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IN MEMORIUM

The Canadian Botanical Association/L'Association botanique du Canada regrets to announce the death of Miss Matilda Weresub on January 6 1983, in her 69th year. She had been seriously ill for some time.

Miss Weresub was the sister of Dr. Luella K. Weresub and had just donated $10,000 to the CBA/ABC for the endowment of an award in memory of her sister.

Miss Weresub was born in Russia and came to Canada with her parents and younger sister in 1923, settling in Hubbard, Saskatchewan and moving later to Ontario to be closer to Luella, who had entered Queen's University in Kingston. Miss Weresub had lived in Ottawa for many years.

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NEWS FROM THE SECTIONS

Ecology Section

Chairman: Bruce A. Roberts, Canadian Forestry Serv., P.O. Box 6028, St. John's, Nfld A1C 5X8

General Section

Chairman: Joanne Macdonald, Dept. of Forest Resources, Univ. of New Brunswick, Fredericton, N.B. E3B 6C2

Mycology Section

Chairman: James A. Traquair, Harrow Research Station, Harrow, Ont N0R 1G0

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Systematics & Phytogeography Section

Chairman: John McNeill, Dept. of Biology, Univ. of Ottawa, Ottawa, Ont K1N 6N5

CALL FOR "EMERGENCY RESOLUTIONS"

Members are reminded that, in accordance with By-law 76, " "Emergency resolutions" may be submitted to the Board of Directors at any time prior to their meeting immediately before the annual meeting. The Board of Directors will then declare whether they conform to the general guidelines for resolutions ..... ".

Resolutions submitted under By-law 76 must be received by the Secretary 10 days before the annual meeting (NO LATER THAN JULY 28, 1983). "Emergency resolutions" can only be admitted if they deal with an emergency situation that leaves no time for preparation of a normal resolution.

Send "emergency resolutions" plus all relevant material to the Secretary: Dr. Iain E.P. Taylor, Secretary, CBA/ABC, Dept. of Botany, Univ. of British Columbia, Vancouver, B.C. V6T 1W5

CBA/ABC ANNUAL MEETING 1983, GRAND FORKS

The Program for the Joint Meeting of CBA/ABC and AIBS to be held in Grand Forks, N.D., in August, should be mailed from Vancouver during April to all members of the Association whether or not they have registered for the meeting.

If you have not received your Program by June, particularly if you are attending the meeting, please contact either the Secretary or the *Bulletin* Editor know. We may have a few spare copies, but it will not be a lot — CBA/ABC has to buy the Programs from AIBS and we do not wish to spend more money than is necessary.

POSTERS

Are you presenting a poster at the CBA/ABC Annual Meeting (or any other meeting)? If so, the following advice may be helpful.

1. Remember that posters are becoming almost as important as oral papers at many meetings. Be as careful and conscientious in preparing and presenting a poster as you would a talk.

2. Ensure that you know the size of space allotted to each poster, and that your poster fits within that space.

3. Don't try to write a paper — keep it short! Remember that a time is set aside for presenters to be in attendance at their posters so that you can explain and discuss points. People will return at that time, or try to find you, if they want more information or a point clarified.

4. Use large-size type for written material — at least the Orator ball if type-written. Many people are using large markers and large hand printing for clarity.

5. Use graphs and illustrations — but make sure they are large, clear, and easily readable.

6. Make sure that you put up and take down your poster at the times specified, and that you are there when the program says you will be.

7. Be aware that it may be as difficult for you to see other posters during "presentation time" as it would be to hear other oral papers while giving your own.

CONSERVATION COMMITTEE PROGRESS REPORT

1. *Gilfillan Lake in Nova Scotia* - The committee has studied documentation provided by Paul Keddy and also by the Nature Conservancy of Canada regarding Gilfillan and other lakes in the Tusket River valley. The committee made a strong recommendation to the Conservancy that protection be provided to the endangered Atlantic coastal plain flora in the area. The Conservancy is now planning a meeting in Halifax of all concerned parties to focus on the problem.

2. *Byron Woods in London, Ontario* - The Conservation Committee recommended a thorough scientific study of the natural features of this interesting woodlot prior to issuance of zoning changes that would permit housing development there. The Ontario Ministry of Natural Resources (MNR) funded an independent botanical study which was carried out by a Toronto consulting firm (ecologist: Dan Gregory). This study stated that the site was provincially and nationally significant, and MNR has now indicated its interest in bringing about alterations to the developer's original site plans. Discussions on how the plans can be modified were to begin in early November 1982. The Committee has studied the consultant's report and, based on this, will support any move to restrict development. If an OMB hearing is necessary, the Committee will recommend that CBA objects. A local naturalists group, the McIlraith Field Naturalists, will also object; it has found a lawyer who will act without fee on their behalf.

3. *Ontario's Draft Land Use Planning Strategies* - The Conservation Committee has distributed the district by district draft land use strategies to member experts in the province. We have only looked at the southern districts. Time and manpower were too limited to even think of doing any more. In a number of cases, individual representations have been made by letter and/or by person to the district involved. The Conservation Committee will also prepare an overview response to the whole land use planning program intended for submission from the CBA.

4. *Ecological Reserve Program in Saskatchewan* - The committee decided to encourage the Saskatchewan government to proceed with its ecological reserve program, and a letter was sent from CBA advocating that some of the candidate areas be promptly designated reserves.

5. *Grasslands National Park, Saskatchewan* - The committee recommended that native prairie in southern Saskatchewan be protected by incorporation into a national park. A draft land acquisition strategy is currently being developed by Parks Canada so that land purchase can begin in 1984, after the province has completed its gas and oil exploration in the area. Apparently Saskatchewan is committed to the Grasslands National Park Agreement of 1981 which outlines terms and conditions for the park.

6. *Matchedash Lake Dam, Ontario* - The committee studied an environmental assessment on the effects of alternative methods of lake level control for Matchedash Lake. As southern Ontario coordinator for the committee, A.A. Reznicek met and questioned the district manager of MNR and others on staff in the district. A written critique of the assessment was prepared for MNR, advocating that the water control device which they elect to use permits periodic alterations in the level of lake water and allows fluctuations which are required by the unique and sensitive plant communities in the lake. Subsequent monitoring of the lake by a professional plant ecologist was also advocated.

7. *Acid Rain* - At the suggestion of the committee, the joint Canadian/American meetings to be held in Grand Forks in 1984 will feature a symposium on the scientific substance behind the acid precipitation problem. The committee has investigated some of the literature pertaining particularly to the effects of acid rain on terrestrial vegetation and some of the speakers should address this problem. The symposium will be jointly sponsored by the Ecological Society of America and CBA.

8. *Canada Community Development (CCD) Program, London local chapter of the Wildlife Society Proposal* - The committee studied the Wildlife Society's (WS) proposal to do an ecological study of one of the local natural areas of provincial significance. The attraction of the CCD program was that Canada Manpower would have funded the study if the proposal had been approved. The committee decided that CBA should endorse the proposal as requested by WS. However, WS never submitted a proposal to Canada Manpower because the naturalists group, who had agreed to be the required sponsor, withdrew at the last moment, leaving no time for an alternative sponsor to be sought.

9. *Canadian Council on Ecological Areas* - Dianne Fahselt is presently representing the committee on the CCEA and planned to attend a meeting in Toronto toward the end of November 1982.

10. *Discussion in the CBA Bulletin on Transplantation as a Means of Plant Preservation* - J.K. Morton responded to a committee article that had appeared earlier concerning the advisability of transplantation as a cure to any and all conservation issues. He cited a documented example where transplantation failed and indicated that transplantation is not always a reliable method for ensuring the success of any species or population.

D. Fahselt, Chairman
Conservation Committee

IOPB NEWSLETTER RE-ESTABLISHED

The International Organization of Plant Biosystematists (IOPB) is re-establishing the IOPB Newsletter. The Newsletter has been a useful source of information on biosystematists and biosystematic research being carried out throughout the world. Items on current research, meetings, publications, requests for research materials, etc. should be sent to: The Editor, IOPB Newsletter, Dr. Krystyna Urbanska, Geobotanisches Institut, Zürichbergstrasse 38, CH-8044, Zürich, Switzerland.

ELECTION BALLOTS

Ballots for the 1983 elections for officers of CBA/ABC will be mailed out in the middle of April.

All members of CBA/ABC are urged to vote in the elections.

BCC INFORMATION

Following is the text of a letter sent by the President of the Biological Council of Canada, G. Robin South, to the President of CBA/ABC, James Soper, as a result of the item on BCC dues published in the last issue of the *Bulletin*. This is followed by extracts from an ensuing correspondence between the Secretary of CBA/ABC, Iain Taylor, and Robin South.

Dear Jim,

I was concerned to note that once again the question of the BCC poll tax on the CBA membership has received criticism (Bulletin Vol. 16(1), p.5). I have recently corresponded with Bill Illman about the same matter. To my knowledge, the CBA is the only one of our constituent socities to regularly protest the poll.

As an umbrella organization the BCC does not regularly maintain lists of the members of its constituent societies although we have published directories of Canadian biologists in the past. It is thus impossible for us to know how many members of an individual society are also members of another BCC constituent society. The poll tax is simply levied on the basis of total membership, as advised by the respective society treasurer. From a logistical point of view, it would be very difficult for the BCC to detect duplication. In any event, I suspect that duplication is much greater in some societies than in the CBA.

There seem to me to be two problems. Firstly, the CBA has historically highlighted the BCC "dues" in its annual dues notices; secondly, and more important, I feel that the CBA membership is not perhaps well informed of what the BCC does, and what benefits might be accruing its membership. The Canadian Society of Zoologists, and the Canadian Phytopathological Society, for example, regularly publish the highlights of BCC council meetings in their newsletters, thus keeping members abreast of events. As a member of the CBA myself, I would certainly like to encourage a similar activity in the CBA Bulletin.

I will of course be presenting a report at the forthcoming meeting in North Dakota. In the meantime, however, I would like to highlight current activities which, in my view, will bring considerable benefit to the CBA and other constituent societies of the BCC. We are currently involved in several major developments, viz.

1. Advising NSERC in the establishment of an Advisory Committee on Biology, intended to assist NSERC in the evaluation, promotion and long-term planning of basic and applied biological research in Canada.

2. In collaboration with the Science Council of Canada, conducting an urgently needed inventory of Canada's field stations, with a view to advising NSERC and Government on long-term policy in their support and development in the National context.

3. Lobbying for changes in hiring practices for scientists in the Federal Government.

4. Developing a lobby to revitalize the 1973 proposals for a National Network of Botanical Gardens.

5. Planning the 1985 Canadian Congress in Biology, to be held at the University of Western Ontario, June 23-29, 1985.

The BCC is concerned with Science policy, and as such publishes position papers, develops lobbies and organizes meetings on behalf of its constituents. It has been very effective in the past, as you will know, in addressing questions of concern to all Canadian biologists. I hope, therefore, that the CBA membership will view the BCC in a positive light.

I look forward to meeting with the members of the CBA at the August meetings, and to answering questions about the activities of the BCC.

Yours sincerely,

G. Robin South
President

Dear Robin,

Thanks for the copy of your letter to Jim Soper.

.....

I have spoken to [the Editor] about increasing information about BCC to CBA members. She says that she prints anything that is sent to her. She will not make up stuff. If BCC wants space it can have it in return for the information to be printed. I suggest that either our President or one of your officers can deal with that problem. Another way ..... pass on the minutes etc. to Sylvia. If she has time she culls stuff, but time is a premium, ...

I will ask our President (and try to arrange an on-going arrangement) to report to our membership via the *Bulletin* on BCC matters.

With all best wishes,

Iain E.P. Taylor
Secretary, CBA/ABC

Dear Iain,

..... it may be encouraging for you to know that the BCC is moving towards the production of a leaflet which will be made available to members of all constituent societies, and the object of which will be to inform the membership of the various societies as to what BCC is and what it does. I do not deny that there has been something of an information gap, and while some societies have been very effective in advising their membership of the activities of the BCC, others, perhaps including the CBA, have been less effective.

Following our executive meeting in April, I expect that our Secretary will be in touch with Sylvia and the editors of the other constituent societies bulletins with a view to having a regular insertion about the activities of the BCC.

Yours sincerely,

G. Robin South

Editorial Note: I have received about three times more information from BCC in the last six months than at any other time since July 1980, when I took over the *Bulletin*. I re-iterate the point made in Iain Taylor's letter -- an Editor cannot print material that is not provided. I look forward to adding another regular feature to the *Bulletin*, BCC INFORMATION, and to a continued improvement in the relationship between CBA/ABC and BCC.

TRANSPLANTATION OF RARE PLANTS

TRANSPLANTING RARE PLANTS TO PROTECT THEM: A PLANT ECOLOGIST'S PERSPECTIVE

At the last meeting of the CBA Conservation Committee, concern was expressed about several recent cases where rare plants and/or ecosystems were threatened by development, and where transplanting was suggested as a solution. It was felt that CBA ought to have a policy on this, and several individuals were asked to prepare statements. It is a very complex problem, because the questions raised range from the purely ethical to the purely scientific. I would like to consider a restricted question: Do we have the scientific data to justify transplanting as a means of protecting rare species? To keep the discussion confined, I will not deal with either of the following possible arguments:-

(1) One object of conservation is to preserve representative ecosystems. Transplanting a few components of a particular ecosystem will not result in a "natural" ecological community.

(2) One object of conservation is to protect representative vegetation. Transplanting a few species might maintain the flora, but not the vegetation. The flora is the list of species in an area, whereas vegetation includes the distributions and relative abundances of these species.

Ignoring ethical or scientific considerations relating to conserving entire ecosystems, the question I wish to examine is: Is it technically feasible to predict whether we can use transplantation to successfully establish a species in an adjacent area of similar habitat? Note that I am further confining the topic of discussion. Transplanting to botanical gardens does not, in my opinion, deserve serious consideration except in the most severe cases (unless, perhaps, it is for propagation and eventual re-introduction to a natural community). Similarly, transplanting to an entirely different habitat will not be considered. I assume that no-one will seriously argue that deep forest plants be moved to old fields, or wetland plants to adjacent rockbarrens.

Definition of transplanting

Two terms need to be clearly understood: (1) What constitutes "successful transplanting"; and, (2) what constitutes an area of "similar habitat"?

Successful transplanting consists of more than just moving a plant and showing that it is alive a week later. Successful transplanting requires that a viable population be established, that is, all of the following stages must occur. (Assume that adult plants are being transplanted.) "Success" would be defined as:-

(1) initial survival (that is, adjusting to transplant shock)
(2) persistence
(3) flowering
(4) seed set
(5) seed dispersal
(6) germination
(7) establishment of seedlings
(8) growth of seedlings to new adults.

The transplant is a success only if all of steps 1 to 8 occur at the new site. While many perennials may persist and spread by means of asexual reproduction (Harper & White 1974, Harper 1977), it is still reasonable to insist that a viable population must be one that is capable of completing its life cycle.

How similar is "similar habitat"? I will return to this later, but let us assume that "similar" means at least the same physiographic site class in the same site region (Hills 1961).

Thus, the question initially posed can be rephrased: Can we predict that steps 1-8 would occur in an adjacent physiographic site class? Assume we have two relict Carolinian woodlots. Species A occurs in Woodlot #1, but not Woodlot #2. Whether or not Species A could be transplanted from #1 to #2 depends largely upon the reason for its absence from #2. There are two possibilities:-

(1) Species A is absent from Woodlot #2 because some set of specialized habitat requirements demanded by the species cannot be met within Woodlot #2. I will call this the "specialization hypothesis".

(2) Species A is absent from Woodlot #2 because no propagules have arrived. If dispersed, the species is capable of establishing in Woodlot #2. I will call this the "dispersal hypothesis".

Clearly transplanting will likely work in case 2, but fail in case 1. Thus, the problem is actually a re-statement of a fundamental ecological question: How important is habitat specialization, and how important is dispersal, in explaining the present distribution of a species?

Neither detailed measurements, nor careful experimentation, are likely to enable us to answer this apparently simple question in the near future.

Assume that a field ecologist measures n environmental factors in woodlots #1 and #2, and concludes that there is no significant difference. This does not refute the specialization hypothesis, because, as a reductionist would quickly point out, it is likely the $n + 1^{th}$ factor which discriminates between the two sites. Similarly, it may not be the mean of the factor, but its variance with time. Assume that transplants are made and succeed for y years. Proponents of specialization can correctly argue that temporary persistence is not the issue, but long-term survival is. The $y + 1^{th}$ factor might be the year when climatic fluctuations eliminate the transplants from Woodlot #2, but allow them to survive in the better conditions provided in Woodlot #1. If measurements of n factors were made for y years, it could be argued (soundly) that either the $n + 1$ factor discriminates between the woodlots, or the variance contributed by the $y + 1$ year.

Thus, it at first appears that it is not possible to determine the role of habitat specia-

lization and reach a scientific decision, even given unlimited time and resources. Before turning to the practical issue of transplanting, consider the scientific dilemma further.

Rejecting the specialization hypothesis

Above, I argued that it might be the $y + 1$ year which distinguished between the two sites, thereby making it impossible to reject this hypothesis under any circumstances. There is, I believe, one possible experimental solution. Presumably, even natural populations of a species have a limited life-span. If we (1) monitored enough natural populations to obtain an estimate of mean life-span for natural colonies, and (2) did the same for experimental transplants, it ought to be possible to test whether the transplanted populations were significantly more short-lived than the natural populations. If there were no significant difference we could reject the specialization hypothesis.

Such an experimental study would probably take a very long time. Harper & White (1974) and Harper (1977) have reviewed the literature on the life-spans of plants, and several of their observations are relevant. It is clear that many plants have life-spans well over a century. Clonal species in particular have no upper limit, and clones greater than a century old have been found in many species. Moreover, a single rare event, such as a fire, may allow the regeneration of species, which may then persist as clones for centuries.

Rejecting the dispersal hypothesis

It may well be easier to attempt to reject the dispersal hypothesis, thereby leaving the specialization hypothesis. There are at least two alternatives.

It may be possible to demonstrate that dispersal is not limiting. A combination of seed traps and seed bank studies might demonstrate that seeds of Species A are constantly arriving and accumulating in Woodlot #2, and that the site is therefore (at least presently) unsuitable. If this were the case, we could reject the dispersal hypothesis. (Note that the alternative is not true: The absence of detected dispersal does not strongly support dispersal as the explanation, since "rare" dispersal events may be more than adequate for the species to disperse under natural conditions.)

These alternatives are summmarized in Table 1.

Note that these hypotheses are not mutually exclusive. A species could be absent from a site both because it has not dispersed there and because the site is unsuitable habitat. In this case too, transplants would fail. It would not be absent, however, if both dispersal and habitat requirements were met.

Practical considerations

The above arguments show how difficult it is to answer the specialization versus dispersal hypothesis for even a single species. I know of no examples in the scientific literature where this has been successfully accomplished. Certainly given the time scale of environmental hearings, such studies would seem to be out of the question. Moreover, the problem is compounded with rare species, which are exactly the species of interest. There are few individuals for obtaining autecological measurements, and relatively few seeds produced for measuring dispersal!

Therefore I conclude that, without such studies, it cannot be scientifically argued that any particular transplant program is justifiable.

Proponents of transplanting may feel it is "unrealistic" to set up such stringent criteria, but to do anything less would be to deny the very real problems that face scientists in plant ecology.

Those without scientific training in ecology always appear to under-estimate the complexity of the problems involved. Consider the factors which likely influence our hypothetical Species A in the Carolinian woodlot. If we assume 10 tree species, 10 shrub species, 20 herbaceous species, and 5 agents of seed dispersal, we already have 50 biological components influencing and possibly interacting with Species A. Those familiar with experimental design will realize the immensity of the problem involved in determining which of these components are relatively important, and which are not. Will any canopy species provide the necessary shade? Are there mycorrhizae, and perhaps mutualistic associations with shrubs? Is an insect pollinator required? Does the pollinator require other herbaceous species to complete its life cycle? Is there a specialized requirement for seed dispersal? Morton (1982) has cited one case where a rare species, *Schoenus ferrugineus* L. (Cyperaceae),

TABLE 1. Interpreting the outcome of experiments testing the specialization and dispersal hypotheses

Transplants	- live as long as natural populations	- reject specialization and accept dispersal
	- fail to live as long as natural populations	- accept specialization dispersal inconclusive*
Seed Traps & Seed Banks	- dispersal documented	- reject dispersal and accept specialization
	- no dispersal observed	- inconclusive

* Species may be highly specialized and inadequately dispersed.

failed to survive being transplanted a distance of only a few meters on a lakeshore. Though the plant persisted for a few years, it eventually died out and is now believed to be extinct in Britain.

It is all too easy to be swayed by facile arguments, such as a species surviving in a backyard wildflower garden. I have transplanted common woodland plants from woodlots being bulldozed. They survived. But, as noted above, a viable population must meet further conditions. It must pass through stages 1-8. (Species such as *Sanguinaria canadensis* and *Caulophyllum thalictroides* have done so. Others have not.) It must also persist as long as other natural populations. Note too, that criteria 1 through 8 may each have increasingly specialized requirements, as shown in Figure 1. This re-emphasizes that temporary persistence, or even vegetative propagation, in a site does not demonstrate that successful transplanting is possible.

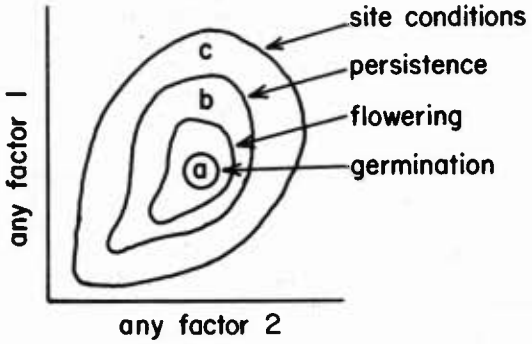

FIGURE 1. One way in which life history stages may be a function of two environmental factors (e.g., light, temperature, moisture, nitrogen, phosphorus). At "a" these two factors permit successful transplantation, at "b" plants persist but these two factors are not adequate for sexual reproduction, and at "c" adult plants do not persist after transplanting.

In conclusion, it is extremely difficult to demonstrate scientifically that transplanting will succeed. Without the appropriate data, predictions of success are really nothing more than guesses and therefore transplanting cannot be considered a straightforward solution to preserving rare plants.

Acknowledgements

Mirek Sharp kindly read a draft of this manuscript and assisted in clarifying several points. Comments and criticisms from other readers are requested!

Addendum

Mirek Sharp recently brought to my attention Chapter 2 in C.J. Krebs (Ecology: The Experimental Analysis of Distribution and Abundance. 1978. 2nd ed. Harper & Row, N.Y. 678 pp.). This chapter is entitled "Methods for Analysing Distributions", and discusses the interpretation of transplant experiments in a related manner.

Literature Cited

Hills, G.A. 1961. The Ecological Basis for Land Use Planning. Ontario Department of Lands and Forests, Research Branch, Report No. 46. 204 p.

Harper, J.L. 1977. Population Biology of Plants. Academic Press, London. 892 p.

Harper, J.L. & J. White. 1974. The demography of plants. Annual Review of Ecology & Systematics 5: 419-463.

Morton, J.L. 1982. Preservation of endangered species by transplantation. CBA/ABC Bulletin 15(3): 32.

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FORTHCOMING MEETINGS

First National Conference for Canadian Women in Science and Technology, May 20-22, 1983, at the University of British Columbia, Vancouver. The Society for Canadian Women in Science and Technology (SCWIST) is hosting a national conference for women scientists, potential women scientists, and those who wish to be informed on contemporary issues in science. The conference will address the specific issues of science and math education for girls; women scientists re-entering the work force; problems and issues related to practising women scientists; and the development of a national network of women in science and technology. The plenary sessions are "Women, Science and Society", "Future of Canadian Women in Science" and "Is Science Male?". The registration fee is $100 (cheques should be made payable to Society for Canadian Women in Science and Technology).

To register or for further information, contact: Dr. Hilda Lei Ching, SCWIST, P.O. Box 2184, Vancouver, B.C. V6B 3V7

American Society of Pharmacognosy 24th Annual Meeting, July 24-28, 1983, at the University of Mississippi, University, Miss. The main Symposium will be on "Recent Advances in Structure Elucidation of Natural Products". The deadline for submission of abstracts for papers and posters is June 1, 1983.

For further information, contact: Dr. James D. McChesney, School of Pharmacy, The University of Mississippi, University, Miss. 38677.

FUTURE MEETINGS OF CBA/ABC

1983 — Grand Forks, N.D., August 7-11
Joint Meeting with AIBS

1984 — Fredericton, N.B., June 24-27

1985 — London, Ont, June 23-29
Canadian Congress of Biology
(BCC Sponsored Meeting)

1986 — Sudbury, Ont, date not yet known

1987 — Montréal, Qué, date not yet known

Shrubs of Ontario, by James H. Soper and Margaret L. Heimburger. 1982. Life Sciences Miscellaneous Publications, Royal Ontario Museum, 100 Queen's Park, Toronto, Ont M5S 2C6. 495 pp. $20.00 Can. plus $2.00 postage & handling.

This is a first rate book that every Ontario field botanist and naturalist will want to own. At a price of $20, it is within the reach of all serious students of our flora. It is, however, a little too bulky to be used as a field companion. This is unfortunate because a smaller and more compact format could have been achieved with a little foresight.

Each species of shrub, both native and naturalized, is illustrated with a very good full-page line drawing. Keys for identification are provided, and for the most part they work very well. Also there is a full description, together with notes on habitat, distinguishing characters and the derivation of the name, for each species. Similarly, dot maps give precise information on known distributions in Ontario and notes indicate the range of distribution elsewhere. These maps are one of the most valuable features of the book, and will make it a constant reference source for botanists and phytogeographers. Hopefully the maps will serve to pinpoint the many gaps in our knowledge of the distribution of these plants in Ontario and encourage the reporting of new discoveries.

The definition of shrub is taken a little too literally with the inclusion of several diminutive components of the ground vegetation such as *Potentilla tridentata* and *Linnaea borealis*. At the other end of the scale, it is difficult to understand why some species, e.g. *Juniperus virginiana*, are omitted and others, e.g. *Salix fragilis*, are included. However, it is doubtful whether any two botanists would entirely agree on what species to include in a list of our shrubs!

A useful feature of the book is that it brings the nomenclature and taxonomy of most of our shrubs into line with recent work, for the standard floras of eastern North America are sadly out of date. Shrubs include several taxonomically "critical" groups. The treatment of these by the authors is very uneven. For instance, that for the Willows is excellent, but those for the Brambles, Hawthorns, and Serviceberries are rather disappointing and appear to contain an over-simplification in what are admittedly difficult and, to some extent, poorly understood genera.

Despite these criticisms, the authors are to be congratulated on the publication of a thoroughly researched and well produced book that will, for this reviewer, be a constant source of reference and pleasure. I commend it to all botanists and field naturalists who are interested in the flora of this side of our continent.

John K. Morton
Univ. of Waterloo

A Flora of Waterton Lakes National Park, by Job Kuijt. 1982. University of Alberta Press, Edmonton. xxiv + 684 pp. $25.00 Can. (hardcover), $15.00 (waterproof paperback).

More than half of the vascular plant species found in Alberta occur in Waterton Lakes National Park. This handsome new flora of the park includes habit drawings of all the species plus a few colour plates. A novel feature of the book is the simplified botanical terminology used, which should make it especially useful to amateur naturalists and visitors to the Park. The simplified terminology works remarkably well, but there are problems in a few cases. The word "entire" is not used in a consistent way. In the key *Rubus parviflorus* is described as having entire leaves, which it does not, even by the definition given in the glossary. I also was not certain what "far heads" meant in the key to *Cirsium*. The keys work well generally, although the longer ones would be easier to follow if the leads were numbered. Instead, strange symbols are sometimes used if contrasting leads are not on the same page. *Carex concinnoides* is mentioned in one lead of the Sedge key but is not keyed out, which could prove confusing. It is, in fact, treated as a synonym of *C. richardsonii*.

There are a few inconsistencies in taxonomic treatment. No infraspecific taxa are recognized in *Camassia* but they are in *Zigadenus*. *Lithophragma bulbifera* is recognized as a species, which is somewhat suspect, but *Linum lewisii* is synonymized with *L. perenne* despite their genetic isolation and consistent differences in floral structure. Ferns are all lumped into the artificial family Polypodiaceae, although that probably does make identification of them easier.

The number of typographical errors is remarkably low, although *Aster conspicuus* is misspelled and on page xviii *Oplopanax horridum* is alternately stated to not occur in the area and then to occur in the Park. But these are all minor quibbles. All in all, it is a well done and easily usable local flora.

Fred R. Ganders
Univ. of British Columbia

Collins Field Guide to the Wild Flowers of South-East Australia, by Jean Galbraith. 1977. William Collins Sons & Co. Ltd., Sydney. 450 pp. $13.95 U.S. (from I.S.B.S., P.O. Box 1632, Beaverton, OR 97075).

The flora of temperate southeastern Australia is large, diverse, and spectacular. To cover it in a field guide is not an easy task. This ambitious book describes more than 3000 native species (everything except *Eucalyptus*, grasses and sedges), as well as a small number of introduced species. It includes 368 small but good quality colour photographs and more than 300 line drawings.

My two criteria for judging a field guide such as this are whether the names are correct and whether I can identify plants with it. The nomenclature is accurate overall, although perhaps not up-to-date in lumping *Tasmannia* in *Drimys* and *Syzygium* in *Eugenia*. Curiously, the parenthetical authors of plant names have all been omitted, but this will make no difference to most users of the book. The book uses a very simplified terminology, which often works well but sometimes seems to have little advantage, for example calling glands "knobs". Dichotomous keys are not used, but simplified key-like guides narrow down the list of possibilities. This means that one must often read through a dozen or more descriptions. The descriptions of each species are two to five lines long, and include the geographical range. Together with the pictures, they allow reasonably easy identifi-

cation of most genera and many species. The problem comes in the large genera — there are too many species to choose from.

The book includes 169 species of Wattles (*Acacia*), 88 of Bushpea (*Pultenaea*), and 18 other genera with 30 species or more. Together these 20 genera account for about one quarter of the book, and they make up much of the vegetation. It would be a formidable task to identify most of these species without using technical keys. The short, simplified descriptions provided are not sufficient. After reading about ten descriptions, I tended to get frustrated and give up. A novice would have better luck with a less comprehensive book that emphasized the common and conspicuous species. Someone who wants to identify everything will have to use a flora.

For a visitor to southeastern Australia interested in wildflowers, I would recommend Flowers and Plants of Victoria and Flowers and Plants of New South Wales and southern Queensland, published by A.H. and A.W. Read, Sydney. They cover fewer species, but with more (and larger) excellent colour photographs. They may be a little large to carry in the field, but I had more success identifying the plants that I photographed in Australia using them than I did using this field guide.

Fred R. Ganders
Univ. of British Columbia

Introduction to in vitro propagation, by D.F. Wetherall. 1982. Avery Publishing Group Inc., Wayne, NJ. 87 pp. $7.95 U.S.

Plant Tissue Culture. Methods and Applications in Agriculture, edited by T.E. Thorpe. Academic Press, London & New York. 379 pp. $23.50 U.S.

For anyone who has questioned the value, utility or future of plant tissue and organ culture in today's and tomorrow's botany, then a scan through a list of recent titles will come as a shock. In recent years many texts and reviews have appeared covering varying aspects of the topic. Wetherall's short, soft-covered Introduction to in vitro propagation is not one of the useful general treatments but is intended primarily for the amateur gardener, horticulturalist or high school student who wishes to propagate plants using aseptic techniques. As such it will be wuite useful, but will be of little value to the student with more general objectives.

Far more useful and informative in my opinion is the volume edited by T.E. Thorpe of the University of Calgary, Plant Tissue Culture. Methods and Applications in Agriculture. This collection of articles, derived originally from an International Training course sponsored by UNESCO in Brazil, provides very detailed summaries of the present state of many individual procedures and applications. The first chapters, dealing with basic methodology, review the basic culture room and facilities, media, embryogenesis, protoplast formation, mutagensis, meristem preservation and cytogenetics techniques. The second set of chapters cover anther culture for haploid tissues, in vitro fertilization, and special chapters on the use of in vitro techniques with rice, sugar cane, coffee and fruit trees. For the most part, each article is well referenced and provides an excellent statement on the state of the science at the end of the '70s.

At the conclusion of the 1981 CBA Annual Meeting at Guelph, the banquet speaker - George Setterfield - tried to convince his audience that plant tissue culture in all its forms was no longer a laboratory toy, but a well-established procedure what should be seriously considered by botanists, being eminently suited for the resolution of many intractable biological problems. For those Canadian botanists who felt his message was not sriously intended, and there appeared to be many, I would recommend this last title especially. It is a very worthwhile addition to the field.

Richard I. Greyson
Univ. of Western Ontario

Wild Food in Australia, by A.B. & J.W. Cribb. 1976 (1980 reprint). Fontana Books, Wm. Collins Publishers Pty. Ltd., Sydney. 240 pp. $6.50 US (from I.S.B.S., P.O. Box 1632, Beaverton, OR 97075).

This book was first published by Collins and is now available in reprinted form. It describes a variety of the plants, as well as some edible fungi, algae and animals, to be found in this large continent with its extremely varied flora.

Botanical descriptions, of necessity, are inadequate and pre-suppose familiarity with at least one species of each genus. Eight colour plates, with a total of 60 paintings by Charles McGubbin, aid in identification, as do a few delightful marginal sketches of others.

The weaknesses of the book appear in the description of the fruits of *Achronychia* with which the book opens. It says that rain forest trees are notoriously difficult to identify but this one has translucent oil dots in the leaves! Some of the fleshy, cream, yellow, purple or red, rounded or clearly 4-angled fruits seem to have been eaten but little is known of their edible qualities. The authors tried more than one species but found them acid and too aromatic to be enjoyable.

Protection of plants and animals is stressed in the well-written preface, yet 3 species of orchids are listed for Queensland, where they have protection.

Again, a number of species or genera are included whose toxicity can be questioned or that may require special treatment before using. Tea made from mistletoe berries has been fatal to at least one user, and two of the *Acacia* species listed are reported by Kingsbury (Poisonous Plants of the United States and Canada, 1964) to contain toxic substances.

Foods are classified as fruits, seeds, roots, etc. There is a section on water and beverage plants, and one on nectars, gums and leaf exudates (manna). Most of the seaweeds are known commercially, the few fungi include familiar species of *Agaricus*, *Coprinus* and *Lepiota*. Animals discussed are now generally protected.

It is interesting to learn that only one aboriginal plant is used commercially (the Macadamia or Queensland Nut), that honey ants can carry a marble-sized reservoir or 'honey' in their abdomen, and that witchetty grubs, the larvae of a large moth, are delicious when cooked (confirmed to me by a recent Australian visitor). Enthusiasts who suffer from recommended foods can try large clay or mud pills.

Much of the book's charm lies in the historical references to plants used by aboriginals and tried by explorers or early settlers. More could have been made of the authors' own adventures such as with Moreton Bay Chestnuts and Black Arum Lily roots. Plants are often included because of an interesting historical reference rather than because they are edible. A book for armchair reading, but of no great interest to taxonomists, although it does provide a general guide for Australians who might require emergency food.

Mary I. Moore
Deep River, Ont.

Cartoons Etcetera — Largely of a Scientific Nature, produced by Robin Day. 1982. Ubiquitous Publishing, Winnipeg. No pagination. $3.00 Can + 0.60¢ postage (from Robin Day, Biology Dept., Univ. of Winnipeg, 515 Portage Ave, Winnipeg, Man E3B 2E9).

This book is the result of doodling between classes and later collaboration with four other people - Peter Kuitenbrouwer, Ron Lausman, Darryl Wiebe and Lois Klassen. The cartoons, as indicated in the title, are largely scientific - botany, zoology, ecology, medicine, pysch., etc. They include something that I guess many students do to break the tedium (certainly I did x years ago when at a certain university) - daffy definitions and plays on words. In this case, these are often by illustration. For example, Spudnik is a potato orbiting the earth; a series of pictures of a melon, collie and baby demonstrates two words from a song; Oedipus complex becomes Eat-a-Puss complex, complete with apple in the mouth; the French form of peanut butter becomes Beurre d'arachnides, with a terrifyingly 'fanged' spider eating it; and so on. My favourite cartoon? A bird declaring that it has never heard of adaptation while standing before an opened can of granola - the beak is a can-opener. This is also the cover picture. Three people collaborated to produce the Scientist's Dinner - Primordial Soup with Synonym Rolls, Raw Data and Fudged Results served on the finest Tectonic Plate.

The book has been on my desk for 2-3 months and has attracted attention from numerous people - many laughs and, it must be admitted, some groans for the puns perpetrated, and one or two "ughs" for the odd somewhat gross item.

I recommend this little book for anyone who has a sense of humour and of the ridiculous.

Sylvia Taylor
UBC Botanical Garden

BOOKS RECEIVED FOR REVIEW

Moss Flora of the Maritime Provinces, by Robert R. Ireland. 1982. Publications in Botany, No. 13. National Museum of Natural Sciences, National Museums of Canada, Ottawa, Ont. 738 pp. $20.00 Can.

Flowers of the Wild. Ontario and the Great Lakes Region, by Zile Zichmanis & James Hodgins. 1982. Oxford University Press (Canada), Toronto. xv + 272 pp. $35.00 Can.

PERSONALIA

Dr. Michael Shaw of the University of British Columbia has been appointed a University Professor in recognition of his distinguished contributions to science and to the University. Dr. Shaw has resigned as Academic Vice-President and Provost of the University as of June 30 1983. He was Dean of Agricultural Sciences at UBC from 1967 until 1975 when he became Vice-President. The rank of University Professor is conferred on faculty members who have achieved special distinction, and Dr. Shaw is only the third person to receive the honour. He will now devote his time to teaching and research in the Faculties of Agricultural Sciences and Science at UBC, with an office in the Department of Botany. Dr. Shaw has an international reputation in the field of rust diseases and their interactions with the host plants, and is the author of almost 90 scientific publications. He is a fellow of the Royal Society of Canada, and was awarded its Flavelle Medal in 1976; received the Gold Medal of the Canadian Society of Plant Physiologists in 1972; was the fifth Canadian scientist to be elected a fellow of the American Phytopathological Society, in 1973; and received the honorary degree of Doctor of Science from McGill University, his alma mater, in 1975. Dr. Shaw was editor of the Canadian Journal of Botany from 1964-1979, and was President of CBA in 1980-81.

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FINNISH BOTANIST DIES

I expect that many members of the CBA/ABC know the name *Ilmari Hustich* and his publications on Canadian phytogeography. It is my sad duty to announce that this remarkable man died on the 30 April, 1982, in Finland.

Dr. Hustich — or *Ilmo* as he was called in Canada — was one of the European botanists who used to conduct field work in Canada and then return home to publish his findings. And he did publish his results soon after each expedition, which must have pleased his main financer, the Arctic Institute of North America! He was born on 11 August, 1911, in Helsinki and first went to the Labrador coast in 1937 (at the age of 26) with the geographer V. Tanner and the geologist E. Franck (who later settled in Canada). This trip resulted in the paper titled "Notes on the coniferous forest and tree limit on the east coast of Newfoundland-Labrador" (Acta Geographica 7(1):1-77. 1939). Since then he had visited Canada about ten times and published ca. 20 articles in English (plus one in French and 7 in Swedish) on the phytogeography and ecology of eastern Canada. These papers mainly deal with forest geography, timber-lines, tree-ring chronology and vascular floristics, primarily in Labrador, northern Quebec and northern Ontario. Ilmo cooperated or had contact with many Canadian scientists, such as A.E. Porsild, W.K.W. Baldwin, F.K. Hare, S. Rowe and V. Krajina. Duplicates of his herbarium collections are well-represented in the Musuem of Natural Sciences in Ottawa, although his main collections are in the Botanical Museum, University of Helsinki (H).

However, for the most part of his career, Ilmo had botany on the back seat. This is clearly seen from the bibliography of 207 titles published by P. Fogelberg in a special issue of the geographical journal Fennia (159(1):1-251. 1981), dedicated to him under the title "Ilmari Hustich seventy years". He was primarily a geographer, and held a professorship in economic geography at the Swedish School of Economics in Helsinki from 1951 to 1973 (he actually belonged to the Swedish-speaking minority in Finland). For instance, he is the author of an excellent and highly original book on political geography of the world, a bestseller in numerous revised editions (in Swedish and Finnish) for 20 years in Finland and Scandinavia. For a short time he was even the Minister of Commerce and Industry in the government of Finland, and during his last years was especially active in fields such as environmental conservation and futurology. He was also honoured with the title Academician.

Dr. Hustich was not known as a nitpicker of the finest details, rather he attempted to create new, fruitful vistas for other researchers by comparing the vegetation and plant geography on both sides of the North Atlantic. Good examples are his oft-cited maps of the polar limits of conifers and attempts to define concepts such as "Subarctic" and "tree-line" so as to make them equally understood in all northern regions.

I am personally obliged to Dr. Hustich for his help in the arrangements of my first field trip to Canada (Newfoundland) in 1956, so that I feel like continuing his tradition in maintaining a thin Finnish-Canadian thread of cooperation. The more organized exchange of biologists and geographers between McGill University and the University of Turku was also partially initiated by him. I think that we should recognize that foreign internationalists (as Hustich was called at home) may after all play a significant positive role even in such largely national sciences as phytogeography and floristics.

Teuvo Ahti
Univ. of Helsinki

MORE CONSERVATION

I found the following information in an article in a British gardening journal (GC & HTJ) and thought that it might be of interest in the on-going transplantation discussion. It will be worth watching the experiment to see what happens or if, indeed, the results are published .... Ed.

Steetley Refractories wanted to quarry a very rich dolomite limestone area at Thrislington, Co. Durham, England. The area is (was?) the home of many rare plants — including English Flax, Blue Moor Grass and hellaborine orchids. It is said to be part of only 101 ha in England where alpine plants grow alongside chalk downland species.

The Nature Conservancy Council vigorously opposed the quarrying, but Steetley said over 500 jobs would be lost at its dolomite processing plant at another site. Therefore, the Environment Secretary proposed a compromise — the quarrying could go ahead if Steetley moved the site at its own expense.

As a result, 8 ha of rare plant life is being moved about 1 km. The well-known British botanist, Dr. David Bellamy, was consulted to see if the plants could be moved to an inferior limestone site. He is quoted as saying, "If the scheme works, as we are sure it will, it will be a landmark for conservation".

Extracted from: GC & HTJ
Dec. 3, 1982

DID YOU KNOW?

A claim for damages to an oak tree, caused when it was hit by a car, has been dismissed by three judges in the Michigan State Appeals Court. The claim was for damage to "a living thing, with aesthetic quality". The judges were sympathetic, but turned down the claim as follows:

We thought that we would never see
A suit to compensate a tree
A suit whose claim in court is pressed
Upon a mangled tree's behest;
A tree whose trunk was pressed
Against a Chevy's crumpled chest;
A tree that faces each new day
With bark and limb in disarray;
A tree that may forever bear
A lasting need for tender care.
Flora lovers though we three,
We must uphold the court's decree.

From: GC & HTJ
Jan. 21, 1983

WERESUB FUND UPDATE

The establishment of an endowment fund to provide the Luella K. Weresub Memorial Award was announced in the last issue of the *Bulletin*.

The Treasurer reports that donations received to 21 March 1983 total $1600, in addition to the original bequest of $10,000 from Miss Matilda Weresub.

The Bulletin of the Canadian Botanical Assoc.
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Material for inclusion in the Bulletin should reach the Editor at least one month prior to the date of publication of that issue.

To ensure prompt delivery of the *Bulletin* please notify the Editor of any change of address as soon as possible.

Inquiries about membership of the CBA/ABC should be addressed to the Secretary of the Association:- Dr. Iain E.P. Taylor, Department of Botany, University of British Columbia, Vancouver, B.C. V6T 2B1