

THE CANADIAN BOTANICAL ASSOCIATION

BULLETIN

DE L'ASSOCIATION BOTANIQUE DU CANADA

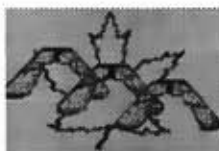
Patron / Président d'honneur

His Excellency the Right Honourable / Son Excellence le très honorable

Roméo Leblanc P.C., C.C., C.M.M., C.D.

Governor General of Canada / Gouverneur général du Canada

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Editor / Éditeur:
J. F. (Joe) Gerrath
Guelph

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EDITOR'S COMMENTS COMMENTAIRE DE LA PART DE L'ÉDITEUR

This will be the only issue of the Bulletin before the Annual Meeting in Montréal. I will delay publication of the next issue, normally dated July, until after the meeting in order to include news about what happened.

This mailing also contains the First Circular for the XVI International Botanical Congress in August 1999. I know it is more than two years in the future but, as with previous congresses, the organizers want an early indication of who is planning to attend.

Uniting Canadian Plant Biologists?

Our President, C.C. Chinnappa, informed me recently that he had received a letter from the Vice-President of the Canadian Society of Plant Physiology suggesting the fusion of our memberships (possibly also with those of other Canadian plant-oriented societies) into one organization which might be called The Canadian Society of Plant Biology. The matter will be brought forward at our Annual General Meeting, so be prepared to voice your opinion, whether it be pro or con. In this issue (page 19) is a letter giving the opinion of Iain Taylor, a member of both CBA/ABC and CSPP/SCPV. Unfortunately the physiologists meet this year in Vancouver at the same time we meet in Montréal, so Iain will not be at our AGM.

New Editor?

The search for a person willing to take over from me as editor of the Bulletin continues. As of the time I am writing this, the Nomination Committee has not received any nominations, nor has it received any expressions of interest from anyone wishing to volunteer their services. What this seems to mean is that after I mail out my final issue in October (more likely November), the publication of the Bulletin will be suspended until someone is found who is willing to take on the task. I will be at the Annual Meeting in Montréal, so that anyone who would like to discuss what is involved in producing each issue can talk to me there.

I'll see you all in Montréal, if you can make it there.

Joe Gerrath, Editor

CALL FOR RESOLUTIONS FOR THE ANNUAL GENERAL MEETING

Members who wish to submit Resolutions to be included on the agenda of the CBA Annual General Meeting in Montréal should take note of the following rules (extracted from By-Laws 68-77).

Resolutions require a mover and 4 seconders, all of whom must be CBA members in good standing. They must be submitted to the Secretary of CBA at least 10 weeks before the Annual General Meeting (by May 27, 1997). All resolutions must be accepted by the Board of Directors before they are placed on the agenda of the Annual General Meeting, and may be returned for revisions if they do not conform to the guidelines for Resolutions specified in By-Laws 68-77.

PROPOSITION DES RÉOLUTIONS POUR L'ASSEMBLÉE GÉNÉRALE ANNUELLE

Les membres qui désirent proposer une résolution pour inscription à l'ordre du jour de l'assemblée générale annuelle de l'ABC à Montréal doivent prendre note des règlements suivants (extrait des règlements 68 à 77 de l'Association).

Les résolutions requièrent un proposeur et quatre secondeurs tous membres en règle de l'Association. Elles doivent être soumises au secrétaire de l'ABC au moins dix semaines avant l'assemblée générale annuelle (avant le 27^e mai 1997). Toute résolution doit être acceptée par le Bureau de direction avant d'être inscrite à l'ordre du jour de l'assemblée générale annuelle. Si la résolution ne répond pas aux exigences requises dans les règlements 68 à 77, elle sera retournée au proposeur avec indication des révisions à faire.

Future Annual Meetings Prochaines Réunions Annuelles

1997

**Palais des Congrès/Convention Centre
Montréal, Québec
(with/avec A.I.B.S.)
August 3-7 août**

1998

**University of Saskatchewan
Saskatoon, SK
June 27 juin to/à July 1 juillet**

1999

**America's Center, St. Louis, Missouri
(XVI International Botanical Congress)
August 1-7 août**

2000

**University of Western Ontario
London, ON**

2001

**Okanagan University College
Kelowna, BC**

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ON COMBINING CANADIAN PLANT BIOLOGY.

Dear Editor:

Periodically individual and executive members of the various Canadian plant biology societies are drawn into discussion about a future for Canadian Botany (hereafter referred to in the broader term of Plant Biology) which includes some kind of unification of the various specialist societies. I was asked to comment a year ago and the following is the essence of those remarks.

I have been an interdisciplinarian for almost all my career and so any opportunity to reach across the traditional boundaries is exciting. I am now actively engaged in research on scientific ethics and in risk assessment for the release of genetically modified plants, and have found more new fences and barriers to cross. I believe that there are a few important, but fundamental questions which we as a community have neglected, resulting in almost inevitable failure for previous "fusions" such as BCC and plant biology's involvement with CFBS. My starting position is that Canadian plant biologists have had the very worst possible motive for forming earlier "agglomerations", namely to pressure government to provide more money for research. The effect of this approach has not been to unify us. It has divided us because the various imbalances between grant selection committee budgets have led us to whinings that "the molecular biologists get it all", "molecular biologists aren't botanists", "the ecologists shouldn't be allowed to waste money on expensive field work", or "why are we wasting money on taxonomists?". Governments "love" this stuff. It is the perfect excuse for doing nothing and for cutting funds even more. We should not consider fusions, or even joint meetings, until we can articulate, **AND SUPPORT BY REAL ACTIONS**, some fundamentally sound reasons for such collaboration. Certainly lobbying government is an essential function, but we must cross the credibility gap of public accountability very soon or our cause, not to mention our disciplines, will wither. The basic questions are really very simple, some may say naive. In my 30 years of involvement in Canadian plant biology, there have been some discussions but we seem always to have been distracted by the territorial boundaries. Individual societies are too small to let this continue if they hope to survive.

WHAT SOCIETIES CURRENTLY SERVE THE CANADIAN PLANT BIOLOGY COMMUNITY?

Currently we have national organizations which cater to Agrologists/Agronomists, Botanists, Forestry Institute of Canada (part), Geneticists (part), Plant Molecular Biologists, Plant Pathologists, Plant Physiologists, Tree Improvers. Sorry if I have missed someone out, but even this list shows the potential for "divide and conquer" tactics from the outside.

WHY WOULD CANADIAN PLANT BIOLOGISTS WANT TO UNITE?

To present a unified front to Federal and Provincial granting agencies, Federal and Provincial government agencies, Public, Industry, and the formal core education system. We would also benefit because a fusion would raise critical mass, provide an opportunity for real interactive meetings, break territorial tribalism, and increase awareness of interdisciplinary opportunity.

WHY WOULD CANADIAN PLANT BIOLOGISTS NOT WANT TO UNITE?

We would lose focus on special interests. A focus on a Canadian organization would reduce opportunity and maybe money to attend American meetings which attract most of the big players on the continent. We would lose our traditional activity (e.g., traditional societal activities and format).

WHAT MUST WE ACHIEVE IF THERE IS TO BE A UNIFICATION OR FEDERATION?

We need **FUNDAMENTALLY** sound reason(s). BCC existed for the wrong reasons (e.g. to whine to government that grants were too few, small) and had weak foundations. CFBS maybe is evolving towards some "right reasons", but the heavy weights of biomedical science make it unlikely that it can accommodate the non medicals where issues (e.g. environment) are not medical.

WHAT QUESTIONS MUST BE RESOLVED?

1. Is the organization to be a federation or a unification?
2. Is there genuine grass root interest?
3. Can each society define the benefits (political and professional) of associating with other societies?
4. Can the executive members as individuals and the executive committees as units start the project, and stay with it to achieve the real sell?
5. Can any unified/federated annual meeting be kept viable so that at least 3/4 of the societies are always present and each participates, for example, at least twice every 3 years?
6. Can the annual meeting accommodate the "traditional" non presentation aspects of each society (e.g., field trips, workshops, public and policy activity, unifying biological themes, teaching stuff).
7. What management structure can identify and achieve the common needs? Before we rush in, we must find the committed individuals who will develop the ideas and lead the enterprise. A well motivated and well considered fusion would be a massive move forward. However, the first step must be to change our initial state. We all seem to "wanabee" something, but we must start by wanting to be Canadian Plant Biologists. If we can address the questions raised above, and probably a few more critical items, there is hope. Without dealing with the basic questions, we will just go down the same old territorial paths and will waste more time and energy than we have or can afford.

I have been around a long time, not as long as some!! I have seen several rushes of good intentions, but in the long term we are hardly out of the starting blocks. We need a vision, a clear mission, and a structure which we all see as essential and workable no matter who occupies the leadership chairs in the organization and its sub-groups. I suggest that it may be time for action, but not for a repeat of the mistakes of the past. All we have to do is find the leaders, give them a mandate and support them as they "get stuck in".

Sincerely,

Iain E.P. Taylor
Former President, Canadian Botanical Association
Editor, Canadian Journal of Botany
Member, Canadian Society of Plant Physiologists

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Wanted: New Homes for Herbarium Specimens of Vascular Plants

The chairman of the Department of Biology at Carleton University has decreed that no courses or research using in-house specimens of vascular plants in the department's herbarium, CCO, (or of vertebrates in the Carleton University Museum of Zoology) will be offered in the foreseeable future and that virtually all specimens must be discarded, unless new homes can be found for them. As this outrageous, short-sighted, and professionally irresponsible plan to consign many valuable teaching, reference, historical and research specimens, some irreplaceable, to a garbage dump is wasteful and abhorrent to me, I am trying to locate institutions where they will be maintained in perpetuity, used, and appreciated.

Accordingly I am directing this notice to herbaria, museums and university departments of botany or biology housing scientists interested in teaching and research on structural adaptations or whole organisms, biodiversity, systematics, biogeography and related subjects based on well-prepared and documented herbarium/museum specimens.

Our herbarium was established in 1952 and curated by E.A.O. Turnau, W.I. Illman and I.L. Bayly, all now retired. CCO contains over 32,000 catalogued and many uncatalogued vascular plants, primarily from North America, but there are also many specimens from the West Indies, north and south Africa, Japan, Australia and elsewhere. For instance, there are many specimens of pitcher-plants (*Nepenthes*) from southeast Asia.

To obtain more information about the collection and/or to express tentative interest in accepting all, or subsets, of the plants, please contact: **Dr. Donald A. Smith, Department of Biology, Carleton University, 1125 Colonel By Drive, Ottawa, ON K1S 5B6. Telephone: 613-520-2600, ext. 3879; FAX: 613-520-4497; or leave a message for me with Adam Baker at adbaker@ccs.carleton.ca.**

Donald A. Smith
Department of Biology, Carleton University

Editor's Note: Dr. Smith also informed me that Carleton's specimens of fungi, lichens, algae and bryophytes have already gone to new homes.

RECENT GRADUATES University of Guelph

Ph.D - 1996 [Dept. of Crop Science]

Istvan Rajcan - Molecular and breeding studies of doubled haploids segregating for linolenic acid levels in *Brassica napus* L. Advisor: K.J. Kasha.

Patricia Vrinten - Isolation and characterization of microspore embryogenesis-related cDNAs from barley (*Hordeum vulgare* L.). Advisor: K.J. Kasha.

Qing Yao - Development of a genetic transformation system using microspores of barley (*Hordeum vulgare* L.). Advisor: K.J. Kasha.

Ph.D - 1996 [Dept. of Horticultural Science]

Amarjit Chahal - Genetic and molecular analysis of petaloid cytoplasmic male sterile, revertant and restored carrot genotypes. Advisor: D.J. Wolyn.

Jennifer DeEli - Chlorophyll fluorescence as a rapid indicator of postharvest stresses in apples. Advisors: D.P. Murr and R.K. Prange.

Margaret Hutchinson - Morphoregulatory role of thidiazuron: Hormonal regulation of somatic embryogenesis in *Geranium*. Advisor: P.K. Saxena.

Rufaro Madakadze - Maturation of *Geranium* (*Pelargonium xhortorum* Bailey) somatic embryos. Advisor: P.K. Saxena.

Lisa Skog - Effect of controlled atmosphere storage and high temperature conditioning on chilling injury of nectarines. Advisors: D.P. Murr and R.B. Smith.

Ph.D - 1996 [Dept. of Land Resource Science]

Mayra Elena Gavito - Mycorrhizal development and maize phosphorus nutrition, growth and yield. Advisor: M.H. Miller.

M.Sc. - 1996 [Dept. of Crop Science]

Aca Bosnic - Decision rules for postemergence herbicide control of barnyardgrass (*Echinochloa crus-galli* L. Beauv.) in corn (*Zea mays* L.). Advisor: C.J. Swanton.

Holly Brittain-Loucas - Somatic embryogenesis in orchardgrass, *Dactylis glomerata* L., and its applications. Advisor: S.R. Bowley.

Daniel Curtis - Growth analysis of Harosoy 63 soybean (*Glycine max* (L.) Merr.) isolines differing in maturity genes and growth habit. Advisor: J.W. Tanner

M.Sc. - 1996 [Dept. of Environmental Biology]

Gaspar Horvath - Optical porosity and wind flow dynamics of Radiata Pine (*Pinus radiata* D. Don) timberbelts in New Zealand. Advisor: A.M. Gordon.

Eugene Kotey - Effects of tree and crop residue mulches and herbicides on weed populations in a temperate agroforestry system. Advisor: A.M. Gordon.

Tara McCaughy - Dynamics of root storage reserves and seed viability of *Lythrum salicaria* L. (Purple Loosestrife) in relation to control. Advisor: G.R. Stephenson.

M.Sc. - 1996 [Dept. of Horticultural Science]

Debbie Chan - The influence of life stage and cultivar on the distribution of cadmium in durum wheat. Advisor: B.A. Hale.

Francis Mik - Cell proliferation and organogenesis in *Pelargonium xhortorum* Bailey cv. Scarlet Orbit Improved. Advisor: P.K. Saxena.

Susan Murch - Morphoregulatory role of thidiazuron: Effects on metabolic processes during regeneration. Advisor: P.K. Saxena. [Geranium seedlings and roots]

NOUVEAUX GRADUÉS
Département de Phytologie
Faculté des Sciences de l'Agriculture et de
l'Alimentation, Université Laval, Québec

M.Sc. - 1995

Julien Beaulieu - La croissance des plantes arctiques (*Dupontia fisheri* et *Eriophorum scheuchzeri*) en réponse au broutement par les oisons de la grande oie des neiges. Directeur de thèse: G. Gauthier. Codirectrice: Line Rochefort.

M.Sc. - 1996

Denis-Fernand Bastien - Établissement et croissance des sphaignes dans une tourbière exploitée et abandonnée. Directrice: Line Rochefort.

Manon Croft - Comparaison microbienne de substrats tourbeux naturels et résiduels. Directrice Chantale Beauchamps. Codirectrice: Line Rochefort.

Chantale Ferland - Approches de restauration d'une tourbière ombrotrophe du Nouveau-Brunswick à la suite de son exploitation. Directrice: Line Rochefort.

Jacques Prévost - Essais de réintroduction de plants de bleuets pour la restauration de zones dénudées à la bleuetière de Normandin, Québec. Directrice: Line Rochefort. Codirectrice: Suha Jabaji-Hare.

Publication Available

Semple, John C., Heard, Stephen B. and Chunsheng Xiang. 1996. The Asters of Ontario (Compositae: Astereae): *Diplactis* Raf., *Oclemena* E.L. Greene, *Doellingeria* Nees and *Aster* L. (including *Canadanthus* Nesom, *Symphyotrichum* Nees, and *Virgulus* Raf.). University of Waterloo Biology Series, No. 38: 1-94. ISSN-0317-3348. Price: \$10.00 plus \$3.50 S&H (plus GST for Canadian buyers)

A monograph presenting a revised treatment of the asters of Ontario. Various classifications of all asters are discussed and a new scheme is presented based on previously published studies on morphology, cytology and chloroplast DNA analyses. Species occurring in the province are placed in four distantly related genera within the tribe Astereae. The monograph includes partial synonymy and detailed illustrations of 32 species and their infraspecific taxa, updated distribution maps and descriptions of genera, subgenera and species. Six new names and combinations are included. There is a dichotomous key to all taxa.

This publication may be obtained from:

U.W. Biology Series
 Department of Biology
 University of Waterloo
 Waterloo, ON N2L 3G1

Graduate Student Opportunities
University of Saskatchewan

Funding is anticipated, from the Specialty Crops sector of the Agri-Food Innovation Fund of Saskatchewan Agriculture, to provide stipends for graduate students interested in undertaking one of the following research projects:

- 1) Determination of the importance of umbelliferous herbs and spices as honey plants, and their pollination by honey bees and other insects.
- 2) Investigation of the development and anatomy of floral nectaries, nectar-sugar production, and bee pollination of varieties of *Brassica* spp.
- 3) Determination of the value of various medicinal and aromatic species as honey plants.

Projects preferably would be initiated in September 1997 or January 1998. Interested students are asked to submit university transcript(s), a research career statement, and a resumé including three (3) academic references to Dr. Art Davis, Department of Biology, University of Saskatchewan, Saskatoon, Saskatchewan, S7N 5E2. Phone: (306) 966-4732; FAX: (306) 966-4461; Email: davis@duke.usask.ca

Publication Available

The New Morphology: Integrative Approaches. 11th Annual Southwestern Botanical Symposium. Rancho Santa Ana Botanic Garden. May 26-27, 1995. *Aliso*, Vol. 14, No. 4. [issued Sept. 1996] ISSN: 0065-6275.

Aliso is not a journal that would be found in most Canadian libraries. However, Roy Taylor, Executive Director of the Botanic Garden and former CBA President, recently sent your editor a copy of this issue of the journal, which contains four articles which may be of interest to members: Using confocal microscopy in the study of plant structure and development. (Mark P. Running & Elliot M Meyerowicz); *Does the monocot mode of leaf development characterize all monocots?* (Geeta Bharathan); *Diversity and evolution of seedling Baupläne in Pelargonium (Geraniaceae)*. (Cynthia S. Jones & Robert A. Price); *Genetic dissection of the morphological evolution of maize*. (John Doebley).

For information on obtaining this issue and other publications of the Rancho Santa Ana Botanic Garden, contact:

Scientific Publications Sales
 Rancho Santa Ana Botanic Garden
 1500 North College Avenue
 Claremont, CA 91711-3157

CAROLINIAN CANADA: DEVELOPING A VISION FOR THE FUTURE

Last year the Carolinian Canada Steering Committee set in motion a review of potential conservation strategies for the future. While the initial thrust of protecting prime natural areas in the Carolinian Zone was a significant achievement over the past twelve years, there's a growing concern that larger landscape level issues need addressing, and that Carolinian Canada is in a good position to facilitate change, but would need a redefined mandate.

To help in redefining the future role that Carolinian Canada could play, Ron Reid and Ric Symmes were contracted to carry out a Conservation Strategy study. It included a series of workshops: first an Issues and Options Workshop at the S.D. Latomell Conference in October, then a Vision and Priorities Workshop in November, and finally three Strategic Goals, Objectives and Action Plan workshops in December and January. The Steering Committee and a wide representation of conservation and other land-use stakeholders were involved in these activities. The comments of the many participants were analyzed and incorporated into the final Conservation Strategy.

In addressing future concerns of the Carolinian landscape, the following elements were identified as particularly important:

- forest cover, especially interior forest habitat
- stream water and wetland quality
- savannahs and prairies
- urban greenspace

As well, it was agreed that three approaches to address these priorities should receive increased emphasis and support:

- education and communication
- private stewardship
- non-government organization stewardship and ownership of lands

If any CBA/ABC members have concerns or ideas and did not have an opportunity to express them during the above process, contact the Carolinian Canada Committee:

Douglas van Hemessen, Secretary
Carolinian Canada
659 Exeter Road
London, ON N6E 1L3
Tel.: 519-661-2744
E-mail: vanhemdo@epo.gov.on.ca

John Ambrose, CBA/ABC Representative
Carolinian Canada Steering Committee
Metro Toronto Zoo, Scarborough, ON



BOURSE DE DOCTORAT PH.D. FELLOWSHIP

Montant/Amount: 15 000 \$Can/Année
Durée/Duration: 3 ans

Développement floral et phylogénie des Araceae Floral Development and Phylogeny of the Araceae

Cette étude portera principalement sur une analyse comparative des données de l'ontogénie (microscopie électronique à balayage) et de la taxonomie moléculaire (séquences de gènes nucléaires et chloroplastiques). Une grande partie des spécimens utilisés proviendra des collections du Jardin Botanique de Montréal.

The primary focus of this study will be to compare and to integrate floral ontogenetic characters (derived from scanning electron microscopy) with a molecular phylogenetic analysis (derived from chloroplast and nuclear gene sequences). Specimens to be used in the project are available in cultivation at the Montréal Botanical Garden.

Les personnes intéressées par cette bourse devront manifester un intérêt pour la morphologie et la systématique.

Students with strong interests in plant morphology and systematics will be considered for the fellowship.

Les personnes intéressées sont priées d'envoyer leur *curriculum vitae* et deux lettres de référence (avant le 31 mai 1997) à:

Those interested should send their *curriculum vitae* and two letters of recommendation (before May 31st, 1997) to:

Denis Barabé (barabed@ere.umontreal.ca)
ou / or

Anne Bruneau (bruneaua@ere.umontreal.ca)

Institut de recherche en biologie végétale
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Montréal, QC, Canada H1X 2B2

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TÉL: (514) 872-0272

**Poorly Known Economic Plants of Canada -
13. Sweet Flag, *Acorus calamus* L.**

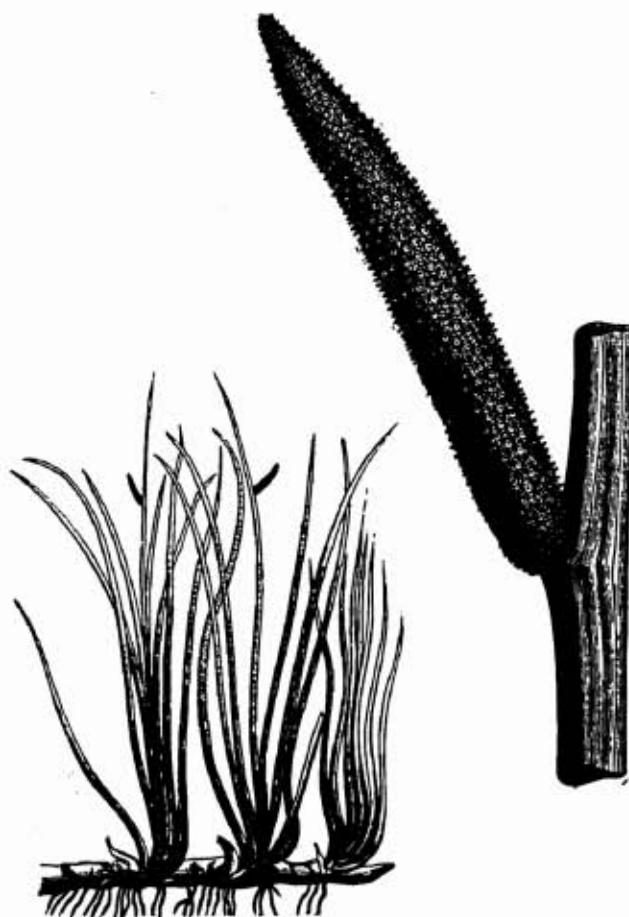
E. Small and P.M. Catling, Eastern Cereal and Oilseed Research Centre, Agriculture and Agri-Food Canada, Saunders Bldg., Central Experimental Farm, Ottawa K1A 0C6

Common Names: Sweet Flag, Sweet Sedge, Calamus.
French: Belle Angélique (Belle-Angélique), *Acorus roseau*.

Note: Material from Sweet Flag used as a medicinal agent or food additive is usually referred to as "calamus", while "Calamus" is also one of the common names of the plant. The "flag" in the name is a reference to the iris-like leaves (i.e. like those of yellow flag, *Iris pseudoacorus* L., or blue flag, *I. versicolor* L.), while the "sweet" refers to the pleasantly aromatic odour and (bittersweet) taste of most parts of the plant, especially the rhizome. The native North American variety may be called "American Sweet Flag" whereas the variety introduced from Europe may be called "European Sweet Flag".

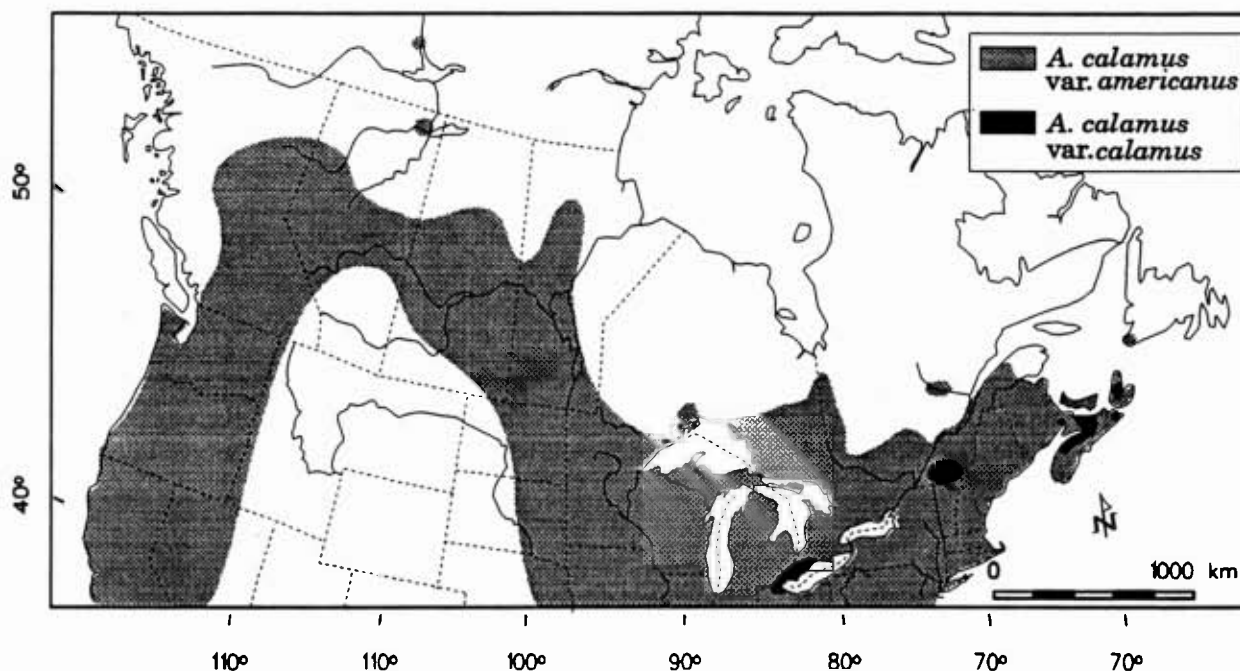
Sweet Flag is a perennial herb of temperate to subtemperate Eurasia and the Americas. It is semi-aquatic, occurring in swamps and edges of streams, marshes and ponds. The erect, sword-shaped leaves up to 2 m long emerge from a tortuous, branched, underground rhizome with V-shaped leaf scales. The rhizome is whitish-pink internally, cylindrical, 1-2 cm thick and up to a metre long. The numerous yellow and green flowers are on a spike-like spadix, which is subtended by a leaf-like spathe. Although traditionally placed in the Araceae (Arum family), recent studies have suggested that *Acorus* deserves to be separated into its own monotypic family, the Acoraceae. It has been contended that *A. calamus* may represent the oldest extant lineage of monocotyledons. Most authors consider *Acorus* to have just one species. Recent studies suggest that two taxa exist in North America and at least three worldwide.

The diploid *A. calamus* var. *americanus* (Raf.) Wulf [sometimes treated as a species, *A. americanus* (Raf.) Raf.] occurs from North America to Siberia; the tetraploid *A. c.* var. *angustatus* Bess. occupies eastern and tropical southern Asia; and a sterile triploid, *A. c.* var. *calamus*, is in Europe, temperate India, the Himalayan region, and eastern North America. Variety *calamus* is differentiated from var. *americanus* by its



lack of fruit and aborted pollen that fails to stain in standard viability tests. This triploid is believed to have been introduced from Asia to Europe and North America. A hexaploid form has been reported from the Kashmir area. American Sweet Flag, the fertile diploid, occurs in every province of Canada, with a possibly introduced collection recorded from the District of Mackenzie. European Sweet Flag, the sterile triploid, is relatively uncommon in Canada, but has been recorded in Ontario, Quebec, Nova Scotia, New Brunswick, and Prince Edward Island. In the U.S., Sweet Flag occurs as far south as Florida, Texas and Colorado.

Moses (in Exodus 30) related how God instructed him to prepare a sacred oil with "calamus" and other sweet-smelling herbs to anoint important ritual items. Whether or not the calamus of the bible is Sweet Flag or some other herb has been debated, but for many centuries the fragrant oil was used in perfumes. Indeed, the value of calamus used by the North American



fragrance industry has exceeded \$30,000,000.00 in some recent years. However, the rhizome of Sweet Flag has been employed primarily as medicine, almost everywhere the species occurs, such usage often having evolved independently. Ancient Egyptians and classical Chinese, Indian, Greek and Roman civilizations all appear to have used Sweet Flag, mostly medicinally. North American Indians also used it extensively for medicinal purposes for a wide variety of illnesses, and often as a panacea. Early Europeans, Chinese and Arabs considered Sweet Flag to be a strong aphrodisiac, and incorporated it into love potions. In North America and New Guinea, Sweet Flag has been occasionally used to induce abortion.

At least until the middle part of this century, calamus was accepted as a legitimate pharmacological agent in Western medicine, employed primarily to treat digestive upsets and fevers. Calamus is still used to a minor extent by modern doctors, mostly in Eurasia, and is encountered in several multi-ingredient commercial drug preparations marketed in Canada. The antispasm property of calamus may be the basis of relieving digestive disorders.

The omnivorous Brer Rabbit of Joel Chandler Harris Uncle Remus fables exclaimed that "I done got so now dat I cant eat no chicken 'ceppin shes seasoned up wid calamus root."

Occasionally, Sweet Flag has been used as an edible plant. Some North American Indians roasted the rhizome as a vegetable. The rhizome was candied as a confection by Europeans and early American colonists. Wild food collectors sometimes use the young leaves in salads. Up until the Second World War, Sweet Flag was employed in North America to flavour food products, tonics, and tooth powders. Calamus oil is still used in Europe as a flavouring in alcoholic beverages. Anyone contemplating using Sweet Flag as food should be cautioned that (aside from the poisonous qualities described below) aquatic plants growing in contaminated water may harbour harmful chemicals and organisms from the water. Of course, the possibility always exists for those collecting rhizomes in aquatic habitats that one of the seriously poisonous aquatic umbelliferae could be mistakenly collected.

The fragrant leaves were once used to remove disagreeable odours and deter insects. The oil of

Sweet Flag has been established to have insecticidal, antibacterial, antifungal, and antiamebic properties. Not surprisingly then, Sweet Flag has been used frequently for antibiotic purposes: as a vermifuge, antiseptic, antiprotozoal agent, fish poison, flea repellent, moth repellent, ant repellent, and to treat diverse diseases caused by microorganisms. It has some potential for protecting stored food products from insect pests.

Cardinal Wolsey of London, England was notorious for extravagant expenditures to obtain pleasant-smelling calamus from distant locations to strew on the floors of cathedrals during festivals. Up until the 20th century, "strewing herbs" were widely used in households and public buildings for sanitary and deodorant purposes.

Sweet Flag oil has been found to have hundreds of compounds, particularly phenylpropanes, mono-terpenes, and sesquiterpenoids. Oil of the tetraploid is very high in β -asarone (often over 90%), while the triploids have less than 5% and the diploids have none. β -asarone is carcinogenic, and the apparent absence of this and other toxic phenylpropane derivatives in the plants of North America may represent a means of using Sweet Flag relatively safely. An added medicinal recommendation for the North American variety is that it appears to have a greater antispasmodic effect than the other varieties. Many experimental studies have established that one of the medical virtues of calamus is its ability to reduce spasms.

Certainly there has been concern over the safety of Sweet Flag, which is currently banned in food products in North America. This prohibition was based on cancerous tumours developed in laboratory animals treated with Sweet Flag high in content of carcinogenic β -asarone. However, it is important to realize that even if North American Sweet Flag lacks the carcinogenic substances found in the plants of the Old World, under certain conditions it is still reputed to be poisonous, producing disturbed digestion, gastroenteritis, constipation, and bloody diarrhea. The volatile oil causes dermatitis on contact with the skin in some individuals. It should be emphasized in view of the toxic potential of the plant, that any kind of personal use without the supervision of an informed physician is hazardous.

In medieval Europe, it came to be appreciated that Sweet Flag is psychotomimetic (mood-altering), and indeed it was believed to be one of the ingredients in the hallucinogenic "flying ointments" used by witches.

In India Sweet Flag was employed to narcotize cobras. Indians from Northern Canada used the rhizomes as a spiritual hallucinogen. Walt Whitmans "Leaves of Grass" refers repeatedly to Sweet Flag and is said to have hidden descriptions of the mental effects in the poetry. It is the asarones in the oil that are psychoactive, whereas other components in the oil relax smooth muscle tissue. Fortunately the narcotic capacity is much too subtle to have attracted use as a recreational inebriant.

Sweet Flag has commercial promise as a natural pesticide, antifungal and antibacterial agent, flavouring ingredient, perfume component, and medicine. It has been commercially cultivated for its products in various parts of Europe and Asia, and is currently cultivated as an ornamental. As a cultivated crop, the plant has the advantage of rapid propagation by rhizomes, which can be harvested within 2 years of planting. The recent finding that native Canadian plants appear free of carcinogenic β -asarone suggests that the food and medicinal uses that have been thought unwise require reconsideration. However, additional phytochemical and pharmacological study is needed. From an agricultural viewpoint, a semi-aquatic crop would not be easy to manage, but offers the possibility of creating multi-use wetlands.



Jennifer Shay Receives Award

A former CBA/ABC President has received a prestigious national award. Dr. Jennifer Shay, Professor Emerita in the Department of Botany, University of Manitoba, was presented in Ottawa with a Canadian Healthy Environment Award for lifetime achievement by the Honourable Sergio Marchi, Minister of the Environment. These awards were created in 1989 to recognize outstanding achievement and dedication of Canadians in conserving and protecting the environment.

BOOK REVIEW

Flora of the Yukon Territory. By William J. Cody. 1996. National Research Council of Canada. 643 pp. Price: \$79.95 (hardcover); \$49.95 (softcover)

Among the achievements that Canadians can be proud of is the leadership we demonstrated in the United Nations Convention on Biological Diversity ratified in 1992. It soon became evident, however, that we were going to experience some very big challenges in meeting the obligations of the convention and thus contributing to its effectiveness as a global and national instrument for guiding efforts to conserve biodiversity and use biological resources sustainably. Why are the challenges very big? Simply because we need new and organized information on classification, evolution and ecology for the identification, monitoring and management of natural resources. Bill Cody has provided us with an essential tool to do the job we want to do, and it is a tool that works very well.

Poplars and Pussy Willows may provide the automobile fuel of the future -- but which Poplars and which Pussy Willows? Where do they grow? What are their climatic limits? How can they be identified? Recognition that human life is largely dependent on effective management of the earth's natural resources is leading to an increasingly clear understanding of the value of a "Flora", regardless of whether "Flora" means the plants of a region or the manual providing a wealth of information about them. Cody's Flora does all the things that Floristic Manuals traditionally do, but on a grand scale including providing keys, 1200 illustrations and descriptions for identification, as well as hundreds of distribution maps, and habitat and other information in 643 pages. This very substantial work provides information essential for biological research in fields such as agriculture, forestry, sustainable resource management, landscape planning, environmental assessment and wildlife management. It treats all the plants found to date growing outdoors in the Yukon. It can be used to determine the identity of agricultural weeds and pests, and to discover sources of material for use in plant breeding, for commercial utilization, and for revegetation. It indicates whether plants are native or introduced and rare or common. It provides a basis for work aimed at environmental classification necessary to many sectors of the economy. It also provides a basis for assessing responses of organisms to changes in environmental conditions, for identifying environmentally sensitive sites, for managing natural areas, and for "groundtruthing" satellite maps. It will have a big impact because it makes current, accurate and extensive information on the plants of the Yukon Territory available for the first time.

Although Cody's first trip to the Yukon was in 1967, it was not until the early 1980s that he began extensive field work. Then with helicopter support over 4 consecutive years from Polar Continental Shelf and Yukon Renewable Resources, he gathered information on the flora of many remote regions, taking risks, working into the night (which is light in arctic summer), and experiencing various hardships along the way. He collected 10,000 specimens during this period and acquired an additional 15,000 sent to him by field biologists working in the Yukon. These specimens are in the national collection (DAO) maintained by Agriculture Canada in Ottawa. They serve as a basis for the book and for future work

aimed at floristic study and classification of Canada's boreal flora. They are also a long lasting resource of enormous value to systematic and other research generally.

Flora of the Yukon Territory includes 80 families, 339 genera and 1112 species. In addition species are included in the keys and text (marked with an asterisk) that are suspected of occurring in the Yukon, thus greatly improving the usefulness of the work. In addition to serving as a definitive work for Yukon Territory, Cody's book includes 1/4 of the Canadian flora and will be useful to anyone working in the north since many of the species are widespread. The introduction includes a brief physical and vegetation description as well as an indication of where more information is available on these topics. Statistics are also provided on the numbers of genera and species in various plant families. The introduction concludes with a valuable history of floristic research in the Yukon Territory, and keys to plant families. The main portion of the book, including the keys to genera and species, species accounts, illustrations and distribution maps, begins on page 21 and ends on page 604. Up to three taxa appear on each page in a three column format with excellent quality drawings in the left, dot distribution maps on the right and text in the centre wrapping around the distribution maps. This modified three-column design is compelling, and does a tremendous service in terms of user friendliness. In fact this manual was ranked as "among the very best" in terms of format and user friendliness (Taxon 46: 194. 1997). Within pteridophytes, gymnosperms, monocotyledons and dicotyledons, the arrangement is taxonomic but alphabetical within family. The sequence largely follows that of the "Vascular Plants of Continental Northwest Territories, Canada" by A.E. Porsild and W.J. Cody (1980) with which workers in northern Canada are already familiar. The book concludes with a comprehensive glossary and a bibliography that gives a very useful indication of the recent botanical work available to those wishing to pursue certain subjects in greater depth. The index, with accepted names in *bold italic*, synonyms in *plain italic*, and common names in normal type, is very easy to use. The endcovers include maps of major drainage and roads, and glaciated and non-glaciated terrain.

The real test of the value of this book should be based on the question of what it adds to the information already available, i.e. Eric Hultén's (1968) "Flora of Alaska and neighbouring territories", which included Yukon Territory. It adds a great deal including newly described taxa such as *Botrychium spathulatum*, *Draba kluanei*, *Draba porsildii*, *Elymus calderi*, *Lesquerella arctica* ssp. *calderi*, *Senecio ogtorukensis*, *Arabis calderi*, *Arabis codyi*, *Saxifrage codyana*, etc. The latter two endemics were named in Mr. Cody's honour. In accordance with recommended practice, new taxa and combinations attributable to Mr. Cody were published separately (Can. Field. Nat. 108(1): 93-95. 1994), but these are of course also included in the book. Other information on plants of the Yukon Territory that could not be accommodated in the concise format of the book is also available (Can. Field., Nat. 108(4): 428-476. 1994), and another equally extensive publication is in the advanced stages of preparation. Cody's work also includes taxa that were previously concealed under one name like *Carex utriculata* and *Carex rostrata*. It also includes taxa not previously

Review continued on page 30

The Plant Press / La Presse Botanique

These pages are intended as a chronicle of news items about plants (or about CBA/ABC members) appearing in newspapers or in the popular science magazines. Contributions from your local newspapers are invited. Send the editor a clipping, photocopy or simply a note about the item and don't forget to indicate the source and date.

Ces pages sont consacrées aux nouvelles concernant les plantes (ou certains membres de l'ABC/CBA) qui paraissent dans les journaux. Les contributions en français sont également encouragées. Faites parvenir vos soumissions au rédacteur en chef ou à la rédactrice adjointe, section francophone, et n'oubliez pas d'indiquer la source de l'article et la date de publication.



Second Crop from "Regenerated Rice"

In China rice is normally harvested in autumn and a new crop is not planted in the same paddies until the next spring. Recently a new technique has been developed for regenerating (or "ratooning") rice plants after the first harvest so that a second harvest can be obtained from the same plants. The technique originated in Sichuan Province and involves the application of fertilizer after harvest to get the rice plants to resume growth and reflower. The regenerated rice technique has now spread to about 1 million hectares in southern China, producing an additional 1.4 billion kilograms of rice per year. Agronomists estimate that if second harvests could be obtained from the two million hectares of paddies suitable for the technique, more than 6 billion kg of rice per year could be added to the Chinese food inventory.

China Daily, December 24, 1996



Oldest Wooden Weapons

A recent article in *Nature* reports the discovery of 3 complete wooden spears which are estimated to be 400,000 years old, more than 275,000 years older than any previously known wooden weapons. These spears, from an open-pit coal mine near Hannover, Germany, are about 2 meters long and are made from spruce. The sharpened tip was at the basal end of the tree, where the wood is the hardest. Each spear has a centre of gravity similar to that of a modern Olympic javelin, indicating that it was designed to be thrown, probably at large animals (the butchered remains of 10 horses were dug up with the spears). The find indicates that these ancient humans, instead of being scavengers of meat, as currently believed, had a previously unsuspected ability to design and manufacture weapons for killing large animals. It also indicates that humans entered the cold northern areas of Europe much earlier than the dates currently quoted in texts. Researchers speculate that the people who made the spears may have been distant ancestors of the Neanderthals.

New York Times, March 4, 1997

Vitamin C for a Healthy Heart

Researchers in Finland report a correlation between Vitamin C deficiency and heart attacks in men. A study of 1600 men aged 42 to 60 found that 13% of those identified as having Vitamin C deficiency experienced heart attacks during the 6-year study, whereas those not deficient in Vitamin C had a heart attack rate of less than 4%. Researchers conclude that Vitamin C may be important in protecting against heart attacks. The eating of fruits high in vitamin C, such as oranges, kiwi fruit and black currants, is recommended.

Globe and Mail, March 15, 1997



Tomato Sauce for a Healthier Heart!

Tomatoes continue to be touted as an important food in helping to combat heart disease. Venket Rao, a nutrition scientist at the University of Toronto, reports that any sauces containing processed tomatoes (including ketchup, pizza sauce and spaghetti sauces) are good for the heart. The active ingredient is thought to be the red pigment, lycopene, which acts as a powerful antioxidant in the body. In particular, antioxidants such as lycopene help to prevent the deposition of cholesterol on artery walls, the major cause of heart disease. According to Rao, tomato sauces are better than raw tomatoes because in the raw fruit lycopene is bound in a form that cannot enter the blood stream efficiently. Rao also reports that lycopene is absorbed better if it is mixed with fats in our food. So . . . put lots of ketchup on that greasy hamburger so that it will not be as dangerous for your heart.

Kitchener-Waterloo Record, March 20, 1997



More Healthy Hearts - from Rhubarb!

A paper (in press) from food scientists at the University of Alberta reports the cholesterol-reducing ability of ground rhubarb fiber. A study involving 15 persons with high cholesterol levels found a reduction of 12-15% in cholesterol levels after 4 weeks of ingesting 27 grams of rhubarb fiber daily. The fiber ties up cholesterol in the gut so that it is eliminated in the feces. You would have to eat an awful lot of rhubarb to get the beneficial effect of the fiber, so the researchers are hoping that an industry can be started for the production of rhubarb fiber as a food supplement. In addition to its effect on cholesterol, there is some evidence that rhubarb fiber may also lower blood glucose levels, so that it could be beneficial for diabetics.

Kitchener-Waterloo Record, February 27, 1997



Cold Cure from Pomegranate?

In vitro studies by British researchers have found that an extract of pomegranate fruit kills bacteria and viruses without harming living human cells in the same system. A nasal spray is being prepared for clinical trials of the extract.

Kitchener-Waterloo Record, March 24, 1997

New Botanical Garden

The construction of a new, 7000 hectare botanical garden has begun at Yichang, Hubei Province, China, near the site of the 3-Gorges Dam Project. The garden is being established to preserve wild plants facing destruction from flooding. Both rare and common plants will be transplanted or raised from seed collected from the area to be flooded by the dam.

Liu Muting, China Daily, January 21, 1997



Plastids in Human Parasites!

In a recent *Science* article researchers report that several human parasites, including *Plasmodium* (malaria) and *Toxoplasma* (toxoplasmosis), possess ancient, non-functional chloroplasts. Studies of parasite DNA found not only the expected nuclear and mitochondrial types, but also a third type of DNA, which resembled that of the chloroplasts of green algae. The organelle containing this plastid-type DNA has now been tracked down, and has been given the name "apicoplast". The apicoplast has no thylakoids (is not photosynthetic) and has four bounding membranes, a good indication that it may have been derived from a captured green alga. The two inner membranes would represent the original envelope of the algal chloroplast and the two outer membranes would be derived from the algal plasmalemma and the food vacuole membrane of the parasite cell. Although the function of the apicoplast is currently unknown, researchers think that it must be essential for the survival of the parasite, otherwise this organelle would have been eliminated long ago. If this turns out to be true, it might be possible to kill the parasite using poisons which attack chloroplasts (such as certain herbicides).

Carol Yoon, New York Times, March 11, 1997



Tea Tree Oil

The Australian tea tree, *Melaleuca alternifolia*, derived its common name from Captain Cook's sailors, who supposedly brewed a version of tea from its leaves. Australian aborigines have long used the tree as a medicinal plant and Australian researchers have confirmed the efficacy of tea tree oil as an antiseptic (stronger than carbolic acid, but less irritating to humans). The active ingredient in the oil is terpinen-4-ol. During World War I Australian soldiers carried tea tree oil in their first aid kit for use as an antiseptic on wounds. After the war its use declined as many other antibiotics were developed. Tea tree oil is still being extracted and sold (it is available in Canadian natural health shops). It is recommended for use in the treatment of cold sores, acne, eczema, yeast infections and athlete's foot.

Vancouver Sun, February 3, 1997



Shakespearean Garden

This article by a gardening columnist suggests the establishment of a "theme" garden using flowers which are mentioned in the plays of Shakespeare. The bard used plants freely in his writing and many well-known turns of phrase can be traced back to the plays (e.g. *the apple of his eye*, *the primrose path*, or, one of the most quoted lines, *That which*

we call a rose, by any other name, would smell as sweet). Here is a suggested list of flowers which could be put into a "Shakespearean" garden. Note that some of the old common names of flowers differ from those we use today. The list is followed by lines from various plays in which these flowers are mentioned.

- *Arum maculatum* (long purples, cuckoo pint)
- *Caltha palustris* (Mary-buds, marsh marigold)
- *Cardamine pratense* (lady's smock, cuckoo flower)
- *Lonicera periclymenum* (honeysuckle, woodbine)
- *Lychnis flos-cuculi* (crowflower, ragged robin)
- *Primula elatior* (oxlip)
- *Primula vulgaris* (cowslip)
- *Rosa eglanteria* (eglantine, sweet briar rose)
- *Viola odorata* (sweet violet)
- *Viola tricolor* (love-in-idleness, wild pansy)

- Hamlet, Act 4: The Queen (describing the dead Ophelia)
There is a willow grows askant the brook,
That shews his hoar leaves in the glossy stream;
There with fantastic garlands did she make
Of crowflowers, nettles, daisies and long purples,
That liberal shepherds give a grosser name,
But our cold maids do dead men's fingers call them
- Cymbeline, Act 2: A song sung by a musician
Hark! Hark! The lark at heaven's gate sings,
And Phoebus 'gins arise,
His steeds to water at those springs
On chaliced flowers that lies;
And winking Mary-buds begin
To ope their golden eyes;
With everything that pretty bin:
My lady sweet, arise; arise, arise!
- Loves Labour's Lost, Act 5: Spring speaks!
When daisies pied, and violets blue.
And lady-smocks all silver white,
And cuckoo-buds of yellow hue,
Do paint the meadows with delight,
- Midsummer Night's Dream, Act 4: Titania
So doth the woodbine, the sweet honeysuckle,
Gently entwist, -- the female ivy so
Enrings the barked fingers of the elm.
- Midsummer Night's Dream, Act 2: Oberon
I know a bank whereon the wild thyme blows,
Where ox-lips and the nodding violet grows;
Quite over-canopied with lush woodbine,
With sweet musk-roses, and with eglantine.
- The Tempest, Act 5: Ariel
Where the bee sucks, there suck I;
In a cowslip's bell I lie;
There I couch when owls do cry.
- Henry V, Act 4: Henry (in disguise among his army)
I think the king is but a man as I am:
The violet smells to him, as it doth to me.
- Midsummer Night's Dream, Act 2: Oberon
Yet mark'd I where the bolt of Cupid fell:
It fell upon a little western flower, --
Before milk-white, now purple with love's wound,
And maidens call it love-in-idleness.

Vancouver Sun, March 1997

A Veteran Smoker in the Womb!

"The baby of a smoking mother should be considered to be an ex-smoker", said a Belgian researcher at a recent American conference. He was reporting on a study of babies born to mothers who smoke. The study measured the levels of a nicotine breakdown product, cotinine, in the urine of baby and mother. Newborns of smoking mothers have the same cotinine level in their urine (about 550 nanograms/mg) as is present in their mother's urine. The babies probably spend their first few days of life undergoing withdrawal from nicotine. In toddlers exposed to cigarette smoke at home (from mother or others), cotinine levels around 200 ng/mg were measured (this is higher than for adults exposed to second-hand smoke). These results may partially explain why babies of mothers who smoke are usually smaller than normal, more likely to die suddenly, and more likely to have lung problems.

Calgary Herald, March 20, 1997



World's Smallest Motor

In a recent issue of *Nature* Japanese researchers report the discovery of the world's smallest "motor" [5 nm in diameter]. The motor is an enzyme, ATP synthase, which forms the many bumps which are visible on the surface of a thylakoid membrane in electron micrographs. The enzyme comprises seven components, a central axle and six sub-units wrapped around it to form a collar. The inner component is free to spin inside the collar. It is thought that the turning rotor, which would spin at about 20 revs./sec., exposes active sites on the sub-units in the proper order to accomplish the conversion of ADP to ATP. The ATP molecules are then ejected "like sausages from a machine". It is of interest to note that Dr. Paul Boyer of U.C.L.A. first proposed that ATP synthase worked in exactly this way in the 1970s.

Nigel Hawkes, *The Times* (London), March 24, 1997



Extinct British Violet Returns (from Canada)

When Robert Robson and his wife Hannah left Britain for Canada in 1820, they took with them cuttings of the strongly scented, double-headed violet that grew in their garden at Piercebridge, County Durham. In the intervening years this unusual violet has died out in Britain. The wild specimens probably succumbed to sulfur pollution from local industries and the ones grown in gardens did not survive the campaigns to grow more vegetables in everyone's garden during World War II. Because of an inquiry about his family history in Britain by Balfour Le Gresley, the great grandson of Robert Robson, it was discovered that the violet has been growing in the family's Toronto garden since the Robson's arrival. It has now been re-introduced to Britain, being propagated initially at the Dorset home of Clive Groves, Vice President of the International Violet Association. Researchers at Durham University will receive plants which will be planted in Piercebridge, from where the original cuttings left for Canada long ago. The nomenclature of the plant is being researched and, if it was not previously named, this globe-trotting violet will probably be called *Viola odorata* 'Le Gresley'.

Damian Whitworth, *The Times* (London), March 25, 1997

Continuation of Book Review from page 27

reported in North America or Canada (e.g. *Oxytropis mertensiana*, *Poa pseudoabbreviata*, *Potentilla villosula*), and more than 100 taxa not previously reported from Yukon. New identification keys had to be produced to accommodate the new taxa and new records. Furthermore it includes current names and ranks for taxa and it incorporates the work of various specialists done since Hultén's publication. The treatment of willows (*Salix*) for example is based on the 1973 (and later work) of George Argus, and recent monographs (listed in the references) provide the basis for treatments of *Chenopodiaceae*, various groups of *Carex* and many other genera, while the treatments of *Antennaria*, *Arabis* and *Papaver* were contributed by R. Bayer, G. Mulligan and D. Murray, respectively. It also includes hundreds of significant range extensions within the Yukon Territory and, in this respect, it provides the first truly accurate picture of Yukon plant geography. Several taxa previously reported are deleted on the basis of unsatisfactory evidence. In short, Cody has added an enormous amount of information to what was previously available and his work is a major step forward. In fact it is more than a major updating. It is the first really accurate and reliable synthesis covering a huge area of Canada, and an area of the Canadian north with a very high biodiversity.

Cody enlisted the collaboration of designer Marcel Jomphe and editor Jane T. Buckley, both of whom made very significant contributions, and he also benefitted from the cooperative work of several very talented artists (see acknowledgements). In addition he acknowledges the valuable reviews of Luc Brouillet, Jacques Cayouette and David Murray, and extensive logistical support from his daughter, Leslie Cody, as well as extensive research assistance from Yukon Renewable Resources through Catherine Kennedy. Agriculture and Agri-food Canada and the National Research Council of Canada also deserve recognition for support and for producing an outstanding publication worthy of its content (and at a thief's price). In the words of Rudolph Schmidt in *Taxon* (46: 150. 1997), it is "Doubleplusgood! Wow! Most Impressive! Lavishly done!". Even more than that though, this book is a major practical achievement of botany in Canada, again something that we can all be proud of. Thanks Bill!

Paul M. Catling
University of Ottawa

P.S. Mr. Cody has kindly provided notes on two errors that have come to his attention:

Pages 209-210. The illustration beside the *P. hyperborea* text on p. 209 is actually *P. obtusata* and the illustration beside the *P. obtusata* text on p. 210 is actually *P. hyperborea*. Simply indicate these figures to be interchanged.

Page 132. In the key to *Carex* group 1, the first couplet "I" should end with "*C. pyrenaica*", and "*C. pyrenaica*" should be omitted from couplet "J" three lines below.

Meetings / congrès

Conservation Biology

The Society for Conservation Biology will hold its 1997 Annual Meeting in Victoria, B.C., June 6-9, 1997. For information, contact: Dr. David Duffus, Program Chair, Department of Geography, University of Victoria, Box 3050, Victoria, BC V8W 3P5. [E-mail address: SCBprog@office.geog.uvic.ca]

Grassland Congress

The XVIII International Grassland Congress will begin in Winnipeg, June 8-12, 1997, and end in Saskatoon, June 15-19, 1997. For more information: 18th I.G.C., P.O. Box 4520, Station C, Calgary, AB T2T 5N3. Telephone: 403-244-4487. Email: amc@supernet.ab.ca

Joint Meeting

Boulder, Colorado, is the site for a joint meeting of The Society for the Study of Evolution, The American Society of Naturalists and The Society of Systematic Biologists, June 14-18, 1997. Obtain further information from: Dr. Jeffrey B. Mitton, Dept. of Environmental, Population & Organismic Biology, University of Colorado, Boulder, CO 80309-0334.

Urban Ecology - Leipzig 1997

This is the title of an international conference to be held in Leipzig, Germany, June 25-29, 1997. Obtain information from Dr. Hildegard Felmann [E-mail: feldfrau@pro.ufz.de]

Cultivated Plants

The Third International Symposium on the Taxonomy of Cultivated Plants is to be held in Edinburgh, U.K., July 20-26, 1997. Information: Dr. Crinan Alexander, Royal Botanic Garden, Inverleith Row, Edinburgh, U.K. EH3 5LR. [E-mail: c.alexander@rbge.org.uk]

Fern Meeting

A special meeting on Fern Development and Evolution will be held July 28-31, 1997, at Purdue University, West Lafayette, Indiana. Discussions will be arranged on the topics of development and evolution. There will also be workshops on modern genetic and molecular biological techniques and their application to the study of fern development and evolution. For information on the program of the meeting, contact co-organizer Jody Banks; for registration, contact Nancy Burget. The address for both is Department of Botany and Plant Pathology, Agricultural Research Building, Purdue University, West Lafayette, IN 47906. [E-mail addresses: banks@btny.purdue.edu and burget@btny.purdue.edu]

Rosaceae Meeting in Montréal

For everyone interested in the Rosaceae, an informal lunch meeting will be held during the AIBS meeting in Montréal on Wednesday, August 6, 1997. Let's get acquainted and share our current activities. If you wish to attend, please contact Elizabeth E. Dickson for more details. Address: 6 Wolf Crescent, Redwood Meadows, AB T3Z 1A3. [E-mail: eedickso@acs.ucalgary.ca]

European Environment Conference

This conference will be held in Leeds, U.K., September 15-16, 1997. For information, contact: Elaine White, Conference Coordinator, ERP Environment, P.O. Box 75, Shipley, U.K. BD17 6EZ.

Wetlands Symposium

The Fifth Symposium on the Biogeochemistry of Wetlands will be in Egham, U.K., September 16-19, 1997. For information, contact: Dr. A. Weir, Royal Holloway Institute for Environmental Research, Huntersdale, Callow Hill, Virginia Water, U.K. GU25 4LN.

Biocomputing Symposium

The 3rd Pacific Symposium on Biocomputing will be held in Kapalua, Maui (Hawaii), January 4-9, 1998. Obtain information from: Norma Belfer, PSB Conference Coordinator, UCSF Computer Graphics Laboratory, 513 Parnassus Avenue, San Francisco, CA 94143-0446 [Email: psb@cgl.ucsf.edu] or visit the conference website: <http://www.cgl.ucsf.edu/psb>

Wheat Genetics Symposium

The Ninth International Wheat Genetics Symposium will be held at the University of Saskatchewan. August 2-7, 1998. For information, consult the website: http://usask.ca/agriculture/cropsci/winter_wheat/9th_iwgs/

Carbohydrate Symposium

The 19th International Carbohydrate Symposium will be held in San Diego, California, August 9-14, 1998. The First Circular is now available and can be viewed at the website: <http://www.ics98.uci.edu> or can be obtained from: ICS 98 Symposium Secretariat, Dept. of Chemistry, University of California, Irvine, CA 92697-2025.

XVI International Botanical Congress

It is more than two years before the next Botanical Congress in St. Louis, August 1-7, 1999, but the organizers have already issued the First Circular for the Congress. A copy of the First Circular is included with this issue of the Bulletin. Anyone wishing additional copies of the Circular or wishing more information on the Congress should consult the website which has been set up: <http://www.ibt99.org>

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Les soumissions pour le bulletin d'août doivent arriver au plus tard le 15 juillet 1997.

Advertisements for **Positions Available** and **Classified** categories may be placed at a cost of Can\$5.00 per published column centimeter. Individual members of the Association may place free advertisements of **Positions Wanted** and **Post-doctoral Opportunities**.

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