for the editor.

Present circulation is 350, over half of which are in libraries or in other institutions. 500 copies now cost about \$20/page X 35 pages = c. \$700 per issue. It was suggested that with the subscription price increase and increase production, fliers be made to that effect and sent to each Tree-Ring Society member, plus several to each International Workshop on Dendroclimatology participant to distribute to potential Tree-Ring Society members.

Suggested possible inclusions for the Bulletin were:

Who is working on what and where (current research)

Reviews

Publication of synoptic results

Discussion of new techniques

Meetings of interest

Data Bank information--what is available

It was suggested that there could also be supplemental issues of the Tree-Ring Bulletin to publish chronologies.

INTERNATIONAL TREE-RING DATA BANK

Summary of Discussions

April 25, 1974

It was suggested that an international data bank be started with a limited archival system, organized to anticipate intricate retrieval systems desired later. For the time being entries should be limited to data related to global climatic reconstruction, since present funding comes from agencies interested in that project. Actual ring widths should be stored, along with indices if already converted, and climatic response functions if available.

Reasons given by participants for having a data bank:

- It is a feasible undertaking because there is already in existence enough data to store in a data bank usefully, without anyone doing additional work.
- It will help dendrochronologists find out how much more work is needed and where energies should be directed.
- It safeguards against loss of data from laboratories which dissolve and scientists who retire.

---In broad-scale studies, such as global climate reconstruction, a data bank allows smaller laboratories which are not in a position to do the reconstruction themselves to have input and see the results of reconstructed climate in their areas.

---In climate reconstruction, a data bank will help in developing a wider basis for evaluation. There is a real potential that this will help define climatic parameters.

---A data bank offers the opportunity to compare analogous situations in other areas of the world.

---Worldwide tree-ring data can be useful for all countries in dealing with specific ecological problems, such as analyzing variations in productions of albacore tuna.

Availability of data: All entries must be catalogued, along with the category of availability. There should be two categories of availability:

- 1) Available to all
- 2) Available only by permission of the contributor

University of Arizona Laboratory of Tree-Ring Research individuals must apply for permission to use Data Bank materials, just like any individual in any other laboratory.

Permission to submit data should come from the individual contributor, not from his department. However, problems may exist when chronologies literally belong to a laboratory, e.g. because they were given to the lab.

Perhaps at least United States contributors could write into their laboratories' grant proposals \$500 each for submitting their data to the Data Bank.

Dr. Merlin P. Lawson offered to support within his department the bibliographic aspect of a data bank.

April 26, 1974

REPORT OF THE AD HOC DATA BANK COMMITTEE

A report of the ad hoc Data Bank Committee of the International Workshop on Dendroclimatology was made by Dr. Merlin Lawson, chairman. Members of the committee were Dr. Jon Pilcher, Dr. Bernd Becker, Dr. Marion Parker, Mrs. Linda Drew, and Miss Karen Babcock. Proposals offered were the following:

- 1) It is feasible and very important that we make progress on the International Tree-Ring Data Bank.
- 2) All data should be located at a central laboratory, preferably the Laboratory of Tree-Ring Research in Tucson. In the future

there could possibly be some decentralization in the form of bibliographic and other data collections at other institutions.

- 3) Funding might be handled with user service fees, with users in two categories: a) those who can pay, and b) those who cannot pay. Those who can pay would have priority in getting work done.
- 4) A back up system for the data is essential.
- 5) Bibliographic and program libraries are highly recommended.
- 6) The regulatory committee for the International Tree-Ring Data Bank should be made up solely of contributors. That committee might consider utilizing ideas suggested by users, also.
- 7) Data stored should be a) tree-ring widths by core (not the master chronology), with the indices derived by the contributor if possible, b) site information, and c) exotic, alternative parameters (on another data format).
- 8) Dr. Harold C. Fritts should be the first Data Bank Committee chairman and should be able to appoint interim committee members.

- 9) A minority report within the ad hoc committee said that it might be preferable not to have the Data Bank in any way connected to the Tree-Ring Society.

Dr. William J. Robinson moved that the report be approved and the motion carried.

April 26, 1974

MEETING OF DATA BANK CONTRIBUTORS, HAROLD C. FRITTS, CHAIRMAN.

Summary of Conclusions.

- 1) A Data Bank Newsletter should be produced independent of the Tree-Ring Society Newsletter.
- 2) Contributors of accepted data are considered members of the International Tree-Ring Data Bank.
- 3) Present requirements for data entered into the Data Bank include:
 - a) Replication and absolute dating of rings
 - b) Length minimum of 100 years
 - c) Minimum number of 10 trees, per species and site, hopefully with two measured radii per tree.
- 4) Consideration cannot be given to chronologies not meeting

these requirements, and in many cases more rigorous requirements must be applied by the contributor.

- 5) Format of entries must be consistent with whatever International Tree-Ring Data Bank standards are determined.
- 6) Users are a) those given permission by contributor to use his data, and b) anyone using the freely available data.
- 7) All contributors have the option to
 - a) Withdraw data
 - b) Change category of data availability.
- 8) It will be preferable to print out each Data Bank entry at Tucson and mail it to the contributor for proofing before actually entering data into the Data Bank.
- 9) Costs could be handled in two ways:
 - a) Flat fee per job + costs
 - or
 - b) Three categories of basic fee entry, with costs in addition.
 1. Entry fee of \$500. for government agencies, laboratories, etc. + costs.

2. Entry fee of \$100. for individually supported researchers + costs.
 3. No fee to unsupported researchers + costs.
- 10) Eventually the International Tree-Ring Data Bank must be self supporting, although it will now be supported for approximately three years.

Contributors appointed by Dr. Fritts to be on the interim Data Bank Committee are:

Dr. Charles Stockton, Laboratory of Tree-Ring Research, University of Arizona, Tucson.

Dr. Jon Pilcher, Paleoecology Laboratory, The Queen's University, Belfast.

Dr. Bernd Becker, Botanisches Institut, Universität Hohenheim, Stuttgart.

Dr. Zdzisław Bednarz, Akademia Rolnicza, Kraków.

Technical assistants appointed were:

Mrs. Linda Drew, Laboratory of Tree-Ring Research, University of Arizona, Tucson.

Miss Karen Babcock, Laboratory of Tree-Ring Research, University of Arizona, Tucson.

COMPUTER ASPECTS OF A DATA BANK

April 25, 1974

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Summary of Dr. Moffatt's Recommendations

I. DATA BASE MANAGEMENT SYSTEM:

A. What is a Data Base Management System?

A DBMS makes sure that all computerized data is retained, that it can be recovered, and that it can be manipulated. With a DBMS, inverted subject files can be built which log a given characteristic (e.g. species, elevation, etc.) in front of the site identification code, making it, then, the primary entry and thus saving immense amounts of time during retrieval. For example, if one wanted to look at all Pinus ponderosa chronologies, he would search the inverted file for species. Since the entire computer file need not be searched each time, costs of retrieval are cut considerably. Such inverted files can be built at any time with any characteristics already on file or with extrapolated characteristics.

B. Criteria to Consider When Building a Data Base Management System:

CATEGORIZATION It is important to be able to store, categorize, and retrieve data rapidly and with flexibility. Try to decipher the types of retrieval you think you'll want from the data, including extrapolated data. Complex data base becomes difficult for users to understand. A DBMS should be as simple as possible, but sufficiently complete to do the job.

VOLUME/UPDATE/DEMAND Analyze the volume of demands you think you will have on the system, including initial storage volume and future growth, update volume, and retrieval volume. Twenty trees for 300 years (i.e. one site) would take 24,000 digits on the computer. This can be handled very nicely: It's manageable and easy to recover. With the size records we have, we can put about 150,000 trees on a 2400 ft. tape.

INTEGRITY To protect data from loss by destruction there must always be a backup of at least one and preferably two copies at all times. Tapes should be recopied on fresh tapes every 6 months.

PRIVACY To protect other people from seeing or obtaining that which you don't want them to see, you must decide what kind of privacy you need and select one of the many efficient ways that exist for handling

the problem. Certainly a log of all retrievals must be kept, including for what purpose and by whom the data was drawn out. Someone needs to monitor the data and retrieval at all times.

II. OTHER COMMENTS

PRINTOUT For international mailing, microfiche cards are most efficient and should really be considered. Microfiche readers cost about \$90. - \$275. and are available throughout Europe.

INFORMATION STORAGE Disks seem to be preferable to tape in their efficiency and flexibility. They are cheaper in the long run in that less data needs to be read for selective retrieval. They have the ability to handle many more things at one time. Disks must still be backed up by other disks or by tape for data protection..

Written Summaries of Activities of
Individual Laboratories

Dr. Michael G. L. Baillie
 Paleoecology Laboratory
 The Queen's University
 Belfast
 NORTHERN IRELAND

Recent work has led to the establishment of a 592 year absolute chronology for Irish oak (Quercus robur/petraea) covering the period AD 1397 to AD 1970. This has allowed the absolute dating of a number of late and post medieval buildings incorporating oak timbers.

A floating chronology of 453 years has been established using timbers from medieval sites in Dublin. On archaeological grounds this chronology covers the approximate period AD 850 to AD 1300. Present work is continuing with the intention of bridging the gap between the chronologies and establishing absolute building dates for a series of timber framed structures on the Dublin sites.

Dr. Bernd Becker
 Botanisches Institut
 Universität Hohenheim
 Stuttgart
 WEST GERMANY

The laboratory at Stuttgart is continuing the tree-ring studies of the late Professor Huber, Munich, in the following ways:

1. We have established new modern chronologies in southern Germany (Pinus sylvestris, Picea excelsa, Quercus sessiliflora);
2. Studies in the daily growth-rate of Scotch pine in the Schwarzwald Mountains;
3. Dating of medieval churches, farmhouses, etc., with
 - a) The South-Germany oak chronology 1974 - 832 B.C. (Huber)
 - b) The Central-Europe fir chronology 1974 - 820 B.C. (Becker and Giertz)
 - c) A very new Norway spruce chronology which starts at 1250 B.C., from the area surrounding Rothenburg (Becker, unpublished);
4. Floating chronologies of subfossil riverine oak main-horizons in southern central Europe. 1000 analyzed cross-sections cover the river systems of the River Danube, Rhein, Main and their tributaries. They cover after C¹⁴ datings the Holocene-Period between 8500 - 1700 B.P. Three widespread main-horizons show phases of destroying and burying of riverine oak forests between the end of Atlantic-Times up to the Roman-Period.

Dr. Zdzisław Bednarz
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The ring widths of stone pine from Sucha Kasprowa Valley in the Polish Tatra Mountains was strongly related to mean temperatures in June-July. High precipitation during the growth season reduced ring width. The annual rings of Acer pseudoplatanus L. were strongly related to sunshine in June-August. Using these relationships, climatic variations from 1750 - 1910 were reconstructed. As a result of comparing the curves of widths of annual rings of stone pine from the Polish Tatra Mountains, from the Bavarian Alps, and from the Gorgony (Soviet Union) great similarity of annual fluctuations of growth of the investigated trees was found.

Dr. André Berger
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BELGIUM

Much has been said about the astronomical theory of paleoclimates but very few people have an objective idea of the problem. The main reason for the incoherence between the basic assumptions made by different scientists to explain the validity of the astronomical theory of paleoclimates is the non-existence of an absolute quantitative chronology of the secular variations of the surface temperature. The dating of 2 sets of fluctuating phenomena (as paleoclimatic data given by biologists, dendrologists, and paleotemperature issued from theoretical studies) from qualitative coincidence of their general behavior always leads to artificial agreement when the terminus of one is unknown and can be stretched or compressed at will. It is necessary to have 2 absolute independent chronologies before drawing any conclusions. As the insolation is a function of elements of the ecliptic, a modern solution for e, κ, i, ψ, ξ , and has been computed including terms depending on the 2nd power of the planetary masses and the 3rd degree with respect to the e 's and i 's. From a paleoclimatological point of view, comparisons between all existing solutions show that ours is accurate enough to analyze the last 10^6 years or even more.

Dr. Frank L. Charton
Department of Geography
University of Illinois
Urbana, Illinois

Dendrochronological techniques are being employed in an effort to answer ecological and environmental questions. Charton and Harman (Annals of the Association of American Geographers, Vol. 63, No. 3, September, 1973, pp. 302-311) analyzed the tree-ring record from mature living Quercus alba specimens on 34 woodlots across northwestern Indiana. Trees growing on fine-textured soils reflected the greatest environmental stress, a result supporting an earlier hypothesis that local distribution of xeric oak-hickory plant communities was related to soil texture. In an unrelated study in Illinois, Charton has attempted to ascertain the influence of natural flooding on floodplain flora along the Sangamon River. However, difficulty in measuring the annual growth increments of available species, primarily Acer saccharinum, has severely hindered the project.

Dr. Dieter Eckstein
Universität Hamburg
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WEST GERMANY

The tree-ring research in the Institute of Wood Biology of the University of Hamburg has five main applications in 1) dating of archeological excavations, 2) dating of architectural monuments, 3) dating of art-historical objects (paintings and sculptures), 4) dendroclimatic studies, 5) anatomical studies. In doing the first three applications, tree-ring chronologies were and will be established for several regions from Denmark and northern Germany to the Netherlands along the coastal region of the North Sea, of which parts go back to about 1100 A.D. A floating chronology exists for a part of northern Germany covering the period from about 500-1000 A.D. In the future, these oak chronologies will be exploited from a climatic point of view. In addition, further variables, rather than the ring widths, will be extracted from the annual layers in order to extract more climatic information from them, and to obtain information for the changes in the xylem due to air pollution and other human influences.

Dr. Eugene T. Estes
Rend Lake College
Ina, Illinois

Major interest is in extending a chronology back in time for climatic inferences. Previous work has been with Quercus alba and Pinus echinata, but this record extends only 200 - 250 years. Dry wood specimens from oak beams of buildings and cores from Juniperus virginiana are potential sources for longer ring records. Preliminary investigations indicate difficulties in cross-dating the juniper.

Dr. Pertti Hari
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FINLAND

There is a group of young people - the Silviculture Department at the University of Helsinki. This group studies the ecology and physiology of trees, especially the influence of internal and external factors on primary production, growth, photosynthesis and transpiration. The analysis of field data is based on models, which use derivatives and integrals.

Dr. Bengt Jonsson
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SWEDEN

Projects include:

1. Forecasting the development of the Swedish forests under different treatments during the next 50 years. Initially, we assume that the climate is "normal" during this period. The investigation is based on the material from the Department of Forest Survey at the Royal College of Forestry in Snelm. On the basis of this material, we determine many growth functions for single trees. Then we use these functions for forecasting. In the future, when we know more about the climate, we will adjust our prognosis.
2. On a small scale, we are collecting material for long tree chronologies from living trees, trunks, stumps and beams in old buildings, and developing methods for statistical analysis.

Dr. André Munaut
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Since 1960, dendrochronological studies have been carried out at Louvain on living trees, archeological and subfossil material sampled in the Netherlands, Belgium and Switzerland. The aim of these studies is to provide chronologies in order to solve paleological, archeological and climatological problems, as well as for C¹⁴ calibration.

The C¹⁴ and archeological studies are carried out with the Archaeological and Biological Institute of the University of Groningen (Prof. Waterbold, Dr. Corparie, Dr. Vogel, Dr. Mook). Climatological studies are starting in collaboration with Dr. André Berger (Institut d'Astronomie et de Géophysique, University of Louvain).

Mr. Marion L. Parker
 Canadian Forestry Service
 Western Forest Products Laboratory
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 CANADA

Basic applications: Wood quality, dating and climate.

Specialization: X-ray densitometry

Technique and Instrument development: Computerized tree-ring scanning densitometer, X-ray scanning machine, power-driven increment borers (water and air), computer crossdating program and sample preparation techniques.

Projects with Canadian Forestry Service: 1) Fertilized and thinned DF (2 yrs. with Pacific Forest Research Centre); 2) dendrochronological studies with Mackenzie Valley transportation route (3 years with inland waters - flooding, ice jamming, landslides, climate, river discharge, alluviation rate, erosion and permafrost); 3) specific gravity of western hemlock; 4) service function.

Projects with University of British Columbia: 1) DF chronology in British Columbia; 2) effect of air pollution on trees; 3) archeological dating; 4) X-ray study of river sediment cover; 5) willow dating.

Dr. Richard L. Phipps
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United States Geological Survey
Tree-Ring Laboratory
Reston, Virginia

Our primary objective is to develop and provide botanical tools for hydrologic research and investigations. Basic research of the project is primarily concerned with aspects of growth of deciduous tree species in closed forest situations: effects of crowding and competition, 3-dimensional growth models, shallow water tables versus growth rates, occurrence of extreme rings versus species-habitat combinations. Recent emphasis has been placed on a complete simulation of wetlands forest dynamics. Future projects include the development of a master chronology of the Washington D.C. area. Included as a part of the project is a Tree-Ring Lab which functions as a service facility for the Geological Survey.

Dr. Jon Pilcher
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Sub-fossil oaks (Quercus robur/petraea) and pines (Pinus sylvestris) have been collected from a number of sites in the north of Ireland. Radiocarbon dates span the last 8000 years. Work is in progress cross-dating the material and so far a number of floating segments have been established, one over 500 years. Cross-dating is good throughout the 50 mile radius area studied. Resulting chronologies will be used for archaeo-dating, radiocarbon calibration and study of bog and fen history in association with pollen analysis.

Prof. Armand Pons
Dr. Françoise Serre
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Laboratoire de Botanique Historique et Palynologie
Marseille
FRANCE

The laboratory of paleophytoecology of Marseille is primarily devoted to pollen analysis and chiefly concerned with the climatic history of the last 15 millenia of southeast France and the southern Alps. The remote past (tertiary and even cretaceous) is also studied.

Concerning dendrochronology and dendroclimatology, the main work in the past 6 years has been carried out on Aleppo pine (Pinus halepensis). Some other tree species (Fagus sylvatica, and Abies alba of the southern Alps, and Tetraclinis articulata of northern Tunisia) have also been investigated.

In paleoclimatology, the objective now is to obtain chronologies at least 300 years old on the wet Mediterranean coasts, extending to the actual boundaries of the Mediterranean bioclimate. Various tree species (P. halepensis, P. leucodermis in the north, Cedrus atlantica in the south), beams and piles of ancient buildings will be used.

Dr. Jaan Terasmae
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CANADA

Regionally, research covers eastern Canada - southern to arctic. Spruce, pine, hemlock, cedar and tamarack are the primary species used. Lab facilities include X-ray and densitometer system, and optical measuring. Dendrochronology has been used to date landslides, late-Holocene events, and to monitor environmental pollution. Correlation is attempted between instrumental weather records, dendroclimatology, and "proxy" records such as varved lake sediments (palynology, chemistry, physical characteristics), peat stratigraphy, historical records, and hydrology of rivers and lake levels. A project in landscape geochemistry involves the use of tree-rings (wood chemistry) in a study of soil and air related chemical anomalies. Substantial efforts are directed towards calibration of tree-ring records.

Dr. Yoav Waisel
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ISRAEL

Work is undertaken along three lines:

- 1) Dendrochronology - collections have been made in Israel, in northern Sinal (Juniperus phoenicea) and in the northern Galillen (Quercus thaburensis, Juniperus drupacea). Some material was collected in Cyprus (Pinus nigra, P. brutia and Juniperus foetidissima), in Crete (Pinus brutia, Cupressus sempervirens), Turkey (Pinus nigra, Abies silicica) and in Iran (Juniperus polycarpus, Quercus persica and Pistacia atlantica). An attempt is made to construct a master chronology.
- 2) Dendroarchaeology - analysis of all botanical material collected in archaeological digs.
- 3) Cambial activity - study of environmental effects on cambial activity.

Dr. Wayne Wendland
Dr. Albert M. Swain
Center for Climatic Research
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The main objectives of the Center for Climatic Research are to identify and explain temporal and spatial climatic patterns of the Holocene. Series of pollen (1000 yrs.) varve (1000 yrs.) and tree ring (250 yrs.) data are responders to climate (proxies) from which climatic information is extracted by statistical transfer functions. Samples of all three proxies have been obtained from a few sites paralleling the US - Canadian border, to permit three independent climatic reconstructions for comparison. The varve chronology yields a precise chronology for the pollen. Climatic reconstructions may be verified by climatological records from our data bank of early sources. We encourage users to request and submit data sources to this cataloguing service.

Dr. Frank W. Woods
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Through the use of a gamma-ray densitometer, our laboratory is studying the effects of air pollution, mineral fertilization and other human disturbances, as well as climate, on tree growth. We are concerned with the forest stand as the fundamental unit of response. Sources of climatic data nearest to and most representative of local stand climate have been used to evaluate tree responses, and to separate anthropic from climatically induced variations in ring width. Immediate plans include studies attempting to correlate intra-year density patterns with concomitant weather conditions. Also, samples and data will be collected to construct chronologies for the eastern United States, and particularly for the Great Smoky Mountains, in cooperation with the Tree-Ring Laboratory.

INTERNATIONAL WORKSHOP ON DENDROCLIMATOLOGY

1974

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