

Apr. 1 1981

The 1981 Annual Meeting and Symposium of the
PHYTOCHEMICAL SOCIETY OF NORTH AMERICA

Will be held August 10-14, 1981 on the campus of Cornell University in
Ithaca, New York

The annual meeting will feature contributed paper sessions on
phytochemistry including:

1. Chemotaxonomy and systematics
2. Plant enzymology
3. Plant chemistry
4. Plant stress
5. Physiology and ecology
6. Subcellular and cellular localization

There will be (a) Poster Session(s) for those preferring this medium of
presentation.

The symposium, "Cellular and Subcellular Localization in Plant
Metabolism" will be held coordinately with contributed papers, and
published as Volume 16 of "RECENT ADVANCES IN PHYTOCHEMISTRY."

Topics:

I. CELLULAR METABOLISM

1. C₄ Plant Photosynthesis (C. C. Black)
2. Stomata (W. H. Outlaw)
3. Synthesis and degradation (of secondary metabolites) (E. E. Conn)

II. SUBCELLULAR METABOLISM

4. Cell Walls (M C. Ledbetter)
5. Vacuoles (G. J. Wagner)
6. Chloroplasts (S. C. Huber)
7. Mitochondria (J. N. Siedow)
8. Microbodies (A. H. C. Huang)

TENTATIVE SCHEDULE:

The symposium topic will be Subcellular and Cellular Localization in Plant Metabolism and will be complemented by contributed papers in many areas of Phytochemistry.

	A.M.	P.M.
Sunday		Register at N. Campus Union 8:PM Reception, Johnson Art Museum
Monday	9:AM Welcome and Announcements 9:15 Symposium Paper 10:10 Coffee 10:30 Contributed Papers	1:30 Symposium Paper 2:20 Coffee 2:40 Contributed Papers
Tuesday	9:AM Symposium Paper 10:00 Coffee 10:30 Poster Session	1:30 Symposium Paper 2:20 Coffee 2:40 Contributed Papers - Posters
Wednesday	9:00 Symposium Paper 10:10 Coffee 10:30 Contributed Papers	1:30 Tour Starts
Thursday	9:00 Symposium Paper 10:00 Coffee 10:30 Contributed Papers	1:30 Symposium Paper 2:20 Coffee 2:30 Business Meeting 7:30 Banquet
Friday	9:00 Symposium Paper 10:00 Coffee 10:30 Contributed Papers	

A final program will be published in the July Newsletter.

NAMES/ADDRESSES/PHONE NUMBERS OF THE ORGANIZERS:

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1981 Annual Meeting: PHYTOCHEMICAL SOCIETY OF NORTH AMERICA
August 10-14, 1981

Cornell University, Ithaca, New York, 14853

RETURN FORM NO LATER THAN MAY 15, 1981 TO:

L. L. Creasy
Department of Pomology
Plant Science Bldg.
Cornell University
Ithaca, New York, 14853

NOTE EARLY DUE DATE. Abstracts will be published in the PSNA Newsletter.

- 1) Abstracts should fit into the block 7cm by 13 cm.
 - 2) Since the abstracts will be reproduced directly, they should be well prepared and any structures should be neatly drawn.
 - 3)
 - a. The title should be CAPITALIZED.
 - b. Locations for authors should follow names if multiple authors are at different locations. Underscore the author who will present the paper.
 - c. For uniformity, elite type is preferred. Use single spacing and fill the block.
 - 4) Projection is limited to 2 x 2 slides, presentation time to 20 min for oral papers.
-
- 1) Presentation format: Oral _____, Poster _____.
 - 2) Session preferred: Chemotaxonomy and Systematics _____, Plant Enzymology _____, Plant Chemistry _____, Plant Stress _____, Physiology and Ecology _____, Subcellular and Cellular Localization _____, Assign me to an appropriate session _____.

<p style="text-align: center;">John T. Jones, Treasurer Department of Biology University of South Florida Tampa, Florida 33620</p>
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AGAIN PLEASE NOTE THAT THE DUE DATE FOR ABSTRACTS IS MAY 15, 1981.

Report of the Treasurer

January, 1981

The membership and financial position of the Society are both stronger than ever. We now have 318 members (287 regular, 31 student). We lost our usual 26 in 1980, but gained 37 new members. Of these 249 are U.S. members, 34 are Canadian, 11 are West German and 24 are from various other foreign countries. It's interesting to note that student membership has more than tripled in the past three years while regular membership has inched upward. Our total net worth as an organization is now \$20,866.21 up 58.6% over last year.

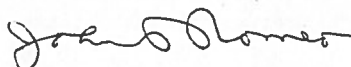
In the 1980 annual report included in this issue, you will note that our assets increased \$7,711.90. The reasons for this substantial increase are threefold: 1) We are selling a lot of books and collecting a lot of royalties. This is now the major source of society income. 2) The annual meeting held jointly with ASPP cost the society only \$1,150.00 (See accompanying report in this issue). This was due to the fact that the meeting organizers were able to obtain considerable outside support which spared the treasury an excessive outlay. 3) Much of our savings are now invested in high yield money market certificates. These funds are currently earning interest at a rate of 14.8%. If such high rates continue we can expect to realize over \$2,500 in 1981.

In short, royalty income, a strong membership, and interest on our savings will continue to allow us to support a major meeting each year and to maintain our unusually low dues rates.

Please continue to remit your dues promptly and send your address corrections. Any member contemplating retirement should remember you are entitled to emeritus status which exempts you from dues. The next directory will be published in 1982. The secretary will continue to publish the names and addresses of new members in the newsletter.

Copies of all bank statements and the auditor's report are on file. Any comments, suggestions or criticisms will be appreciated.

Respectfully submitted,



John T. Romeo, Treasurer
Department of Biology
University of South Florida
Tampa, Florida 33620

Phytochemical Society of North America
&
American Society of Plant Physiologists
Joint Meeting 1980

Total Income

Registration	\$39,030.22
NSF Grant	4,000.00
WSU Graduate School	2,000.00
PSNA	1,150.00
ASPP/Western Section	500.00
Interest	<u>394.07</u>
TOTAL	\$47,074.29

Total Expenses

Food (mixes, coffee stands, etc.)	13,273.13
Registration and Office Costs	2,919.98
Supplies	2,022.91
Building rental	418.19
Posters and Signs	774.08
Insurance and license	181.00
Hourly help	3,657.65
Travel and housing for speakers	10,037.90
Honoraria for speakers	1,100.00
Wages (secretary, administration)	7,885.05
Employee benefits	339.26
Computer	1,200.00
Pre-announcement flyers	706.80
Refunds (registration)	669.75
Loss from Canadian exchange	27.64
Transportation (local)	1,024.64
Volcano Symposium	686.31
Abstracts and Mailings (PSNA)	<u>150.00</u>
TOTAL	\$47,074.29

FINANCIAL STATEMENT

1 January 1980 - 31 December 1980

Receipts

Membership

Regular	79	\$	24.00
	80		2009.30
	81		128.00

Student			<u>140.00</u>
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Total		\$	2301.30
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Royalties

Vol. 9			123.42
Vol. 10			496.58
Vol. 11			774.08
Vol. 12			3605.35
Vol. 13			<u>1386.42</u>

Total		\$	6385.85
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Interest

Savings			237.35
Money Market Certificates			<u>687.40</u>

Total		\$	924.75
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TOTAL			9611.90
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Assets 1 January 1980

Checking		\$	2,904.32
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Savings			<u>10,249.99</u>
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Total		\$	13,154.31
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Disbursements

Directory - printing, typing		\$	381.22
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Treasurer expenses - postage & printing			154.73
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Secretary expenses - Newsletter & postage			1200.00
--	--	--	---------

Editor-in-Chief expenses - Contract negotiations			120.00
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Foreign exchange debit			4.05
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Auditor			<u>40.00</u>
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Total		\$	1900.00
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Summary 1980

Total receipts		\$	9611.90
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Total disbursements			<u>1900.00</u>
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Net Gain		\$	7711.90
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Assets 31 December 1980

Checking		\$	4,312.66
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Savings			<u>16,553.55</u>
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Total			\$20,866.21
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News from Society Members:

The PSNA welcomes the following new members:

Dr. David E. Lincoln, Dept. of Biology, University of South Carolina, Columbia, S. C. 29208. Interests in Secondary Metabolites Plant Insect Interactions.

Dr. Subhash C. Gupta, Dept. of Pomology, Cornell University, Ithaca, N. Y. 14853. Interests in Growth & Development, Photobiology, Enzymology.

Dr. Mary M. Starnes-Saunders, Ctr. for Viticultural Sci., Florida A & M University, Tallahassee, Fla. 32307. An old member returning after following research interests in other areas, now has interests in Phytopathology-lectin mediated host specificity.

Mr. Harold C. Kistler, Dept. PL. Pathology, Cornell University, Ithaca, N. Y. 14850. Interests in Plant Pathogen interactions molec. basis of disease resistance.

Gregory L. Boyer, MSU-DUE Pl. Res. Lab. Michigan State University, East Lansing, MI. 48824. Interests in Plant Growth-Development Marine Nat. Products.

Mr. Mark F. Bean, MDCH-PCOG, Purdue Sch. of Pharmacy, West Lafayette, In. 47907. Interests in Pharmacognosy, Plant insect interactions.

Dr. Maria Elena Zavala, SEA-USDA, WRRRC - 800 Buchanan Ave., Albany, CA 94710. Interests in localization of secondary plant products, latex laticifers.

Dr. Reanto Amado, Dept. of Food Sci., Swiss Fed. Inst. of Technology, Universitatstorsse 2, CH-8092 Zurich, Switzerland, Interests in cell wall chemistry plant enzymology.

Federation of Scientific Agricultural Societies:

At the request of the PSNA Executive Committee, Jim Saunders attended an organizational meeting of the Federation of Scientific Agricultural Societies (FSAS) in Washington D.C. Feb. 17, 1981. This organization of scientific societies is being formed to aid in disseminating information to Congress and federal funding agencies concerning the need of support for agricultural research. At the organizational meeting, proposals were discussed for establishing an agricultural section in the National Academy of Sciences. If you have suggestions for improved congressional support of research for agricultural sciences, please submit them to the PSNA Secretary.

Up Coming Meetings of Interests:

The 1982 meeting of the American Society of Plant Physiologists Southern Section will be held in Corpus Christi, Texas and will include a trip to the Marine Station at Port Aransas. Annual dues of \$3.00 are payable to Southern Section-ASPP and may be mailed to James N. Siedow, Department of Botany, Duke University, Durham, N.C. 27706.

In association with the CNRS, INRA and APCE, an international symposium on Seed Proteins will be held in Versailles, France, 22nd-24th September, 1981. For further details, write to Prof. J. Mosse, Seed Protein Symposium, Laboratoire D'Elude des Proteines, Centre de Recherches INRA, Route de St-Cyr, 78000, Versailles, France.

In association with the SEB, a symposium on Photosynthetic C, N and S Metabolism will be held in Leicester, 5th-7th January, 1982. For further details contact Dr. P. J. Lea, Department of Biochemistry, Rothamsted Experimental Station, Harpenden, Herts. (U.K.) AL5 2JQ.

The 1982 Annual Meeting of the Phytochemical Society of North America will be held in August at the University of Ottawa in Canada. The general topic for the symposium address has been selected to be Phytochemistry of the Seedling. Contributed papers and posters will be accepted on any topic of interest to phytochemists. Suggestions for symposium speakers and additional information can be obtained from Dr. Constance Nozzolillo, Dept. of Biology, Univ. of Ottawa, Ottawa K1N 6N5, Ontario, Canada (613) 231-2332.

The American Society of Pharmacognosy is meeting with the Society for Economic Botany July 12-17, 1981, in Boston, Mass. Their symposium topic will be "Plants and their Products in the Service of Man." Additional information can be obtained from Dr. Robert F. Raffauf, College of Pharmacy, Northeastern University, Boston, MASS., 02115.

International Congress on Chemistry and World Food Supplies - The New Frontiers. Co-sponsored by International Union of Pure and Applied Chemistry and International Rice Research Institute. February 2-6, 1982. Contact: Chemrawn II Coordinating Office International Food Policy Research Institute, 1776 Massachusetts Ave., N.W. Washington, D.C. 20036.

Allelopathy 1. An Alternate Concept in Weed Control. Sponsored by Alberta Agriculture in conjunction with the Weed Control Research Society of Alberta. May 26, 27, 28, 1981, Edmonton, Alberta, Canada. Registration fee is \$100.00 (covers registration and meals). Contact: Weed Control Research Society of Alberta, 701 9718-107 Street, Edmonton, Alberta, Canada T5K 2C8.

ASPP MEETINGS:

1981 June 15-19, Laval University, Quebec, Canada
 1982 June 14-18, University of Illinois
 1983 August 7-12, Colorado State University
 1984 August 12-17, University of California, Davis
 1985 In Northeast - Host the Canadian Society of Plant Physiologists. Site committee is looking for a host institution. If interested contact ASPP Business Office.

GORDON RESEARCH CONFERENCES - 1981:

June 8-12 Plant Molecular Biology, Proctor Academy, Andover
 June 22-26 Plant Cell & Tissue Culture, Proctor Academy, Andover
 July 20-24 Photosynthesis, Biochemical Aspects Kimball Union Academy, Meriden

Contact: Alexander M. Cruickshank, Director, Gordon Research Conferences, University of Rhode Island, Kingston, RI 02881, Tel. 401-783-4011.

GORDON RESEARCH CONFERENCES - 1982:

Clanton C. Black is organizing a conference on "CO₂ Fixation in Green Plants" to be held in New England June 28 to July 2, 1982.

FELLOWSHIP:

The Walter H. Simson Fellowship in Photobiology established by the Duro-Test Corp. of North Bergen, N.J. in 1978 is again being offered to doctoral and post-doctoral candidates. Recipient of the Fellowship receives \$6,000.

To qualify, candidates must be in a recognized doctoral or post-doctoral program, having completed at least one year of doctoral course work by September 1981. They must be sponsored by a faculty member who is currently involved in active research in the biological effects of light.

Applicants shall submit in quadruplicate, three letters of recommendation, one of which is from the research sponsor, curriculum vitae, and a five-page research prospectus to: Dr. Philip C. Hughes, Director of Environmental Photobiology, Duro-Test Corporation, North Bergen, N.J. 07047. Deadline for application is May 30, 1981. Notification will be given by August 1, 1981.

SUMMER COURSE:

Photosynthetic Physiology of Marine Plants (BOT 216L), July 20 - August 21, 1981. Variations in photosynthetic mechanisms and their ecological consequences in marshgrasses, seagrasses, seaweeds, and phytoplankton. Topics include light capture, carbon reduction pathways, carbon allocation, dark respiration, photorespiration, and growth strategies in relation to community structure and ecosystems processes. Instructor: J. S. Ramus. Contact: Admissions, Duke University Marine Laboratory, Beaufort, N.C. 28516.

POSITIONS AVAILABLE: All positions listed conform to equal opportunity guidelines.

We are seeking a Ph.D. candidate in Plant Biochemistry to investigate the biochemical bases for the phytotoxicity of certain naturally occurring non-protein amino acids. This program commences September 1981, will provide \$5,400/year in support, and is a joint venture between Dr. William S. Cohen and Gerald A. Rosenthal of the Plant Physiology Graduate Program, University of Kentucky, Lexington, KY. 40506, (606) 258-2652.

Teaching Position in Plant Physiology. Available Sept. 16, 1981. Temporary appointment at the Asst. Professor level is 1 academic year with the possibility of reappointment for a second year. Selectee to teach primarily basic plant physiology courses. Starting date is Sept. 16, 1981. Salary is negotiable. Send resume and 3 letters of recommendation to Dr. Tom J. Guilfoyle, Univ. of MN., Dept. of Botany, 220 Bio. Sci. Ctr., 1445 Gortner Ave., St. Paul, MN 55108. Screening will begin May 15, 1981.

Post-doctoral Research Associate - Plant Physiology. Individual will study soy bean pod development (mineral nutrition) and hormonal control of transport of minerals from the leaves to the pods. A Ph.D. in Plant Physiology or a closely allied subject is required. Salary \$14,000 per year starting as early as August 1, 1981 with a possibility of a second year. Application deadline is June 15, 1981 or until a suitable candidate is found. Send resume and names of three references to: Dr. L. D. Nooden, Botany Dept., Univ. of Michigan, Ann Arbor, MI 48109.

Post-doctoral Research Associate. Individual will study mechanism of action of grass herbicides used in cereal crops. Research emphasis to include herbicide metabolism, translocation, membrane effects and other plant hormone

related cellular activities. A Ph.D. in biochemistry, plant physiology, or related fields is required. Position available after April 30, 1981. \$15,000 per year renewal for second year. Send resume and names of three reference to Dr. Donald S. Galitz Department of Botany, North Dakota State University, Fargo, North Dakota 58105.

Post-doctoral Position - Plant Biochemistry. A two-year fellowship is available to isolate, purify, and characterize the flycine decarboxylation reaction from plant mitochondria. A strong background in biochemistry (particularly protein chemistry) is essential and interest and experience in photosynthesis and photorespiration is desirable. Send curriculum vitae and the names of three references to Dr. D. J. Oliver, Department of Bacteriology and Biochemistry, University of Idaho, Moscow, Idaho 83843, (208) 885-7014.

Assistant Professor of Plant Biochemistry. A position is available for a plant biochemist who will be responsible for direction and conduct of research into basic biochemical/genetic differences between closely-related plants to facilitate identification of cultivars and species of seeds. A Ph.D. degree in some area of plant physiology and/or biochemistry is required. Preference will be given to individuals with experience beyond the Ph.D. degree. Salary is competitive and commensurate with qualifications. Application deadline is 15 June 1981. Send curriculum vita, transcripts, and names of at least three references to: G. E. Harman, Department of Seed and Vegetable Sciences, New York State Agricultural Experiment Station, Geneva, N.Y. 14456.

Leader, Biochemical Design Group, Stauffer Chemical Company. Group has mission to create new herbicides and related products by synthesizing molecules that mimic plant metabolites in such a way as to affect plant growth. The candidate should have a doctorate (in biochemistry or molecular biology), and about five years of post-doctoral experience with a record demonstrating originality and independence. The position is in the de Guigne Technical Center, Stauffer Chemical Company, Richmond, CA. Contact: Dr. Richard I. Mateles, Director of Research, Stauffer Chemical Company, Westport, CT 06880.

Post-doctoral Candidate and Graduate Student to work on NASA project "Studies on Maximal Yield of Wheat and Other Small Grains in Controlled Environments." The object is to study growth and yield under conditions of controlled lights, temperatures, CO₂, nutrients, air velocity, humidity, etc. Contact: Dr. Frank Salisbury, Plant Science Department UMC 48, Utah State University, Logan, UT 84322, Tel. (801) 750-2237.

Post-doctoral Research Associate. Job #767, \$1100-1300/month. Chemical Biodynamics Division, Lawrence Berkeley Laboratory. One year term appointment, renewable. Duties: Investigate terpenoid biosynthesis and its regulation in photosynthetic plants, especially Euphorbia lathyris. Investigate biochemical pathways and their regulation from primary photosynthetic products of CO₂ reduction to terpenoid compounds (terpenes, steroids, etc.) using plant tissues, including leaf, latex, callus and suspension cultures. Perform tracer metabolic studies, chemical and biochemical analysis, isolation and characterization of key enzymes. Requirements: Ph.D. in biochemistry or organic chemistry. Experience with isolation and identification of products from plants, use of radioactively labeled substrates and intermediates in plant metabolism studies, and isolation and characterization of enzymes from plants. Contact: Dr. Esther K. Nemethy, Solar Energy Group, Chemical Biodynamics Division, 614 Latimore Hall, Lawrence Berkeley Laboratory, 1 Cyclotron Road, Berkeley, CA 94720, Tel: (415) 486-4109.

Post-doctoral Position. Available beginning 1 July 1981. Immunocytochemical and related techniques to study the subcellular distribution of the morphogenetically active chromoprotein, phytochrome, to consider possible interaction between calmodulin and phytochrome, and to study possible cytoskeletal-membrane interactions in the mechanism of movements of phytochrome within the cell. Background in immunochemistry and experience with one or more immunocytochemical techniques (especially cryoultramicrotomy) is desired. Initial appointment for one year at salary of \$13,000 with second and third year. Please send curriculum vitae and names, addresses and telephone numbers of three references (or 3 letters of reference if overseas) to Dr. Lee H. Pratt, (404) 542-3732, Botany Department, University of Georgia, Athens, Georgia 30602. Closing date is 15 May 1981.

Post-doctoral Positions for research in the area of the Genetics and Membrane Structure of Photosynthesis. The overall goal of the research in this lab is to understand the relationship between membrane architecture and function in photosynthetic membranes. Position is available May, 1981 for at least two years. Salary is \$13,380 per year with annual raises equivalent to NIH Post-doctoral Fellowships. A Ph.D. in a Biological or Physical Science area; experience in some aspect of photosynthesis or membrane structure is preferred. Send curriculum vitae, three letters of recommendation, and official undergraduate and graduate transcripts to: Dr. Louis A. Sherman, Associate Professor, University of Missouri, Biological Sciences Division, 110 Tucker Hall, Columbia, Missouri, 65211.

Post-doctoral Fellow, Plant Physiologist: An individual is being recruited to conduct basic research on the mechanism controlling photosynthate partitioning in Beta vulgaris. A strong background in plant biochemistry is required and research experience in protoplast and vacuole isolation; membrane transport, and plant hormones desirable. Salary range: \$13,000 - \$15,000 per year plus complete fringe benefits. Length of appointment is 12 months with possible renewal after the first year. Send resume, curriculum vitae, statement of research interests, and names of three references to: Dr. Roger Wyse, USDA-SEA, AR, Utah State University, UMC 63, Logan, Utah, 84322.

Post-doctoral Position. Available immediately, renewable up to three years. Research on selection of more efficient mycorrhizal associations in crop plants. Send CV and names of two references to: Drs. A. J. F. Griffiths and A. D. M. Glass, Botany Department, University of British Columbia, Vancouver, B. C. V6T 2B1, Tel: (604) 228-5629.

Post-doctoral Position. Available immediately to work on physiological and biochemical bases of varietal differences in inorganic nutrient utilization in crop plants. Send CV to Dr. A. D. M. Glass, Department of Botany, University of British Columbia, Vancouver V6T 2B1, Canada, and arrange to have letters of recommendation sent from 3 references.

Weed Scientist/Assistant/Associate Professor. Available July 1, 1981. This is a tenure-track joint teaching (50%) and research (50%) position to conduct research on effects of herbicides on specific biochemical processes, physiological responses in weed and crop plants, herbicide residues and weed problems related to crop production. Requires a Ph.D. in Agronomy or closely related field, with a strong background in weed science. Send resume, transcripts, and names and addresses of three persons who have been asked to submit letters of recommendation by April 15, 1981 to Dr. J. Engibous, Chairman, Department of Agronomy & Soils, Washington State University, Pullman, WA 99164.

Technical Supervisor - Plant Physiology. Requires an advance degree (Ph.D. preferred) in Plant Physiology, Agronomy or related scientific discipline. Previous supervisory experience required. Position will be responsible for handling the research and development activities in support of EPA contract work measuring air pollution affects on plant and plant systems. Salary range is \$21,500 - \$23,500 per year. Interested applicants should forward resume to Mr. Nelson M. Pettit, Program Manager, Northrop Services, Inc., 200 S.W. 35th Street, Corvallis, Oregon 97330.

Post-doctoral Research Assistant. Rapeseed Microchemistry and microstructure research project requires a recent Ph.D. graduate. Responsibility for investigation of the major morphological and chemical characteristics in collaboration with rapeseed breeders and processing industry. Extensive training in light, fluorescence, and electron microscopy with a background in plant sciences, biochemistry or nutrition would be an asset. Salary (min. 2 yrs.) dependent on qualifications. Excellent fringe benefits. Please apply to Dr. I. Altosaar, Biochemistry Dept., University of Ottawa, Ottawa, Ontario, K1N 6N5, Canada, Tel. (613) 321-2953 or 231-5866.

Post-doctoral Research Associate to carry out research on sieve tube physiology, with emphasis on electrophysiology and membrane transport. Funding is available for a period of two years. Starting salary: \$13,000 per year. Send a curriculum vitae and have three letters of reference sent to Donald B. Fisher, Department of Botany, Washington State University, Pullman, WA 99163. Closing date is May 15, 1981.

Post-doctoral Research Associate in the area of enzymology to work on problems of sulfate reduction and transfer. The position is available immediately. Qualified candidates, please contact and send CV, publication list and two letters of recommendation to: Dr. Jerome A. Schiff, Abraham and Etta Goodman, Professor of Biology and Institute Director, Institute for Photobiology of Cellulose and Organelles, Brandeis University, Waltham, MA 02254. Brandeis University, located in the Greater Boston area, is a small high quality liberal arts university with excellent modern research facilities. The University is an Affirmative Action/Equal Opportunity Employer.

Research Associate - Plant Biophysicist-Physiologist. (Subject to funding) University of British Columbia, Department of Botany. Post-doctoral research associate to join a group studying changes in cell wall constituents during hormone-induced extension. The project involves the use of proton and deuterium NMR spectroscopy, x-ray diffraction analysis and enzymological techniques. A strong background in polysaccharides and plant physiology is required. Salary is negotiable within the range \$15,000 - \$18,000 per year for three years. Contact: Dr. I. E. P. Taylor, Botany Department, University of B. C., Vancouver, V6T 2B1, C. B., Canada, Tel. (604) 228-2340.

Post-doctoral in Cellular/Molecular Biology. Available 1 September 1981 to study organelle biogenesis. Interest areas include mtDNA mapping, genetics of multiplastidic algae, chloroplast nucleoid structure, in-vitro chloroplast protein synthesis. Computer skills helpful. Send resume and three letters of recommendation to: Dr. R. A. Catolico, Botany, AJ-10, University of Washington, Seattle, WA 98195.

Assistant Professor, Photobiology Institute. Brandeis University, Institute for Photobiology of Cells and Organelles, has a tenure-track opening at the Assistant Professor level for Fall, 1981. A Ph.D. in Biology, Biochemistry

SPECIAL OFFER

TO MEMBERS OF THE PHYTOCHEMICAL SOCIETY OF NORTH AMERICA

40% discount off the list price
on the following books

ISBN	AUTHOR/EDITOR--TITLE	List Price	Discount Price
40758-2	Loewus/Ryan -- THE PHYTOCHEMISTRY OF CELL RECOGNITION AND CELL SURFACE INTERACTIONS (Recent Advances in Phytochemistry, Volume 15)	\$37.50	\$22.50
40572-5	Swain/Kleiman--THE RESOURCE POTENTIAL IN PHYTOCHEMISTRY (Recent Advances in Phytochemistry, Volume 14)	\$29.50	\$17.70
40188-6	Swain--TOPICS IN THE BIOCHEMISTRY OF NATURAL PRODUCTS (Recent Advances in Phytochemistry, Volume 13)	\$29.50	\$17.70
40028-6	Swain/Harborne/Van Sumere--BIOCHEMISTRY OF PLANT PHENOLICS (Recent Advances in Phytochemistry, Volume 12)	\$49.50	\$29.70
34711-3	Loewus/Runeckles--THE STRUCTURE, BIOSYNTHESIS, AND DEGRADATION OF WOOD (Recent Advances in Phytochemistry, Volume 11)	\$49.50	\$29.70
34710-5	Wallace/Mansell--BIOCHEMICAL INTERACTION BETWEEN PLANTS AND INSECTS (Recent Advances in Phytochemistry, Volume 10)	\$35.00	\$21.00
34709-1	Runeckles--PHYTOCHEMISTRY IN DISEASE AND MEDICINE (Recent Advances in Phytochemistry, Volume 9)	\$32.50	\$19.50
50044-2	Runeckles/Watkin--RECENT ADVANCES IN PHYTOCHEMISTRY, Volume 4	\$32.50	\$19.50
50043-4	Steelink/Runeckles--RECENT ADVANCES IN PHYTOCHEMISTRY, Volume 3	\$25.00	\$15.00
50042-6	Seikel/Runeckles--RECENT ADVANCES IN PHYTOCHEMISTRY, Volume 2	\$20.00	\$12.00
50041-8	Mabry/Runeckles--RECENT ADVANCES IN PHYTOCHEMISTRY, Volume 1	\$39.50	\$23.70

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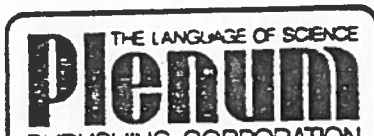
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POST DOCTORAL RESEARCH ASSOCIATE - Available January 1, 1981. Study of calcium transport in relation to physiological breakdowns in plants. Research with radioactive tracers and hormone bioassays in plants maintained in the controlled environment biotron. A strong background in environmental physiology of whole plants is desired with research experience with nutrient analysis, plant hormones and use of radioactively labelled substances. Provide vitae, transcripts and plant research experience. Contact D. T. W. Tibbits, Horticulture Department, University of Wisconsin, Madison, WI. 53706, USA.

POSITION - Research Associate in Horticultural Physiology. Responsibilities - Design, plan and conduct original research primarily on root physiology in the urban environment in collaboration with the UHI Program Leader and other departmental faculty. Evaluation of the environmental constraints placed on root growth as well as investigation of the physiological control mechanisms responsible for successful root systems will be of primary importance. Qualification - Ph.D. in Horticulture, Plant Science, or closely related field required. Application Closing Date - November 1, 1981. If interested please apply by sending resume, transcripts of undergraduate and graduate programs, publications and list of five references to: Dr. Nina L. Bassuk, Chairperson, Search Committee, UHI, Department of Floriculture and Ornamental Horticulture, 20 Plant Science, Cornell University, Ithaca, NY 14853.

PLANT GENETICS - MOLECULAR BIOLOGY - A position is expected to become available for a person interested in research on the genetics of tobacco. The position will be filled by a Ph.D. with training in classical genetics or plant molecular biology. Civil Service position in USDA to be filled by GS-11 or 12. Send vitae and names of three references to: Dr. T. C. Iso, Tobacco Laboratory, USDA, Bldg 001, Rm 115, Beltsville, Md. 20705.

Although these 12-month positions will entail basic research within the Experiment Station, the appointees will also participate in the teaching program. Applicants should send resumes and names of three references to: Dr. R. V. Klucas, Department of Agricultural Biochemistry, The University of Nebraska-Lincoln, Lincoln, Nebraska 68583-0718. Telephone 402-472-2932.

FACULTY POSITION IN ROOT BIOLOGY. A position of Assistant Professor of Biology at Harvard University is available with research opportunities at the Arnold Arboretum and teaching obligations at the Department of Biology. The person should be a vascular plant physiologist, with background training in plant growth and development, and with special interest in woody plants, their propagation, multiplication, growth and development. Application should, by 30 November 1981, be made to Martin H. Zimmerman, Chairman, Root Biology Search Committee, Harvard Forest, Petersham, MA 01366.

Position 1. Plant Breeder. To initiate a cultivar development program in collaboration with chemists, pathologists and agronomists for hydrocarbon-yielding plant species. A Ph.D. in plant breeding and genetics with a strong background in agronomy, physiology and chemistry is required.

Position 2. Cell and Tissue Culture Specialist. Initiate a research program for the manipulation of cells in culture and regeneration of hydrocarbon-yielding plant species. Individual will also develop techniques for the manipulation of plant protoplasts. Collaboration with breeders, chemists and pathologists is also expected. A Ph.D. in plant physiology, plant biochemistry or related field with a strong background in tissue culture, suspension culture and genetics is required.

Position 3. Plant Chemist. Initiate a research program to isolate and characterize potentially useful metabolites from hydrocarbon-yielding plant species. Individual will also develop quantitative and qualitative assays for these metabolites and collaborate with breeders, agronomists and pathologists. A Ph.D. in chemistry with a strong background in natural product chemistry and biochemistry is required.

Position 4. Pest Management Specialist. Individual will initiate a research program to identify pests of hydrocarbon-yielding plant species and develop methods to control these pests. Individual will collaborate with plant breeders, agronomists and chemists. A Ph.D. in pest management or closely related field with a strong background in agronomy, physiology and pesticide chemistry is required. Starting salaries are \$35,000 for all positions. Positions are available 1 January 1982. Send resume and reprints of pertinent publications for each position to: Dr. Timothy R. Peoples, Vice President; Genoco R & D; 1161 North El Dorado Place, Suite 244, Tucson, AZ. 85715.

POST-DOCTORAL POSITION. Available from, December 1981, for studies on physiological and biochemical interactions of Rhizobium meliloti with alfalfa. Applicants should have a degree in either Plant Physiology, Plant Pathology or Microbiology with knowledge of either enzymology or plant tissue culture. Salary \$16,000. Send curriculum vitae and three letters of recommendation by November 15, 1981 to : Dr. C. p. Vance, Department of Agronomy and Plant Genetics. The University of Minnesota, 1509 Gortner Ave., St. Paul, MN 55108.

POSTDOCTORAL POSITIONS - Microbial-Plant biochemistry. Three postdoctoral position are available for the (1) study of electron transport and bioenergetics in electron transport and uncoupled mutants of the symbiotic, nitrogen fixing bacterium, Rhizobium; and (2) for the study of the microbe-plant interactions of these mutants. The positions are available immediately or until filled and the salary is competitive. Send resume to Dr. Donald L. Keister, Charles F. Kettering Research Laboratory, 150 East South College Street, Yellow Springs, OH 45287.

ITEMS OF INTEREST TO PHYTOCHEMISTS:

High Specific Activity Radiolabeled Tobacco Alkaloids and Carbohydrates

Pathfinder Laboratories, Inc., producers of radiolabeled carbohydrates and organic compounds announce the availability of high specific activity Carbon-14 labeled alkaloids, such as nicotine, nornicotine, anabasine, and anatabine. These uniformly labeled alkaloids are isolated from tobacco leaf photosynthesis.

All enquiries regarding prices, availability, catalog, etc., should be addressed to Dr. Surendra K. Gupta, Pathfinder Laboratories, Inc., 11542 Fort Mims Drive, St. Louis, Missouri 63141. PHONE (314) 569-0681. Sarsyntex Achemical Company located in France distributes a catalog which lists a very large variety of Plant Natural Products which are difficult to find from other commercial sources. For information contact: Sarsyntex, Avenue Pdt J-F Kennedy, B. P. 100, 33701 Merignac, FRANCE, Telex 570494, Tel. (56) 34.84.50.

A new journal entitled "PLANT CELL, TISSUE AND ORGAN CULTURE" under the editorship of D. K. Dougall is being published by Martinus Nijhoff Publishers. The intent of the journal is to publish studies on various aspects of in vitro culture of higher plants - including fundamental, methodological and technical aspects. Topics include growth and development, technical aspects, anatomical, histological and ultrastructural aspects, physiology and biochemistry, genetics, phytopathology, and biotechnology. For additional information contact: Rob Roelofswaard, Meartinus Nijhoff Publishers, P. O. Box 566, 2501 CN The Hague, Netherlands.

POSITIONS OPEN:

All positions listed conform to equal opportunity guidelines:

Post-doctoral Position - Plant Biochemistry. An individual is being recruited to conduct basic research at The Pennsylvania State University in cooperation with the U.S. Department of Agriculture on the enzymatic conversion of 3-nitropropionate compounds to 3-nitropropionyl-D-glucose esters in Coronilla varia (crownvetch). Duties will include development of enzyme assays, synthesis of enzyme substrates, and purification of enzyme activities. A background in biochemistry and organic chemistry is desired, as well as experience in enzymology and protein purification. Position is available October 1, 1981 for one year, with the possibility of renewal for a second year. Starting salary is \$16,000 plus fringe benefits - Send curriculum vitae and names of three (3) references to Dr. David L. Gustine, USDA, ARA, US Regional Pasture Research Laboratory, University Park, PA 16802.

Post-doctoral Position - Chemistry or biochemistry to work on identification and separation of secondary plant compounds involved in plant/insect interactions. Salary \$15,000 plus fringe benefits. Send curriculum vitae and names of three references to Dr. James A. Saunders, Tobacco Lab, USDA, Bldg 0C1, Rm 116, Beltsville, MD 20705, (301) 344-3477.

FACULTY POSITION IN PLANT BIOCHEMISTRY. Research interests in (1) Plant Membranes and (2) Plant Growth and Development. Appointments above the assistant professor level are possible. Deadline for applications for position 1 is 30 October, 1981 and for position 2 is 31 December, 1981. Candidates must have a Ph.D. degree in biochemistry, plant physiology or a closely related field and postdoctorate experience is highly desirable.

The 1983 PSNA Annual Meeting will be held in June at the University of Arizona in Tucson, Arizona.

The symposium topic will be "Phytochemical Adaptation to Stress". Suggestions for speakers are now being selected by Dr. C. Steelink, Dept. of Chemistry, University of Arizona, Tucson, Arizona, 85721, (602) 626-2780.

Florida State University is sponsoring a Mini-Symposium in Plant Sciences. This year, the topic is "Phloem Transport". The invited speakers are Dr. M. V. Parthasarathy (Cornell University), Dr. R. Giaquinta (Dupont Company), Dr. D. B. Fisher (Washington State University) and Dr. A. L. Christy (Monsanto Company). The purpose is to give a complete update on the status of this field, with the topics ranging from phloem anatomy to crop yield. The coverage will be appropriate for students and teachers, as well as researchers actively engaged in phloem transport studies.

The first session will begin on Nov. 5th at 2:15 pm and end at 5 pm. The second session will run from 9:00 am until 11:30 am, Nov. 6th.

In order for the audience to participate, the size will be limited to less than 100. The audience will be selected on a "first-come" basis. For additional details and registration information contact: William H. Outlaw, Jr., Associate Professor, Dept. of Biol. Science, Florida State University, Tallahassee, Fla. 32306, (904) 644-4020.

Beltsville Symposium VII

Genetic Engineering Applications to Agriculture, May 16-19, 1982. For additional information and registration forms contact: Dr. Lowell D. Owens, USDA, Rm. 116, Bldg. 011A, BARC-West, Beltsville, MD 20705, (301) 344-4072.

- American Society of Plant Physiologist Annual Meetings.
1982 June 14-18, University of Illinois
1983 August 7-12, Colorado State University
1984 August 12-17, University of California, Davis.
-

Nitrate Assimilation - Molecular and Genetic Aspects. June 22-24, 1982.
Contact: Symposium on Nitrate Assimilation, c/o Zentralinstitut fur Genetik and Kulturpflanzenforschung, DDR-4325 Gatersleben, German Democratic Republic.

AAAS Meeting Jan. 8, 1982, Washington, D. C. symposium entitled: Plant Biology and Biotechnology in the 80's, arranged by Jerome P. Miskische (Prof. and Head, Botany ept., North Carolina State Univ., Raleigh, NC) and A. Carl Leopold (William C. Crocker, Scientist, Boyce Thompson Institute at Cornell, Ithaca, NY). Washington Hilton/ Lincoln East.

Symposium speakers include:
Reccmbinant DNA Technology Application in Crop Plants. Charles S. Levings,
Plant Tissue Culture: Biomass of the Future. Donald J. Durzan, Plant Tissue Culture Production of Economically Valuable Biochemicals. E. John Staba,
Agriculture Innovations - Overview for the Next Two Decades. John F. Fulkerson, Changing Bases of Support for Research and Development in Science and Technology, Quentin W. Lindsey. For further information contact: Dr. J. P. Miskische, Dept. of Botany, North Carolina State University, Raleigh, N. C. 27650, (919) 737-2727.

Upcoming Meetings of Interest

The 1982 Phytochemical Society of North America Annual Meeting will be held at The University of Ottawa, Ottawa, CANADA August 2-6.

The meeting as always will feature both contributed papers on any topic of interest to phytochemists as well as the symposium speakers. This year the topic of the symposium will be The Mobilization of Reserves in Germination and there are currently 13 international speakers which have accepted invitations.

Negotiations are currently underway with The Phytochemical Society of Europe to make this a joint meeting.

PSNA Symposium 1982

Provisional Title: Mobilization of reserves in germination.

Place & time: University of Ottawa, Ottawa, Canada Aug. 2-6, 1982.

Syposium Speakers

1. G. Fulcher, Ottawa Research Station, Agriculture Canada, Ottawa, Ont. K1A 0C6. Histochemical localization of seed reserves.
2. E. W. Simon, Department of Botany, The Queen's University, Belfast BT7 1NN, Northern Ireland. Membranes of the seeds.
3. B. McKersie, Crop Science Department, University of Guelph, Ontario Membranes and germination stress.
4. G. Maclachlan, Dept. of Biology, McGill University, 1205 Ave. Dr. Penfield, Montreal, P. Q., Canada H3 1B1. Carbohydrate metabolism in germination garden peas.
5. J. D. Bewley, Dept. of Biology, University of Calgary, Alberta, Canada. Interactions between the growing axis and storage tissue in the control of reserve hydrolysis.
6. A. Oaks, Dept. of Biology, McMaster University, 1280 Main St. W. Hamilton, Ontario L8S 8K1. The relationship between storage reserves and the biosynthesis of metabolites in the young seedling.
7. P. J. Lea, Rothamstead Experimental Station, Harpenden, Herts AL5 2JQ, England. Amino acid interconversions in germinating seeds.
8. T. Galliard, The Lord Rank Research Centre, Lincoln Road; High Wycombe Bucks. HP1 2QR, England. Starch-lipid complexes in cereals.
9. F. Loewus, Institute of Biol. Chemistry, Washington State University Pullman, WA 99164. Myoinositol and phytates.
10. R. S. Bandurski, Dept. of Botany and Plant Pathology, Mich. State U., East Lansing Mich. 48824 USA. Indole acetic acid conjugates.
11. M. Black, Dept. of Biology, Queen Elizabeth College, University of London, Campden Hill Rd. London W87AH. The "off-on" control process for gibberellin regulation.
12. P. L. Finney, Western Wheat Quality Laboratory, USDA, Washington State University Pullman Washington - 99164 USA. Nutritional benefits of sprouted seeds.
13. G. A. Rosenthal, Sch. of Biol. Sci. univ. of Kentucky, Lexington, KY 40506. The role of allelochemicals in seedling protection.

For additional information contact: Dr. Constance Nozzolillo, Dept. of Biology, University of Ottawa, Ottawa, K1N 6N5, Ontario, Canada, (613) 231-2331

constitution prevents the affiliation with any group which attempts to influence legislation, therefore, we could not affiliate without a constitutional change. Suggestions for constitutional changes must be distributed to the membership 30 days before an annual meeting, therefore, if PSNA wanted to affiliate it would have to wait at least one year. Discussions followed on the pros and cons of affiliation but it was pointed out that it would not affect our non-profit standing.

Dr. C. Nozzolillo gave a report on the progress of the 1982 PSNA meeting in Ottawa. The new title for the symposium topic is "Mobilization of Reserves in Germination," to be held August 2-6, 1982. She reported on a list of speakers which have accepted invitations to present symposium talks and the subjects of their presentations: "The list of speakers is presented under Upcoming Meetings of Interest in this newsletter".

Several other speakers are in the process of accepting invitations for a total number of symposium presentation of 12-14. Discussions which followed indicated a concern about the length of symposiums talks and contributed papers. There was strong sentiment not to have concurrent sessions and to continue with the poster sessions.

It should be noted that contributed papers and poster papers are encouraged on any topic of interest to phytochemists, and the topic of the symposium session need not be related to contributed papers.

Dr. C. Steelink indicated that we have been discussing the prospects of joint sponsorship of the 1982 meeting with Dr. C. Van Sumere, President of PSE, however, final agreements on the financial aspects of a joint meeting have not been settled.

Dr. C. Steelink gave a report on the 1983 PSNA meeting which is to be held in Tucson, Arizona during the later part of June. The title of the Symposium would be "Biochemical Adaptation to Stress." Discussions from the floor indicated a possible conflict with teaching commitments, especially by foreign members.

Dr. J. Saunders gave a report on a possible site for the 1984 PSNA meeting in Boston from an offer he had received by phone. There are apparently other sites also being considered for a meeting that year but no commitments have been made as yet. Dr. S. Brown suggested that we might be drifting away from the secondary products area which started the society and that we should remember that area when symposium speakers are invited.

Dr. F. Loewus motioned and Dr. Saunders seconded that the society thank the organizing committee for the 1981 meeting especially Drs. Le Creasy and Geza Hrazdina for a well run, thoroughly enjoyable meeting. The membership approved this motion by their applause.

The membership was reminded that thanks to the good offices of Dr. F. Loewus, the 1980 recent advances in Phytochemistry entitled, "The Phytochemistry of Cell Recognition and Cell Surface Interactions", is now available for distribution at a 40% discount to all members of PSNA. You will find an order form in the PSNA newsletter for this volume and all other past recent advances.

Recorded this day 8/13/81.

James A. Saunders
Secretary, PSNA

September 1981

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Report on the minutes of the 1981 Annual Business Meeting.

The annual business meeting of the Phytochemical Society of North America was called to order on August 13, 1981 by President Steelink. All members of the Executive Committee were present, together with approximately 35 members of the Society at large.

The minutes of the 1980 business meeting, which were distributed to the society in the September, 1980 newsletter, were approved without modification.

Dr. J. Romeo presented the Interim Financial Report covering the period from January 1, 1981 to July 31, 1981. The report enclosed herein indicated that the society had \$24,902.97 in assets, however, there were several outstanding bills yet to be paid. The society expressed its gratitude to Dr. Romeo for his effective utilization of societal funds and accepted the financial report without modification.

Dr. J. Saunders announced that the Executive Committee had approved the presentation of three Life Membership awards to Dr. Eric E. Conn, Dr. Simmon Wender, and Dr. Stewart Brown. Dr. Brown was in the audience and a certificate was presented to him which read "PHYTOCHEMICAL SOCIETY OF NORTH AMERICA. This certificate recognizes the outstanding scientific achievements and contributions to the field of Plant Phytochemistry made by Dr. Stewart Brown. In appreciation of these scholarly endeavors, the Executive Committee of the Phytochemical Society of North American hereby bestows LIFE MEMBERSHIP," signed by the Executive Committee. Similar certificates were sent to Dr. Conn and Dr. Wender. Dr. Brown thanked the Society for the award on behalf of his colleagues and himself and indicated he was very honored by the presentation.

The next order of business was the election of officers for 1981-1982. The nominating committee had suggested the following names: President-Elect: Geza Hrazdina, Secretary: Jim Saunders, Treasurer: John Romeo.

It was noted that Constance Nozzolillo would move from President-Elect to President following the business meeting as outlined by our constitution. Additionally it was noted that Dr. J. Saunders and Dr. J. Romeo were incumbents in their respective offices. No additional nominations being received from the floor, Drs. H. Stafford moved and R. Ibrahim seconded that the nominations be ceased and the candidates were unanimously elected.

Dr. C. Steelink announced tht 50% of the travel expenses of coach air fare will be paid to members of the Executive Committee for the 1982 meeting. This would only apply to individuals who did not have outside funds to cover the cost of travel.

Dr. L. Creasy announced that the 1981 Organizing Committee had paid the registration of 9 student members who had presented papers and expresses his desire to continue to support the active participation of students at annual meetings.

Dr. J. Saunders gave a report on the possible affiliation with an organization called the Federation of Scientific Agricultural Societies (FSAS). He attended a organizational meeting of this group in February, 1981 and reported that one of the main functions was to lobby for financial support for agricultural research from Congress. Article IX, Section 4 of PSNA

News from Society Members:

Mr. John F. Bain, Dept. of Botany, Univ. of Alberta, Edmonston, Alberta, T6GZE9 Canada. Interests in chemotaxonomy of asteraceae.

Dr. Thomas J. Gianfagna, MSU - DOE Plant Research Lab, Michigan State University, East Lansing, MI 48824. Interests in plant hormones, secondary metabolism.

Dr. William H. Outlaw, Jr., Biological Science, Florida State Univ., Tallahassee, FL. 32306. Interests in stomatal physiology.

Mr. Charles C. Hinkel, 4726 Shamrock Ave., Baltimore, MD. 21206. Interests in sales representative for General Scientific Co.

Mrs. Catherine J. Hennings, Dept. of Botany, Duke Univ., Durham, NC 27706. Interests in Lichen chemotaxonomy.

Dr. Thomas A. LaRue, Boyce Thompson Institute, Tower Road, Ithaca, N. Y. 14853. Interests in nitrogen fixation, nitrogen metabolites.

Mr. Brian N. Meyer, Dept. of Medicinal Chemistry and Pharmacognosy, Purdue Univ., W. Lafayette, IN 47907. Interests in cactus alkaloids, toxic plants, marine natural products.

Positions Available: (All positions are Equal Opportunity Employers)

Plant Physiologist - The position is for a senior scientist to provide leadership in research on tobacco and health. Research concerns deal with the identification of chemical, physical and botanical characteristics of tobacco which may affect health of consumers and developing a procedure to reduce the undesirable components. The incumbent should have an authoritative knowledge of physiology and biochemistry of tobacco and tobacco smoke. Position is a Civil Service GS-14 grade located at Beltsville Agriculture Research Center. Send SF 171, with names of three references to Special Examining Unit, Position #421-0107, SEA, USDA, 6050 Belcrest Rd. Rm 555, Hyattsville, Md. 20782

Biochemistry-Plant Physiology. Research Associate position available for person with recent Ph.D. in biochemistry, plant physiology, or related area. Research will involve use of immunological techniques to investigate biochemical mechanisms controlling lipid synthesis in plants. Starting salary: \$22,486 a year (GS-11). Location: Northern Regional Research Center, U. S. Department of Agriculture. U.S. Citizenship required. Send resume with names and phone numbers of 2 or 3 references by July 20, 1981 to: Dr. John B. Ohlrogge, Northern Regional Research Center, 1815 N. University Street, Peoria, Illinois 61604.

Post-doctoral Position in Natural Products Chemistry to work on identification of the chemical basis of plant resistance to foliage feeding insects. The individual selected should have a good working knowledge of chromatography, NMR, and MS. Salary to \$18,000 per year plus benefits including annual and sick leave and optional group hospitalization and group life insurance. The position is available immediately and the length of appointment is for at least two years. Send curriculum vitae, publication reprints and three letters of recommendation to: Dr. C. Michael Smith, Department of Entomology, Louisiana State University, Baton Rouge, Louisiana 70803, (504) 388-1634.

Meeting Information

The 1982 Annual Meeting of PSNA will be held August 2-6, at the University of Ottawa in Ontario, Canada. The symposium topic will be the Phytochemistry of Seedlings. Contributed papers and posters on any topics of interest to phytochemists will be accepted. For additional information or suggestions contact: Dr. Contance Nozzolillo, Department of Biology, University of Ottawa, Ottawa K1N 6N5, Ontario, Canada (613) 231-2332.

The 35th Tobacco Chemists Research Conference will be held October 7-9, 1981 in Winston-Salem, North Carolina. The symposium topic is entitled, "Tobacco Leaf Chemistry", and approximately 60 contributed papers on tobacco physiology or biochemistry are expected. For additional information contact: Dr. R. E. Noftle, Box 7486, Dept of Chemistry, Wake Forest University, Winston-Salem, N. C. 27109 (919) 761-5520

Items of Interest to Phytochemists:New Product Developments"The Biotest RCS Centrifugal Air Sampler"

"Air sampling is a part of an integrated system of hygienic surveillance. Weighing only 2.5 pounds, the Biotest RCS Centrifugal Air Sampler is a hand held instrument which can be used in any direction. A power cord is not required because the Biotest RCS operates on four standard "D" cell batteries. In addition, with the proper precautions, the Biotest RCS can be used in aseptic environments. Test sampling times for the Biotest are switch controlled and range from 30 seconds to 8 minutes, offering an air capacity of 40 liters per minute (1.4124 cfm). Sampled air volume is electronically controlled. The Biotest RCS Centrifugal Air Sampler employs efficient agar impaction as the collection principle. Media strips containing agar, which line the sampler drum, are commercially available. No dilutions are required for enumeration of microbial units. For the purposes of sterilization, the impeller blade and open end drum assemblies can be removed quickly and easily for steam sterilization, or for dipping or wiping with 70% to 80% Ethanol. The low initial investment and low operating cost of the Biotest RCS make it a highly economic device for air quality surveillance. Distributed by General Scientific Corp., 8741 Landmark Road, P.O. Box 26509, Richmond, Virginia 23261, Attention: Mr. C. Hinkel, Sales Dept. 1 (800) 446-1723. This unit lists for \$975.00 for 1-4 units.

News from Society Members:

The PSNA welcomes the following new members to our society:

Dr. R. M. Kramers, Dept. Agricultural Botany, Univ. of Reading, Reading RG6 2AA, Berkshire, ENGLAND. Interests in subcellular metabolism, in particular plant vacuoles.

Dr. Eve Syrkin Wurtele, Dept. of Biochem., U. C. Davis, Davis, CA 95619. Interests in natural products and subcellular localization of their synthesis.

Dr. Donald K. Dougall, W. Alton Jones Cell Science Center, Old Barn Road, Lake Placid, N. Y. 12946. Interests in plant cell cultures and the production of specific chemicals.

Mr. Steven D. Salt, Dept. of Biochemistry, Univ. of Minnesota, St. Paul, MN 55108. Interests in biochemical and physiological bases of symbiotic and pathogenic interactions of higher plants and microorganisms, fungal metabolic biochemistry.

ROOM RESERVATION FORM

1981 Annual Meeting: PHYTOCHEMICAL SOCIETY OF NORTH AMERICA

August 10-14, 1981

Cornell University, Ithaca, NY 14853

Return no later than: July 15, 1981 to:

L. L. Creasy
 Department of Pomology
 Plant Science Bldg.
 Cornell University
 Ithaca, New York 14853

	Sun	Mon	Tues	Wed	Thurs	Fri
Check off nights	_____	_____	_____	_____	_____	_____

Bed and Breakfast (as much as you can eat) included in room charge.
 Children 12 and under are half price (both Room and meals).

_____ Doubles @ \$13.60 per person for _____ nights = \$ _____
 _____ Meal tickets available (5 lunches and 2 dinners, \$21.60) \$ _____

Roommate _____ (return together if possible).
 or assign a roommate _____.

_____ days parking @\$.25 per day \$ _____

Room charges should be payed in U.S. dollars at the time of arrival.
 Personal checks are acceptable for room and for meal tickets.

Will make my own arrangements:

Stay in Motel _____
 Camping _____
 Undecided _____

NAME _____ TELEPHONE _____
 (Please print) (area code) (number)

Dept/Street _____

Institution/Company _____

City _____ State _____ Zip _____

ADVANCE REGISTRATION FORM

1981 Annual Meeting: PHYTOCHEMICAL SOCIETY OF NORTH AMERICA
August 10-14, 1981

Cornell University, Ithaca, NY 14853

Please complete a separate form for each meeting participant. Return no later than July 15, 1981 to:

L. L. Creasy
Department of Pomology
Plant Science Bldg.
Cornell University
Ithaca, New York, USA 14853

NAME _____ TELEPHONE _____
(Please print) (area code) (number)

Dept/Street _____

Institution/Company _____

City _____ State _____ Zip _____

Number		Amount
_____	Participant (member) -- \$35.00	_____
_____	Participant (non-member) -- \$45.00	_____
_____	Participant graduate/undergraduate student -- \$25.00	_____
_____	Participant member student presenting paper	(no charge)
_____	Spouse/Children -- \$5.00 per family, NAMES _____	_____
_____	Late Registration \$55.00	_____

SPECIAL EVENTS:

_____ Sunday evening Reception
(August 9, 1981, 8:PM, Johnson Art Museum) (no charge)

_____ Spouse/Family Program (cost dependent on program, indicate interest)

_____ Banquet (August 13, 1981, 7:30 PM) -- \$15.00 _____

_____ Excursion on Wednesday August 12, Leave 1:30 PM
(Wine Country/Dinner -- \$25.00) _____

TOTAL ENCLOSED _____

Make checks payable in U.S. Dollars to: Cornell University-PSNA-81

Registration refunds can be made if cancellations are received in writing by July 15, 1981. A \$5.00 charge will be deducted for processing.

P-15 Tuesday 2:50 - 5:00 P.M.

THE PRODUCTION OF RESVERATROL AND ϵ -VINIFERIN BY VITIS SPECIES IN RESPONSE TO UV INDUCTION.

Carol Luczka and Leroy Creasy, Pomology Dept., Cornell University, Ithaca, NY 14853

The production of stilbene phytoalexins has been studied (Langcake & McCarthy *Vitis* 18:224). Resveratrol and ϵ -viniferin (a dimer of resveratrol) have antifungal activity, as shown by spore germination and mycelial growth inhibition tests with *Botrytis cinerea*.

In addition to *V. vinifera*, other *Vitis* species (e.g. *V. riparia*, *V. rupestris*, *V. argentifolia*, *V. andersonii*, *V. longii*) will produce resveratrol and ϵ -viniferin upon exposure to inductive treatments with short UV radiation. An attempt was made to correlate the ability to produce these phytoalexins in response to UV irradiation with established plant resistance to several diseases.

P-16 Tuesday 2:50 - 5:00 P.M.

FACTORS THAT AFFECT THE FUNGAL RESISTANCE IN PAPAYA FRUITS.

Soon Chye Tan, Unit of Biochemistry, Universiti Kebangsaan Malaysia, Malaysia.

PAL, phenolic compounds, pectin and soluble carbohydrates in 20 cultivars of papaya fruits were studied. It was found that phenolic compounds and pectin were more important in inhibiting fungal infections in papaya fruit. Soluble carbohydrates seemed not to be a major factor that affected the resistance. However, soluble carbohydrates might promote fungal growth in the cultivars which have lower content of phenolic compounds and pectin. The experimental results also showed that there was a positive relationship between the activity of PAL and the content of chlorogenic acid in the fruits. The coefficient of correlation was 0.78 which was significant at 1% level.

The cultivars of papaya which might be used in commercial planting will also be discussed.

P-9 Tuesday 2:50 - 5:00 P.M.

REACTION CENTER II PHOTOCHEMICAL ACTIVITY MEASUREMENT BY A FLUORESCENCE METHOD.

Van Buren, J. P., Dept. of Food Science and Technol., Cornell Univ., Geneva, N.Y. 14856, Nakatani, H. Y., and Barber, J., Botany Dept., Imperial College, London SW7, England.

Fluorescence is a convenient method for testing reaction center II activity. Chemical reduction and oxidation in the presence of dichlorophenyl-dimethylurea permits evaluation independent of much of the rest of the electron transport chain. Use of pH 5.5 reaction conditions (succinate-phosphate buffer) gave rapid reagent access to reaction centers. Measurements were made with low actinic light to avoid quenching. Triton X-100 fractionation of photosystems could be followed. Low levels of Na dodecyl sulfate decreased variable fluorescence. Variable fluorescence was compared to the rate of photochemical dichlorophenol-indophenol reduction with diphenylcarbazide as electron donor. Pea and spinach chloroplasts partially inactivated by heat or alcohols were used. Reaction center II was relatively resistant to inactivation.

P-12 Tuesday 2:50 - 5:00 P.M.

INDOLEACETIC ACID OXIDATION IN MATURING APPLE.

Li-shar Huang, Porology Dept. Cornell Univ., Ithaca, NY 14853

Enzymes of IAA oxidation were partially purified from maturing apple peels. The IAA oxidase and peroxidase activities eluted together in both the high and low molecular weight forms during Sephadex G-200 gel chromatography. Specific activities of soluble and bound enzymes increased with fruit maturation. The PAGE showed IAA oxidases were isozymes of peroxidase and there were no extra bands at the peaks of activities. The oxidation was optimal at pH 6.1 and stimulated by 2,4-dichlorophenol. The lag period was shortened by H_2O_2 . Chlorogenic acid inhibition was not competitive with respect to IAA. The major products were probably 3-methylenoxindole and indolealdehyde, as shown by the repeated scan UV spectra or TLC.

P-10 Tuesday 2:50-5:00 P.M.

CHLOROPHYLL PIGMENTS OF TOUCH-NE-NOT SEEDLINGS. (IMPATIENS CAPENSIS MEERB.)

Ingrid Thie and Constance Hozzolillo, Dept. of Biology, University of Ottawa, Canada K1N 6N5

The cotyledons of dormant mature seeds of touch-ne-not are a bright blue-green color. This color replaces the yellow-green of immature cotyledons and is in turn overshadowed by the typical color of photosynthetic tissues upon germination in light. Acetone or methanol extraction at various stages of germination removes chlorophyll, but leaves untouched a gradually diminishing residue of the blue-green pigment. Cotyledons of seeds germinated in darkness also lose the blue-green color and a barely detectable amount of chlorophyll appears in its place. These observations suggest that the pigment is a reserve form of chlorophyll. A peak absorption at 652 obtained with a crushed seed preparation provides further support for this conclusion, but further characterization is attendant upon success in an ongoing search for a non-destructive extraction method.

P-13 Tuesday 2:50-5:00 P.M.

DEGRADATION OF PECTIC SUBSTANCES OF POTATO CELL WALLS IN PHOSPHATE BUFFER

Renato Amadó and Hans Neuensch, Dept. of Food Sci., Swiss Fed. Inst. Technol., 8092 Zurich, Switzerland

Potato cell walls were characterized by light- and electron- microscopy as well as by chemical analysis. The cell walls were refluxed in phosphate buffer of pH 6.8 and the solubilized material fractionated on DEAE-cellulose. The solubilized cell wall material consisted mainly of arabinogalactans probably bound to fragments of degraded pectin. The results can be explained by the selective breakdown (by β -elimination) of pectins during heating in phosphate buffer. Arabinogalactans bound to protopectin are stable under these conditions and are solubilized during pectin fragmentation.

P-11 Tuesday 2:50 - 5:00 P.M.

FERMENTATIVE METABOLISM IN THE SOYBEAN NODULE

Shigeyuki Tajima, Jay Peterson and Thomas LaRue, Tower Road, Ithaca, N.Y. 14853

In the nodule, photosynthate provided by the plant must be converted to products which the bacteroids can use to supply energy for nitrogen fixation. The partitioning of carbon metabolism between host cell and bacteroid is scarcely understood. Because leghemoglobin keeps the free oxygen concentration low, the host cell cytosol may have a fermentative metabolism. We examined anaerobic metabolites in the soybean nodule.

We find the nodule contains alcohol and acetaldehyde. Pyruvate decarboxylase was found in the plant cytosol, and partially purified. Alcohol dehydrogenase was found in plant cytosol and bacteroids. The bacteroids contain aldehyde dehydrogenase, and can use alcohol or acetaldehyde to support respiration and nitrogenase (C_2H_2) activity.

P-14 Tuesday 2:50 - 5:00 P.M.

DETECTION METHODS FOR PHONY PEACH DISEASE INCLUDING ELISA

Mary Starnes Saunders and William J. French, Div. Agr. Sci., Fla. A&M Univ. and Agr. Res. Ctr., IFAS, Univ. Fla. Monticello, FL. 32344

Phony peach disease which is caused by a rickettsia-like bacterium could, until recently, only be positively identified by grafting or vector transmission tests which ordinarily take from 18 to 24 months to complete. Enzyme-linked immunosorbent assay (ELISA) was developed for the detection of the presence of phony peach disease and the results were compared with microscopic examination and histochemical tests in nine year old 'June Gold' peach trees. The presence of the rickettsia-like bacteria could be detected with dilutions down to 10^6 bacteria/ml. Using the ELISA, positive identification of phony peach disease can be made eliminating misinterpreting phony peach disease for tree decline due to other causes.

P-3 Tuesday 2:50 - 5:00 P.M.

NOVEL ASSAY PROCEDURE FOR PRUNASIN HYDROLASE ACTIVITY EMPLOYING PURIFIED MANDELONITRILE LYASE.

M. Gross, G.H. Jacobs and J.E. Poulton, Department of Botany, University of Iowa, Iowa City, Iowa 52242

We wish to report a convenient assay system for prunasin hydrolase activity, employing the cooperation of β -glucosidase-free mandelonitrile lyase, for use in studies on amygdalin (Laetrile) metabolism in plants and animals. Mandelonitrile lyase was purified to near homogeneity from commercial almond emulsin using a rapid one-step ion-exchange chromatographic procedure. Emulsin was applied to a DEAE-cellulose column, pre-equilibrated with 50mM imidazole-HCl buffer, pH 6.0. Mandelonitrile lyase, possessing negligible β -glucosidase activity, was subsequently eluted using a 0-50mM NaCl gradient in this buffer and its purity was assessed by PAGE.

We determined by kinetic analysis the following optimum conditions for assaying prunasin hydrolase activity. The crude tissue extract, containing an unknown amount of prunasin hydrolase, is incubated with excess purified mandelonitrile lyase (=140 m-units) and saturating concentrations (= 5mM) of prunasin. Under these conditions, the mandelonitrile formed by prunasin hydrolysis may be calculated from the rate of change of absorbance at this wavelength.

P-4 Tuesday 2:50-5:00 P.M.

DISTRIBUTION OF ENZYMES OF PHENOLIC METABOLISM IN OAT PRIMARY LEAF TISSUES. W. Knogge, K. Fuisting, Ch. Beulen, & G.

Weissenböck, Botanisches Institut der Universität Köln, 5000 Köln 41, FR Germany

The distribution of two enzymes of the general phenylpropanoid metabolism, L-phenylalanine ammonia-lyase and 4-coumarate: CoA ligase (CL), and that of the key enzyme of the flavonoid metabolism, "flavanone synthase", have been investigated in the tissues of developing oat primary leaves. These enzymes, all showing distinct activity peaks in whole leaves of the plant stage with the highest flavone accumulation rate, presumably serve in flavonoid biosynthesis in a coordinated manner. The distribution of enzyme activities possibly points to a transport of intermediates and/or products of flavonoid metabolism. CL, showing a second activity peak in older leaves due to an increase within vascular strains, seems to be related to lignin biosynthesis at this stage. Analysis of substrate specificity of CL strengthens the latter hypothesis, too; furthermore, the existence of some additional phenylpropanoid biosynthesis is assumed.

P-5 Tuesday 2:50 - 5:00 P.M.

CHANGES IN THE PROTEIN CONTENT OF SENESCING PLANT SUSPENSION CULTURES

Mary Reider and John S. Fletcher, Dept. of Botany and Microbiology, Univ. of Oklahoma, Norman, OK 73019

Protein content of suspension cultures of Paul's Scarlet rose cells was measured at 4 day intervals, beginning on day-14 (normal transfer age) and continuing through day-38. The protein content of parent cultures of increasing age was compared with the dry weight and the ability of the cells to be subcultured.

The protein content of aging cultures decreased from approximately 780 to 500 μ g between days 14 and 18, and then remained relatively constant until day-26 whereupon it declined to approximately 350 μ g per culture. The protein content of parent cultures did not correlate well with their ability to be subcultured, and was therefore not considered a good criteria for following the senescence of cell cultures.

P-6 Tuesday 2:50 - 5:00 P.M.

PROANTHOCYANIDINS IN DOUGLAS FIR NEEDLES AND CELL SUSPENSION CULTURES

Stafford, Helen A & Hope H. Lester, Biology Dept., Reed College, Portland, OR 97202

The biosynthetic pathway leading to catechin, epicatechin and their oligomeric forms, proanthocyanidins, has been studied in needles and cell suspension cultures. Analysis by HPLC and 14 C reversed phase chromatography plus paper chromatography demonstrated the presence of naringenin-7-glucoside, dihydroquercetin-3'-glucoside and eriodictyol-7-glucoside. Dihydrokaempferol glycosides were not detected. Eriodictyol is the intermediate in proanthocyanidin biosynthesis, rather than dihydrokaempferol, the intermediate reported in tea plants.

14 C phenylalanine is rapidly incorporated into higher oligomers or proanthocyanidins at approximately the same time as into monomers, dimers and trimers. A greater incorporation of label into the upper vs the basal terminal unit, first demonstrated by Haslam in angiosperms, has also been demonstrated in gymnosperms. Light had no effect on the labelling rate or pattern in short term incubation experiments (4-8hrs), but higher intensities increased the procyanidin contents of cultures over longer periods of culture (3 wks).

P-7 Tuesday 2:50-5:00 P.M.

BIOLOGICALLY ACTIVE FLAVONOIDS AND PHENOLICS OF ADENOSTOMA FASCICULATUM AND A. SPARSIFOLIUM (ROSACEAE).

Margareta Proksch, Gottfried Weissenböck and Eloy Rodriguez, Dept. of Ecology and Evol. Biology, University of California, Irvine, Ca. 92717. Bot. Institut der Universität Köln, West-Germany.

The genus Adenostoma (Rosaceae) in California consists of two species: A. fasciculatum (Hook & Arn.) and A. sparsifolium (Torr.) Both are common shrubs of the Californian Chaparral community with A. fasciculatum (Chamise) covering up to 70% of the Chaparral area. Adenostoma fasciculatum has been shown to be allelopathic because of its phenolic constituents that inhibit seed germination.

In this paper we report the separation, structure elucidation and quantification of flavonoids and the bound phenolic acids of both species. The major flavonoids are flavonols and the 3-O-glycosides of kaempferol, quercetin and isorhamnetin. Structural elucidation was carried out by UV-, MR- and MS-spectra and GC- and HPLC-analysis of the crude extracts.

Information related to the possible allelopathic role of these phytochemicals is also presented.

P-8 Tuesday 2:50 - 5:00 P.M.

LABELLING OF CF₁ WITH A FLUORESCENT MALEIMIDE.

Richard Beliveau and Richard E. McCarty, Biochemistry Dept., Cornell University, Ithaca, New York 14853

N-(1-Anilino-naphthyl-4)-maleimide (ANM) is a light-dependent inhibitor of photophosphorylation and is incorporated into the γ subunit of CF₁ in both the light and the dark. The N-ethylmaleimide pretreatment of thylakoid, in the dark prevented the incorporation of ANM into CF₁ in the dark, but not in the light. The fluorescence of ANM in the "light site" was blue shifted by 14 nm with respect to that in the "dark site". Evidence for energy transfer from a tyrosine residue to ANM was obtained from thylakoids reacted with ANM in the dark. These results indicate that the ANM in the "light site" is within a hydrophobic region of CF₁. If the structure of soluble CF₁ resembles that of thylakoids in the dark, illumination must cause a pronounced change in the conformation of the bound enzyme.

C-29 Thursday 10:50 A.M.

IDENTIFICATION AND ENZYMIC SYNTHESIS OF THE POLY-METHYLATED FLAVONOIDS OF *CHRYSOSPLENIUM AMERICANUM*

Ragai Ibrahim and Vincenzo De Luca, Biology Dept. Concordia University, Montreal, QuÉ, Canada H3G 1M8

The major flavonoids of this tissue were identified by UV-, NMR- & mass spectroscopy and the analysis of their hydrolysis products. They consisted of the glucosides of two partially methylated 2'-OH-*quercetin* and four partially methylated 6-OH-*quercetin* (*quercetagenin*), two of which with 2'-substitution. The *O*-methyltransferase activity of 40-70% amm. sulph. pellet can be recovered as a discrete peak of activity from Sephadex G-100. It catalyses the methylation of *quercetin* as well as its *OMe*-derivatives at different hydroxyls; suggesting the presence of a number of *O*-methyltransferases.

Further purification of this protein on polybuffer exchanger resulted in three peaks of activity with distinct pI values. Their role in the biogenesis of polymethylated flavonoids will be discussed in relation to their substrate specificities.

(Supported by NSERC grant & University funds)

C-32 Thursday 11:50 A.M.

MODIFICATION OF HORSE RADISH PEROXIDASE BY ORGANIC ISOTHIOCYANATES OF HORSE RADISH OIL

M. D. Loomis*, R. P. Sandstrom*, P. D. Pearce†, and A. J. Burbott*, Dept. of Biochem. and Biophys., Oregon State Univ., Corvallis, OR 97331*, and Applied Biochem. Div., DSIR, Palmerston North, New Zealand*

Horseradish peroxidase (HRP) has been investigated extensively, yet a careful survey of the literature shows many instances of anomalous behavior. For example, even though the enzyme has been available in crystalline form since 1941, variable isozyme patterns are still reported. A study of the anomalies, taken collectively, suggested modification of HRP by reactions with horseradish oil. We have shown that such modifications do occur and have developed extraction procedures, using liquid-N₂ homogenization, and adsorbent polystyrene, that appear to eliminate the modifications.

C-30 Thursday 11:10 A.M.

ENZYMIC SYNTHESIS OF LIGNIN PRECURSORS

H. Grisebach, Th. Lüderitz, Biological Institute, University of Freiburg i.Br., FRG

Cinnamoyl-CoA reductase and cinnamyl alcohol: NADP⁺ dehydrogenase were purified to homogeneity from cambial sap of spruce (*Picea abies*). The properties of these enzymes were compared with those from soybean cell cultures. Pronounced differences in substrate specificities between the enzymes from spruce and soybean were found which reflect the different lignin composition of gymnosperms and dicotyledons angiosperms. Sinapoyl-CoA is a substrate only for the soybean reductase and sinapaldehyde a substrate only for the soybean dehydrogenase. 4-Coumaroyl-CoA is a poor substrate for the reductase from both sources.

P-1 Tuesday 2:50-5:00 P.M.

SUBCELLULAR LOCALIZATION OF DHURRIN SYNTHESIS IN SORGHUM BICOLOR SEEDLING SHOOTS. Eve Syrkin Wurtele, Susan S.

Thayer and Eric E. Conn, Department of Biochemistry and Biophysics, University of California, Davis, CA 95616.

Sorghum seedlings convert tyrosine to *p*-hydroxy mandelonitrile which is glucosylated by the soluble enzyme UDPG: aldehyde cyanohydrin β -glucosyl transferase to form the cyanogenic glycoside, dhurrin. Protoplasts were prepared from epidermal and mesophyll tissues of 5 day light grown sorghum seedling shoots, lysed and applied to a sucrose density gradient. A significant fraction of the glucosyl transferase activity was found to be associated with the plastid-containing fractions of the gradient.

C-31 Thursday 11:30 A.M.

PITFALLS IN THE USE OF AN INTACT CELL ASSAY FOR PHENYLALANINE AMMONIA-LYASE (PAL)-ACTIVITY

Heike Holländer and Nikolaus Amrhein

Lehrstuhl f. Pflanzenphysiologie, Ruhr-Universität Bochum, D 4630 Bochum, Fed. Rep. Germany

A previously described assay for the estimation of relative activities of phenylalanine ammonia-lyase (E.C. 4.3.1.5.) in intact plant cells (Amrhein et al., *Planta* 131, 33-40, 1976) was reexamined for its specificity and its applicability to various tissues.

Intracellular, ³H-release from extracellularly applied L-(2,3-³H)-phenylalanine was measured by sublimation of ³H₂O released into the incubation medium. Specificity of ³H-release was examined by using phenylalanine specifically labelled with ³H in different side chain positions.

In buckwheat hypocotyl segments ³H is stereospecifically released from the pro-³S-position and is due to PAL-activity, whereas in leaf disks ³H is liberated from both the 2 and 3 positions and thus can only partially be attributed to PAL action.

P-2 Tuesday 2:50 - 5:00 P.M.

O-METHYLATION OF APIGENIN IN *ROBINIA PSEUDOACACIA*

Jonathan E. Poulton and Gary W. Kuroki, Dept. of Botany, University of Iowa, Iowa City, IA 52242

Crude extracts from young *Robinia pseudoacacia* seedlings catalyze the *para*-O-methylation of apigenin to acacetin using S-adenosyl-L-methionine as methyl donor. Optimum activity was exhibited at pH 9.0, and Mg²⁺ was not required for maximum activity. EDTA (10mM) did not affect the reaction rate, but 47% inhibition was observed with SAM (100 μ M). Apigenin was the best substrate, but significant activity was shown towards caffeic and 5-hydroxyferulic acids, naringenin, and quercetin. *Para*-coumaric, ferulic, and sinapic acids were not methylated. The K_m for apigenin was 50 μ M. Previous radiotracer studies with *Robinia* leaves (Ebel et al., *Phytochem.* (1970) 9:1529-1534) suggested that the B-ring substitution pattern of acacetin might be determined at the phenylpropanoid stage. By contrast, our demonstration of a *para*-O-methyltransferase activity methylating apigenin, but not *para*-coumaric acid, strongly supports an alternative view, namely, substitution at the C₅ level.

C-23 Wednesday 10:50 A.M.

MODE OF ACTION OF ALTERNARIA CARTHAMI TOXIN IN SAFFLOWER (CARTHAMUS TINCTORIUS L.)

Klaus Tietjen und Ulrich Matern, Institut für Biologie II der Universität, 7800 Freiburg, W.-Germany

Alternaria carthami, the causal agent of leaf spot disease in safflower, produces 3 phytotoxic compounds: zinniol, brefeldin A and 7-dehydrobrefeldin A. Of these toxins, brefeldin A is most important for pathogenicity of the fungus. When cell suspension cultures of safflower were treated with at least 15 µg/ml of brefeldin A, cells turned brown after 5 days. Unlike plants, suspension cultures do not produce polyacetylenic phytoalexins. Addition of cell wall preparations of either *Phytophthora megasperma* var. *soiae* or *Alternaria carthami*, however, leads to accumulation of considerable amounts of polyacetylenes highly toxic to *Alternaria carthami*. When 50 ng/ml of brefeldin A was added after addition of the elicitor, the biosynthesis of polyacetylenes was inhibited by 50%. Our results indicate that brefeldin A-binding sites in safflower are involved in polyacetylene biosynthesis.

C-26 Thursday 9:30 A.M.

L-ASCORBIC ACID BIOSYNTHESIS IN *OCHROMONAS DANICA*.

F.A. Loewus, J.P. Helsper, C.L. Hilby. Institute of Biological Chemistry, Washington State University, Pullman, WA 99164

Ochromonas danica Pringsheim, a freshwater chrysoomonad, converts D-glucose into L-ascorbic acid (AA) over a metabolic pathway that "inverts" the carbon chain of the sugar. In this respect, AA formation resembles that found in AA-synthesizing animals. It differs from this process in that D-galacturonate and L-galactonolactone, rather than D-glucuronate and L-gulonolactone, enhance production of AA and repress the incorporation of ¹⁴C from D-(1-¹⁴C) glucose into AA. Supported by grants from NIH (GM-22427) and NSF (PCM-7813254).

C-24 Wednesday 11:10 A.M.

INHERITANCE OF ALKANES AND SESQUITERPENOIDS IN F₁ HYBRIDS OF *PARTHENIUM ARGENTATUM* (GUAYULE)

Peter Proksch, Mohan H. Behl, and Eloy Rodriguez, Dept. of Ecology and Evol. Biology, University of California, Irvine Ca. 92717

Leaf alkanes and sesquiterpenoids of *Parthenium argentatum* (guayule), *P. tomentosum* var. *stramonium*, *P. fruticosum* var. *trilobatum* and the first filial (F₁) generations obtained from crosses with guayule were investigated by GC, HPLC, NMR and MS. The three species and the hybrids showed distinct chemical profiles with the chemistry of guayule predominating in most of the hybrids. The identified n-alkanes ranged from C₁₉-C₄₀ with either C₂₉ or C₃₁ being the main components. The presence of iso-branched alkanes in *P. tomentosum* and its hybrids was detected by GC-MS. The major sesquiterpenes were pseudoguaianolides and germacrene phenolic acid esters. The phenolic acid esters were inherited from guayule to the hybrids at concentrations five to ten times less than in guayule, as could be shown by HPLC. These preliminary studies indicate that epicuticular alkanes and sesquiterpenoids can be useful in chemotaxonomic and inheritance studies in guayule and hybrids. We thank NSF and the Fulbright Commission for support.

C-27 Thursday 9:50 A.M.

N-FERULOYLGLYCINE AMIDOHYDROLASE (3.5.1.X) FROM BARLEY

Martens M., Ruyschaert M., Hanselaer R. and C.F. Van Sumere Lab. vr. Plantenbiochemie, Univ. of Ghent, B-9000-GHENT, Belgium

The enzyme was isolated from embryos. It was also found in other plants. Enzyme activity was determined by means of a radiobiochemical (using N-feruloyl-2-(¹⁴C)-glycine-2-(³H) (I) as substrate) or a HPLC technique. The enzyme requires sulphate ions, is difficult to purify (purification: 110X; affinity chromatography so far unsuccessful) and hydrolyses N-acylamino acids of the cinnamoyl type (preferentially (I)). Its activity on N-benzoyl-glycine derivatives is low (between 0% and 10% of the activity of the corresponding N-cinnamoyl deriv.) and N-acetyl-glycine is not split. The specificity is different from the kidney aminoacylases (3.5.1.14). Some characteristics are: pH opt. = 8; temp. opt. = 32°C; K_m(I) = 8.6x10⁻³M; V_m(I) = 0.04 µmoles /mg prot./min.; Activ. energy 43.6 kJ/mole. Minimal inhibitor conc. for 100% inhibition are: HgCl₂ (5.10⁻⁵M); p-chloromercuribenzoate (10⁻³M); dithiothreitol (5.10⁻³M); o-phenantroline (10⁻²M); etc. In the later case 6.6.10⁻⁴M ZnCl₂ can completely restore activity. Cobalt ions have no such effect.

C-25 Wednesday 11:30 A.M.

ASCORBIC ACID LOCALISATION IN MELOIDOGYNE INDUCED ROOT GALLS OF *CICER ARIETINUM* L. P.C. TRIVEDI AND N.T. SARNA, BOTANY DEPT. UNIVERSITY OF RAJASTHAN, JAIPUR 302004, India

Root-knot nematode *Meloidogyne incognita* causes severe loss to *Cicer arietinum* in Rajasthan, India. In the present study localisation of ascorbic acid (AA) was made in healthy and *Meloidogyne* infected roots by using Silver Nitrate method. In the former the silver granules appeared in clusters, more towards the periphery but they become progressively scanty towards the central region of the root. The galls showed relatively more AA granules than the healthy root. Heavily infected galls showed large clumps of AA granules in the peripheral region, and they became smaller in the inner gall tissues. Mature giant cells were full of AA granules. Parenchyma cells surrounding them and those lining the cavity containing female nematode or egg masses were also full of AA granules. The egg and the nematodes of all ages were rich in AA. Brownish-black granules of silver were not seen in control slides.

C-28 Thursday 10:30 A.M.

INACTIVATION STUDIES ON PAL USING SUNFLOWER LEAF PHENYLALANINE AMMONIA-LYASE INACTIVATING SYSTEM (PAL-IS). Subhash Gupta and Leroy Creasy, Pomology Dept., Cornell University, Ithaca, NY 14853.

Crude preparations of PAL-IS specifically inactivated *Rhodotorula glutinis* PAL when incubated at 30°C and pH 9.0. PAL-IS-inactivated PAL seems to retain its binding site configuration. The reaction mixture after exposing PAL to PAL-IS when analysed on non-denaturing PAGE did not result in active PAL which indicated that inactivation was non-reversible. The electrophoretic mobilities of inactivated PAL and native PAL were similar on SDS-acrylamide gels but inactivated PAL runs slightly faster on non-denaturing acrylamide gels. These results seem to indicate that PAL-IS although not measurably changing the subunits of PAL, seems to cause structural changes in the PAL molecule. (Supported by NSF PCM 7820040.)

C-17 Tuesday 11:10 A.M.

OSMOTIC STRESS EFFECTS ON CHLOROPLAST PHOTOSYNTHESIS
G.A. Berkowitz and Martin Gibbs, Inst. for Photobiology
Brandeis University, Waltham, MA 02254

Increasing isolated chloroplast assay media sorbitol concentration from 0.33 to 0.67M facilitated a 58-66% reduction in CO_2 -supported and a 19-43% reduction in PGA-supported O_2 evolution. Substrate titrations indicated that PGA reduction was most severely affected by increased sorbitol at V_{max} while the K_m of the CO_2 assimilation pathway for HCO_3^- was increased by high sorbitol. Osmotic potential effects on photochemistry and the phosphate translocator could not fully account for the level of PGA reduction inhibition. An analysis of photosynthetic metabolite levels in 0.33 and 0.67M indicated that a major site of osmotic inhibition was reduction in FBP and SBP bisphosphatase activities. Although CO_2 fixation was inhibited by 60% at 0.67M, FBP and SBP levels decreased by 38%. Exogenous R5P did not completely overcome inhibition of CO_2 -supported O_2 evolution at 0.67M, indicating that another site of reduced osmotic potential inhibition must exist between R5P and PGA in the photosynthetic carbon reduction cycle.

C-20 Wednesday 9:30 A.M.

Enzymic Synthesis of γ -Coniceine in *Conium maculatum*. Chloroplasts and Mitochondria. M. F. ROBERTS, The School of Pharmacy, London University, London, WC1N 1AX, U.K.

Further studies of the transaminase responsible for the first committed step in alkaloid formation in *Conium maculatum* have shown the L-alanine : 5-ketooctanal transaminase to occur in both the mitochondria and chloroplasts. Experiments suggest that these enzymes are the isoenzymes transaminase A and B respectively previously isolated by the author(1). Comparison with work on amino-acid aldehyde transaminases (AAT) in *Spinacia oleracea* and *Arum maculatum*(2) suggests that the chloroplast enzyme is normally responsible for alkaloid production(3).

C-18 Tuesday 11:30 A.M.

LOCALIZATION OF SAM : METHYLTRANSFERASE AND FLAVANONE SYNTHASE WITHIN SPINACH CHLOROPLASTS
Yvette Charrière-Ladreix, Roland Douce and Jacques Joyard. DRF/BV.CEN-G. and USM-G., 55 X, 38041 Grenoble Cedex, France.

Intact and purified chloroplast isolated from spinach leaves capable of high rates of CO_2 -dependent O_2 evolution catalyze the transfer of methyl groups from S-adenosylmethionine to caffeic acid and to flavonols such as quercetin and quercetagetin. We demonstrate that SAM : caffeoyl methyltransferase is associated with the soluble enzymes of the chloroplast whereas SAM : flavonol methyltransferase is bound to the envelope membranes. Furthermore, thylakoids are entirely devoid of O-methyltransferase activity. Taking into account the cellular sites of SAM : O-methyltransferase activity and the presence of other enzymes of the flavonoid pathway such as flavanone-synthase we postulate that plastids are involved in phenylpropanoid derivative biosynthesis.

C-21 Wednesday 9:50 A.M.

MALONYLATION AND DEMALONYLATION OF PHENOLGLYCOSIDES IN PARSLEY (*PETROSELINUM HORTENSE* L.)
Ulrich Matern, Institut für Biologie II der Universität, 7800 Freiburg, West Germany

Malonylated flavonoid glycosides represent a large proportion of the total flavonoid content of irradiated parsley cell cultures. Two malonyltransferases were isolated and extensively purified. One enzyme exhibited broad substrate specificity but was most active with flavone and flavonol 7-O-glycosides. The other enzyme preferentially malonylated flavonol 3-O-glycosides. In parsley plants these enzymes could be demonstrated only in young roots, whereas all other parts of the plant as well as older roots contain 4 esterases which split malonylated flavonoid glucosides in vitro. The relative distribution of malonyltransferases and esterases in parsley as well as the localization of all flavonoids within the vacuoles of irradiated parsley cell cultures may indicate that malonyl-conjugates play some role in transport of phenolic glycosides.

C-19 Tuesday 11:50 A.M.

DISTRIBUTION AND CHARACTERIZATION OF GLYCOSIDASE ENZYMES IN TOBACCO VACUOLES
James A. Saunders, Tobacco Laboratory, USDA, SEA-AR, Beltsville, Md. 20705.

To investigate possible transport mechanisms of cellular metabolites within the tobacco leaf cell the substrate specificity and intercellular distribution of glycosidase activity were examined. Mature vacuoles were isolated from protoplasts of *Nicotiana rustica* by enzymatic digestion with 1% Macerase and 2% Cellulysin and purified on a Ficoll discontinuous gradient at 100,000 x g for 2 hrs. These vacuoles were shown to contain 60 to 80% of the β -D-glucosidase activity which was present in protoplasts from the same leaf. The vacuole preparations were also shown to be active towards the substrates α -D-mannose, α -D-galactose, and β -D-galactose. Little or no activity was observed, however, with eight other glycosidic substrates. The pH optimum, substrate specificity, and ratio of glycosidic activity in the vacuole vs. that in the protoplast, suggest that one enzyme with a broad substrate specificity which is predominately localized within the vacuole could account for the observed activity.

C-22 Wednesday 10:30 A.M.

INDUCTION OF PHYTOALEXIN SYNTHESIS IN SOYBEAN
H. Grisebach, P. Moesta, H. Beiner, Biological Institute, University of Freiburg i.Br., FRG

Induction of phytoalexins (glyceollin isomers and trihydroxypterocarpan) synthesis was investigated in soybean (Harosoy 63) cotyledons and hypocotyls upon inoculation with biotic (glucar.) and abiotic (HgCl_2) elicitors or with compatible and incompatible races of *Phytophthora megasperma* f. sp. *glycinea*. Pule and pule chase experiments with ^{14}C , show that in all cases levels of phytoalexins are mainly determined by their rate of synthesis. Turnover of phytoalexins is only slow. Only wounded tissue contains very low levels of phenylalanine ammonia lyase and chalcone synthase. Upon inoculation high activities of these enzymes are induced.

C-11 Monday 4:30 P.M.

FLUOROMETRIC DETECTION OF CYCLIC IMINO ACIDS. A. B. Bleecker and J. T. Romeo, Univ. of South Florida, Tampa, FL 33620.

The fluorometric detection of several cyclic imino acids of plant origin following automated ion exchange fractionation is reported. Proline, *cis*- and *trans*-4-OH-proline, *trans*-4 and *cis*- and *trans*-5-OH-pipecolic acids, acetylaminopipecolic acid, and 4,5-dihydroxypipecolic acid isomers are resolved with a pH 3.1 buffer. Pipecolic acid is subsequently eluted by increasing the pH to 3.5. Detection involves a post column oxidation of the secondary amines by chloramine T prior to the introduction of the fluorogenic agent o-phthalaldehyde. The characteristic optima each compound shows with respect to the pH of the chl.T solution, the concentration of chl.T, and the temperature at which the oxidation step is carried out are discussed. The detection is linear over a wide range of compound concentrations and is sensitive down to picomole levels. Although similar systems have been used for proline and OH-proline, until now OPA has not been successfully applied to other secondary amines. The present work establishes the usefulness of this technique for compounds of greater interest to phytochemists. It is currently being used in chemical-ecological studies of the legume *Calliandra*.

C-12 Monday 4:50 P.M.

SOLID-PHASE ENZYME IMMUNOASSAY FOR THE DETERMINATION OF PPB-LEVELS OF LIMONIN IN CITRUS¹. P.S. Jourdan, R.L. Mansell¹, and E.W. Weiler².

A solid-phase enzyme immunoassay for the determination of 0.1-10 ng of the bitter triterpene-lactone, limonin, in plant extracts and juice samples is described. As little as 1 part per billion of limonin can be detected. Quantitative results are available within 30 min. of total assay time. The assay makes use of a limonin-horseradish-peroxidase tracer of high immunoreactivity and has been semi-automated using antibody-coated polystyrene optical cuvettes.

¹Univ. of South Florida, Tampa, Fl.

²Ruhr-Universität Bochum, D-4630 Bochum, FRG.

⁺U.S. Patent Application No. 147,732.

C-13 Tuesday 9:30 A.M.

STUDIES OF FLAVONOID METABOLISM AT THE TISSUE AND CELL LEVEL: INCORPORATION OF (¹⁴C) PHENYLALANINE AND CINNAMIC ACID INTO LEAF SECTIONS AND MESOPHYLL PROTOPLASTS FROM OAT PRIMARY LEAVES. M. Proksch, D. Strack and G. Weissenböck, Botanisches Institut der Universität Köln, 5000 Köln 41, FR Germany

Leaf sections, with the abaxial epidermis removed, were floated on precursor solutions. The intact mesophyll was in contact with the solution. C-gly-cosylflavones were found to be labelled within 15 min and total and specific activity increased over several hours. Pulse labelling, as well as pulse chase experiments demonstrated that oat flavones are stable end products of metabolism. When protoplasts were made from these sections, a different flavone labelling pattern was found than that of the intact tissue. This difference appears to be due to tissue specific differences in flavonoid metabolism between the adaxial epidermis and the mesophyll. The data also suggest that photosynthetically active mesophyll cells are a main site of flavonoid biosynthesis in the oat leaf.

C-14 Tuesday 9:50 A. M.

HEXOKINASE ISOZYMES FROM ENDOSPERM OF DEVELOPING CASTOR OIL SEEDS. Jan A. Miernyk and David T. Dennis Biology Dept., Queen's Univ., Kingston, Ontario

Ion Filtration chromatography on DEAE-Sephadex A-25 at pH 5, resolves hexokinase activity from developing *Ricinus communis* seeds into 3 distinct isozymes. In addition to differences in charge, the isozymes have different pH optima, substrate specificities and kinetic characteristics. Ion filtration chromatography of hexokinase activity from isolated organelles showed that isozyme 1 (5% of total activity) is enriched in the mitochondrial fraction, isozyme 2 (20%) is enriched in the plastid fraction and isozyme 3 (75%) is cytosolic. The metabolic role of mitochondrial hexokinase is not known. In the case of plastid hexokinase, we propose that photosynthetically produced sucrose is transported to the developing seeds and metabolized by invertase in the cytosol to hexoses. The hexoses are then transported into the plastids, phosphorylated by hexokinase and metabolized through glycolysis and the pyruvate dehydrogenase complex to provide C₂ units for fatty acid synthesis.

C-15 Tuesday 10:30 A.M.

The localisation of the enzymes of alkaloid biosynthesis in *Papaver somniferum* latex organelles, M.F. ROBERTS, The School of Pharmacy, London University, London WC1N 1AX, U.K., C.J. COSCIA and T. KUTCHAN, Dept. of Biochemistry, St. Louis University Medical Center, St. Louis, MO. 63104, U.S.A.

Continuing studies on the metabolic activity of *P. somniferum* latex (1,2) an attempt has been made to characterise the 1000 g fraction of the latex in relation to alkaloid biosynthesis. Organelles separated using sucrose gradient techniques were characterised by monitoring the following enzyme activities: acid phosphatase, polyphenolase, dopa, decarboxylase and norlaudanosoline carboxylic and synthetase. Morphine and thebaine content together with uptake of (¹⁴CH₃)-morphine were used to locate the alkaloid containing organelles. The results suggest that both the 1000 g and supernatant fractions of the latex are required for alkaloid biosynthesis.

C-16 Tuesday 10:50 A.M.

LIGHT-MEDIATED CONTROL OF CHLOROPLAST-LOCALIZED ENZYMES OF QUINOLIZIDINE ALKALOID BIOSYNTHESIS Michael Wink and Thomas Hartmann, Institut für Pharmazeutische Biologie, TU, D-3300 Braunschweig, FRG

The key enzymes of lupanine biosynthesis, lysine decarboxylase and 17-oxosparteine synthase, could be localized in leaf chloroplast of *Lupinus polyphyllus*. Alkaloid formation in *L. polyphyllus* leaflets and photomixotrophic cell suspension cultures displays a marked diurnal rhythm with an enhanced biosynthesis in the light. Both alkaloid enzymes are activated by reduced thioredoxin and display a pH optimum of about pH 8. Since reduced chloroplast thioredoxin is only generated in the light and since the pH of the chloroplast stroma changes from pH 7 to pH 8 upon illumination, we assume that the enzymes of lupanine biosynthesis may be under the control of both light mediated factors. This could explain the diurnal rhythm of alkaloid formation observed in vivo.

C-5 Monday 11:50 A.M.

THE STRUCTURE, LOCATION AND POSSIBLE FUNCTION OF SESQUITERPENE LACTONES IN *HELIANTHUS MAXIMILIANI* SCHRADER
Jonathan Gershenzon and Tom J. Mabry, Department of Botany, University of Texas, Austin, TX 78712; Gerald Kreitner, Department of Agronomy, Kansas State University, Manhattan, KS 66506; Charlie E. Rogers, USDA Conservation and Production Laboratory, Bushland, TX 79012

The severity of insect predation on cultivated sunflowers has prompted an investigation of the terpenoid chemistry of wild species of *Helianthus* that are resistant to the major sunflower pests. Analysis of the aerial parts of one such resistant species, *H. maximiliani*, resulted in the isolation of a group of five, closely related, guaianolide-type sesquiterpene lactones. These compounds were found to occur in glandular trichomes on the surfaces of the leaves, phyllaries and anthers. When the most abundant of these compounds was added to the diet of larvae of the lepidopteran *Homoeosoma electellum* at concentrations mimicking those found naturally, there was a significant increase in mortality. The sesquiterpene lactones of *Helianthus maximiliani* may therefore function as defenses against insect attack and may account for the resistance of *Helianthus maximiliani* to *Homoeosoma electellum*, a very destructive pest of sunflower heads.

C-8 Monday 3:30 P.M.

SURFACE CHEMICALS OF GREEN TOBACCO LEAF
O. T. Chortyk, R. F. Severson, and R. F. Arrendale, USDA, SEA/AR, Tobacco Safety Research Unit, Athens, GA 30613

We are attempting to identify leaf compounds responsible for tobacco budworm resistance. We are studying the cuticular chemistry of normal and budworm-resistant tobaccos with emphasis on the constituents of exudates of glands on leaf hairs (trichomes). Young green leaves were washed with methylene chloride and the extracts were subjected to chromatographic analyses. The following components of the lipids were identified: paraffinic hydrocarbons, large molecular weight wax esters, paraffinic alcohols, *cis*-abienol and α - and β -duvatrienediols. The relationships between leaf and surface chemical component levels and insect resistance will be discussed.

C-6 Monday 2:30 P.M.

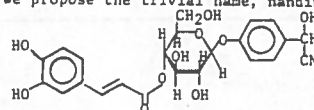
THE METABOLISM OF STEVIOL BY THE FUNGUS
GIBBERELLA FUJIKUROI STRAIN GF-1A
T. Gianfagna, J.A.D. Zeevaart, & W. Lusk. MSU-DOE Plant Research Laboratory, Michigan State Univ., East Lansing, MI 48824

Steviol (13-OH kaurenoic acid) was fed to cultures of *Gibberella* which had been transferred to liquid medium - N, in the presence of CCC. After 4 days no steviol could be detected in the culture medium. The metabolites of steviol were isolated and separated by reverse phase HPLC. The HPLC fractions were evaluated for GA activity using the d5 corn bioassay. There were 4 zones of biological activity which were analyzed by GC-MS. Zone 3 contained 76% of the extractable metabolites by weight. Two compounds were present and identified as 7,13-diOH-kaurenolide (57%), and 7,13-diOH-kaurenoic acid (19%). GA1 and GA18 were found in zone 1. Zone 2 contained, in addition to GA18, two compounds which appeared to be tri-OH derivatives of the kaurenolide and kaurenoic acid. GA53 (6%) was in zone 4. This compound promoted petiole growth in spinach, where it occurs naturally.

C-9 Monday 3:50 P.M.

THE STRUCTURE OF NANDININ, A NEW CYANOHYDRIN FROM *NANDINA DOMESTICA*. Joseph D. Olechno, Jonathan Poulton and Eric E. Conn, Department of Biochemistry and Biophysics, University of California, Davis, CA 95616

The young shoots of *Nandina domestica* Thunb. (Berberidaceae), a common ornamental known as Heavenly Bamboo, produce enormous amounts of hydrogen cyanide when injured. The hydrogen cyanide released accounts for 1.0-2.0 percent of the dry tissue weight. Enzyme free extracts of *N. domestica* readily release hydrogen cyanide if the pH of the extract becomes mildly alkaline. One of the cyanogens of this plant, a water soluble cyanohydrin, p-glucosyloxymandelonitrile, has already been characterized. A water insoluble cyanohydrin has now been identified by chemical, chromatographic and spectroscopic means. It is 4-(α -hydroxyacetonitrilo)-phenyl-6-D-glucopyranoside 4-O-(3,4-dihydroxycinnamate) for which we propose the trivial name, nandinin.



C-7 Monday 2:50 P.M.

RETENTION OF PHYTOALEXIN BIOSYNTHETIC ROUTES IN LEGUME CALLUS CULTURES

David L. Gustine and Barton G. Moyer, U.S. Regional Pasture Research Laboratory, University Park, PA 16802

Legume callus cultures were examined to assess whether phytoalexin biosynthetic pathways are retained in cultured tissues. Callus tissue cultures of *Canavalia ensiformis* (jackbean), *Medicago sativa* (alfalfa), and nine species of *Trifolium* (clover) were initiated and maintained on modified Gamborg's B5 medium. Phytoalexins isolated from cultures incubated for 48 hr on abiotic elicitor (6.3 mM HgCl₂) were purified by LC and HPLC and identified by UV and NMR spectra. None of the elicited cultures produced the same spectrum of phytoalexins as the corresponding plants. All except *T. pratense* produced medicarpin, the only phytoalexin produced by all of the corresponding plants. A second phytoalexin, maackiain, was produced by *T. pratense* and *T. medium calli*; maackiain is also produced in those plant species. These results suggest that 1) the pathway for medicarpin accumulation is a primary biosynthetic route, 2) cultured cells lose some phytoalexin biosynthetic pathways, and 3) the mechanism for regulating phytoalexin accumulation is not lost in culture.

C-10 Monday 4:10 P.M.

NMR SPECTRA OF ANTHOCYANINS AND IDENTIFICATION OF A COTTON GLAND PIGMENT.

Bock G. Chan, A. C. Weiss, Jr., R. E. Lundin and S. Asen. USDA, SEA-AR, WERC, Berkeley, CA 94710 and USDA, SEA-AR Beltsville, MD 20705.

NMR spectra were obtained for 5 anthocyanidins and 7 anthocyanins. Complete assignments were made for all aromatic protons and the anomeric protons. An anthocyanin was isolated from glands of *Gossypium barbadense*, cultivar Waukena White, purified by LC with Sephadex LH₂₀ and microcrystalline cellulose and HPLC with Rp-8. One mg of the anthocyanin was used for NMR measurement with a FT-Joel 100 spectrometer. It was cyanidin-3-glucoside: ¹H NMR (CD₃OD + DCl 6): 9.05 (s, H-4), 8.28 (q, J ortho 9 Hz, J meta 2 Hz), H-6), 8.06 (d, J 12 Hz, H-2'), 7.04 (d, J 9 Hz, H-5'), 6.9 (d, J 1 Hz, H-8), 6.66 (d 1 Hz, H-6), 5.32 (d, J 6.5 Hz, H- α).

S-7 Thursday 1:30 P.M.

CELLULAR ASPECTS OF C₄ LEAF METABOLISM

W.H. Campbell, Chemistry Dept., SUNY, Coll. of Envir. Sci. and Forestry, Syracuse, NY 13210 and C.C. Black, Biochemistry Dept., Univ. of Georgia, Athens, GA 30602

C₄ metabolism features a complex integration of anatomical structures, biochemical activities, and physiological responses. Anatomically, C₄ metabolism in all documented cases involves two types of photosynthetic cells such that a "division of labor" occurs. In one green cell type, part of a biochemical pathway is present and the remainder of the pathway is present in the second cell. Cellular differences are observed readily with light microscopy; these differences are quantitatively studied by examining the total proteins present in each cell by two-dimensional gel electrophoresis. Differences in protein patterns in each green cell type are supported by analysis of enzyme activities in each isolated cell type. Studies on enzyme and chloroplast activities involved in the assimilation of carbon, nitrogen, sulfur, and phosphorus verify that specific portions of each assimilation process occur in each green cell type. Our integrated understanding of these anatomical and biochemical features plus physiological responses will be presented and illustrated with crabgrass leaf studies.

C-2 Monday 10:50 A.M.

A RELATIONSHIP OF BASAL STEM ANTHOCYANIN PIGMENTATION AND INTERNODAL LENGTHS IN LENTIL SEEDLINGS (*LENS CULINARIS MEDIC*)

Constance Nozzolillo, Dept. of Biology, University of Ottawa, Ottawa, Canada K1N 6N5

Anthocyanin pigments appear upon germination in light in the stem and cataphylls of most lentil seedlings of the variety Laird but occasionally acyanic seedlings appear. Seed selection from such plants has provided several "red" and "green" lines. Seedlings of "red" and "green" lines were grown side by side in the greenhouse and growth cabinet. Measurement of individual internodes showed a significant difference in lengths. The first and second internodes, where the red color is most intense are shorter in "red" plants than in "green" plants; the third and fourth internodes, in which the red color is paler or absent, are longer in "red" seedlings. Further studies to determine whether or not there is a causal relationship are in progress.

S-8 Thursday 2:50 P.M.

THE SYNTHESIS, STORAGE & DEGRADATION OF PLANT NATURAL PRODUCTS: CYANOGENIC GLYCOSIDES AS AN EXAMPLE. Adrian J. Cutler and Eric E. Conn, Department of Biochemistry and Biophysics, University of California, Davis, CA 95616.

In vitro systems for the biosynthesis of cyanogenic glycosides have been characterized from *Sorghum bicolor*, *Triglochin maritima* and *Linum usitatissimum*. All are microsomal, membrane bound complexes requiring NADPH for activity and with slightly basic pH optima. They will perform the multi-step conversion of an amino-acid into a cyanohydrin which can then be glucosylated by a soluble glucosyl transferase to give the corresponding cyanogenic glucoside. These multi-enzyme systems exhibit the phenomenon of metabolic channeling in which negligible quantities of intermediates accumulate during product formation.

Studies in sorghum have shown that dhurrin (a cyanogenic glucoside derived from tyrosine) is stored in epidermal cells and the enzymes responsible for its degradation, β -glucosidase and hydroxynitrile lyase are located in mesophyll tissue. When leaf tissue is crushed (e.g. by a herbivore) substrate and enzyme are brought together and free HCN is released.

Supported in part by USPHS Grant GM-05301-23.

C-3 Monday 11:10 A.M.

COMPARATIVE PHYTOCHEMISTRY OF FIRE ADAPTED MEDITERRANEAN SHRUBS

Peter Proksch, Margareta Proksch, Phil W. Rundel and Eloy Rodriguez, Dept. of Ecology and Evol. Biology, University of California, Irvine, Ca. 92717

Adenostoma fasciculatum (Rosaceae) and *Elytropappus rhinocerotis* (Asteraceae) are dominant shrubs of mediterranean ecosystems in Southern California and South-Africa respectively. Both species are well known for their rapid ignition and burning during fires. It has been proposed that the high flammability is partially due to their ether extractives. We showed that the ether soluble substances covering the aereal surfaces of both species differ quantitatively and qualitatively. *A. fasciculatum* (chamise) comprises up to 5% per dry weight external ether extractives, consisting mainly of alkanes, long chain esters, monoterpenoids and triterpenoids. A plethora of phenolic compounds was identified from the internal extracts. *E. rhinocerotis* is covered by large amounts of an ether soluble resin (up to 20% per dry weight), with the main components identified as methoxylated flavones and flavonols. Free phenolic acids are present in minor amounts. The role and importance of these natural products for fire adapted plants as well as their possible biological activity will be discussed. We thank NSF (DEB 7912204) and the Fulbright Commission for support.

C-1 Monday 10:30 A.M.

CATABOLIC TURNOVER OF ENDOGENOUS POLYPHENOLS: DOES IT REALLY OCCUR IN PLANT CELLS?

Udo Margna and Lembe Laanest, Institute of Experimental Biology, 203051 Harku, Estonian SSR, USSR. Higher plants were shown to be capable of splitting phenolic compounds supplied exogenously and it is widely believed now, mainly by analogy, that endogenous polyphenols, too, continuously undergo catabolic turnover. Several arguments warrant caution in accepting that view. Metabolic fate of exogenous polyphenols can hardly be identical with that of the endogenous ones. Pulse-labelled flavonoids mostly remain unchanged or show little loss of label during post-treatment incubation. Only negligible amount of carbon from labelled L-phenyl-alanine fed to plants is later evolved as carbon dioxide or fixed in aliphatic metabolites. No specific enzyme catalyzing ring fission of polyphenols has been found in plants. Thus, so far there seems to be no grounds to claim plant polyphenols metabolically active compounds normally undergoing turnover with disruption of their aromatic nuclei.

C-4 Monday 11:30 A.M.

CHANGES IN CARBOHYDRATE CONTENT INDUCED BY ROOT-KNOT

NEMATODE, *MELOITOGYNE INCOGNITA* IN *CARICA PAPAYA*

K.M. Mathur, Zoology Dept., Univ. of Rajasthan, Jaipur 302004, India.

Carica papaya, a useful fruit plant is severely attacked by *M. incognita* resulting in poor fruiting. In the present study healthy and infected roots were studied for their carbohydrate content by using PAS technique and potassium iodide iodine reaction. Old healthy roots were richer in insoluble polysaccharides including starch, being localized chiefly in old phloem parenchyma. Young galls were devoid of PAS-positive granules. Only the syncytial walls stained strongly and the nematode in association showed PAS-positive granules. Large galls showed plenty of PAS-positive granules localized mostly in phloem parenchyma and in a few cells adjacent the infection court. The sedentary nematodes showed a gradual increase in number of PAS-positive granules reaching a maximum in ovipositing females and in eggs. The egg matrix stained positively while the cuticle and egg shell stained negatively.

S-1 Monday 9:10 A.M.

MICROTUBULE-PLASMALEMMA CROSSBRIDGES IN FLAX FIBERS ENGAGED IN SECONDARY WALL GROWTH

Myron C. Ledbetter, Biology Department, Brookhaven National Laboratory, Upton, NY 11973

Plant cells engaged in wall growth usually display cortical microtubules which mirror in orientation the adjacent cellulose microfibrils; and it is assumed, with some dissent, that orientation of the cellulose is influenced by the microtubules. It has been theorized that cellulose synthetase complexes, located in the plasmalemma, are guided along microtubules by means of bridges connecting microtubules to the plasmalemma. Appropriate bridges have been reported, but their frequency and distribution have not been documented in a systematic way. In this study, bast fibers of *Linum* (flax) have been observed by electron microscopy from transverse, serial, thin sections to map crossbridges found during S-2 wall growth of almost axially oriented cellulose. Most of the microtubules have extensive attachments to the plasmalemma, and it is concluded that the frequency and distribution are such that the plasmalemma can be conceived as being corded off into channels by rows of attachment sites. The relationship of synthetase complexes to the crossbridges is unknown, but the configuration may permit movement of the complexes either along or between the rows of attachment sites. (Supported by the U.S. Dept. of Energy.)

S-4 Tuesday 1:30 P.M.

METABOLISM IN PEROXISOMES (MICROBODIES)

Anthony H.C. Huang, Biology Dept., Univ. of South Carolina, Columbia, SC 29208.

The current status of knowledge on the metabolism in plant peroxisomes (microbodies) will be presented. Peroxisomes in higher plants can be categorized into 4 types according to their metabolic roles: the glyoxysomes for gluconeogenesis in oil-seeds, the leaf peroxisomes for photorespiration, the peroxisomes involved in ureide metabolism related to nitrogen transport in symbiotic nitrogen fixation, and the "unspecialized" peroxisomes of minor cellular constituents occurring in a great variety of tissues. In fungi and algae, the metabolic roles of peroxisomes depend largely on the trophic conditions, and the organelles can similarly be classified into 5 types: the glyoxysome-like peroxisomes involved in the metabolism of storage lipids, external alkane, fatty alcohol, fatty acid, acetate, and ethanol; the peroxisomes involved in photorespiration in algae; the peroxisomes for methanol metabolism in yeast; the peroxisomes for oxalic acid formation in pathologic fungi; and the "unspecialized" peroxisomes.

(Supported by USDA Competitive Research Grant Program.)

S-2 Monday 1:30 P.M.

PHOTOSYNTHETIC CARBON METABOLISM IN CHLOROPLASTS

Steven C. Huber, USDA, SEA-AR and Depts. of Crop Science and Botany, N.C. State Univ., Raleigh, N.C. 27650.

Recent studies have identified the importance of the pH of the chloroplast stroma in regulation of photosynthetic rate. In addition, stromal pH also has a distinct effect on the utilization of inorganic phosphate (P_i), which is transported into chloroplasts in exchange for photosynthetically formed triose phosphates. As a result, the stromal ratio of inorganic/organic-P was altered which in turn influenced the modulation by light of certain chloroplast enzymes, including fructose-1,6-bisphosphatase and glucose-6-P dehydrogenase. Upon illumination of chloroplasts, stromal pH increases from about 7.3 in the dark to 8.0 in the light. The pH gradient across the envelope (about 0.4 pH units, inside alkaline) is maintained in part by energized H⁺ efflux catalyzed by the envelope ATPase. Exogenous Mg²⁺ inhibits photosynthesis by increasing the permeability of the envelope to protons and thereby causing stromal acidification. The mechanism appears to involve activation of a reversible K⁺/H⁺ exchange across the envelope. The fluxes of ions and metabolites across the envelope relate to the coordinated control of cellular carbon-metabolism.

S-5 Wednesday 8:30 A.M.

METABOLITE PARTITIONING IN PLANT CELLS: THE ROLE OF THE VACUOLE

G. Wagner, Biology Dept., Brookhaven National Laboratory, Upton, N.Y. 11973

Storage and sequestration of metabolites, ion balance and osmotic phenomena including osmoregulation, cell and tissue mechanical support, cell elongation, stomatal function, and tissue movements are among the physiological processes in which the mature plant vacuole plays a central role. Histochemical and cytochemical studies have indicated that a number of biochemicals thought to be sequestered or stored in plant cells are found within the vacuoles of cells. Recently a number of investigators have directly examined the subcellular distribution of certain natural products and of certain substances acquired from the environment. Direct examination was accomplished by studying the composition of isolated vacuoles and other organelles. Findings of these studies will be reviewed. The problems and promise of direct subcellular localization study using isolated vacuoles and other organelles will be discussed. All of the vacuolar functions noted above rely in part on mechanisms that drive solute transport across the tonoplast. At the present time suggested mechanisms for transport across the tonoplast are largely speculative. Available evidence supporting various models for tonoplast transport will be reviewed.

S-3 Tuesday 8:30 A.M.

CYANIDE-RESISTANT OXIDATIONS IN PLANT MITOCHONDRIA

James N. Siedow, Department of Botany, Duke University, Durham, NC 27706.

Plant mitochondria exhibit several features which are not found in animal mitochondria including an electron transfer pathway which is resistant to inhibition by cyanide but inhibited by substituted hydroxamic acids. Recently the antioxidant propyl gallate was also found to specifically inhibit this "alternative" pathway apparently acting at the same site as hydroxamic acids. Systematic variations of the structural features of propyl gallate showed that a single phenolic hydroxyl group was the minimum structure required to bring about inhibition and that the phenolate anion represents the form of the inhibitor bound to the alternative oxidase. Further studies have used the binding of ¹⁴C-labeled butyl gallate to mitochondria to look for the presence of the alternative oxidase in mitochondria which do and do not exhibit cyanide-resistance. Finally, the possibility that activity associated with the enzyme lipoxygenase is responsible for alternative oxidase activity was considered and ruled out on the basis of differential inhibitor sensitivities and subcellular fractionation studies.

S-6 Thursday 8:30 A.M.

NOVEL ASPECTS OF CARBON METABOLISM IN GUARD CELLS

William H. Outlaw, Jr., Dept. Biol. Sci., FSU, Tallahassee, FL 32306

Control of CO₂ and H₂O exchange between leaves and the environment is critical to a plant's survival. These gases move across the epidermal layer by effusing through stomata. A pair of guard cells lie parallel to each other and are connected at the ends. When the guard cells swell in response to an environmental stimulus that indicates conditions favorable for gas exchange, the aperture of the stoma enlarges. Guard cell swelling is a simple osmotic effect of active potassium transport into these cells. I have been interested in how cation influx is electrically balanced. Essentially, I will show data that support the following biochemical outline: starch \leftrightarrow organic anions + H⁺. (The protons are transported opposite K⁺ and balance its movement.) Regulation of these steps must be remarkable. I will support this statement in a preliminary way by documenting novel biochemical characteristics of these cells. In addition, I will briefly describe our experimental approach, which has allowed us to study the biochemistry of these cells, which are sprinkled throughout the heterogeneous epidermal tissue.

Plant Enzymology Session.

- 9:30 to 9:50 C-26 F. A. Loewus, J. P. Helsper and C. L. Hilby, L-Ascorbic Acid Biosynthesis in Ochromonas danica.
- 9:50 to 10:10 C-27 M. Martens, M. Ruysschaert, R. Hanselaer and C. F. Van Sumere, N-Feruloylglycineamidohydrolase (3.5.1.X) from Barley.
- 10:10 to 10:30 Coffee
- 10:30 to 10:50 C-28 Subhash Gupta and L. Creasy, Inactivation Studies on PAL using Sunflower Leaf Phenylalanine Ammonia-Lyase Inactivating System (PAL-IS).
- 10:50 to 11:10 C-29 Ragai Ibrahim and Vincenzo De Luca, Identification and Enzymic Synthesis of the Polymethylated Flavonoids of Chrysosplenium americanum.
- 11:10 to 11:30 C-30 H. Grisebach, and T. Luderitz, Enzymic Synthesis of Lignin Precursors.
- 11:30 to 11:50 C-31 Heike Hollander and Nikolaus Amrhein, Pitfalls in the use of an Intact Cell Assay for Phenylalanine Ammonia-Lyase(PAL)-Activity.
- 11:50 to 12:10 C-32 Dave Loomis, R. P. Sandstrom, P. D. Pearce and E. Burbott, Modification of Horseradish Peroxidase by Organic Isothiocyanates from Horseradish Oil.

Lunch

H. Grisebach presiding

1:30 to 2:30 S-7 Cellular Metabolism, C-4 Plant Photosynthesis

W. H. CAMPBELL AND C. C. BLACK, CELLULAR ASPECTS OF C-4 LEAF METABOLISM

2:30 to 2:50 Coffee

2:50 to 3:50 S-8 Cellular Metabolism, Synthesis and Degradation

A. J. CUTLER AND E. E. CONN, THE SYNTHESIS, STORAGE AND DEGRADATION OF PLANT NATURAL PRODUCTS: CYANOGENIC GLYCOSIDES AS AN EXAMPLE.

3:50 to 4:50 PSNA Business Meeting

6:30 Social Hour

7:30 Banquet, North Campus Union

Friday August 14, 1981

9:00 to 11:00 Round Table Discussion

K. R. Hanson, Moderator

SUBCELLULAR AND CELLULAR LOCALIZATION IN SECONDARY PRODUCT METABOLISM

- P-15 Carol Luczka and L. Creasy, The Production of Resveratrol and epsilon-Viniferin by Vitis species in Response to UV Induction.
- P-16 Soon Chye Tan, Factors That Affect the Fungal Resistance in Papaya Fruits.
- P-17 R. Margaret Kramers and R. Horgan, Vacuole/Extravacuole Distribution of Dihydrozeatin O-Glucoside in Phaseolus vulgaris Primary Leaf Mesophyll Protoplasts. (Abstract missed reproduction).

Wednesday August 12, 1981

C. F. Van Sumere presiding

8:30 to 9:30 S-5 Subcellular Metabolism, Vacuoles

G. J. WAGNER, METABOLITE PARTITIONING IN PLANT CELLS: THE ROLE OF THE VACUOLE.

Cellular and Subcellular Localization, Session II.

- 9:30 to 9:50 C-20 M. F. Roberts, Enzymic Synthesis of gamma-Coniceine in Conium maculatum. Chloroplasts and Mitochondria.
- 9:50 to 10:10 C-21 Ulrich Matern, Malonylation and Demalonylation of Phenolglycosides in Parsley (Petroselinum hortense).
- 10:10 to 10:30 Coffee

Plant Stress Session

- 10:30 to 10:50 C-22 H. Grisebach, P. Moesta, H. Beiner, Induction of Phytoalexin Synthesis in Soybean.
- 10:50 to 11:10 C-23 Klaus Tietjen and Ulrich Matern, Mode of Action of Alternaria carthami Toxin in Safflower (Carthamus tinctorius L.).
- 11:10 to 11:30 C-24 Peter Proksch, M. H. Behl and Eloy Rodriguez, Inheritance of Alkanes and Sesquiterpenoids in F-1 Hybrids of Parthenium argentatum (Guayule).
- 11:30 to 11:50 C-25 P. C. Trivedi and N. T. Sarna, Ascorbic Acid Localisation in Meloidogyne incited Root Galls of Cicer arietinum L.

Lunch

1:30 Excursion to Wine Country.

Thursday August 13, 1981

K. Hanson presiding

8:30 to 9:30 S-6 Cellular Metabolism, Stomata

W. H. OUTLAW, JR. NOVEL ASPECTS OF CARBON METABOLISM IN GUARD CELLS.

- 10:50 to 11:10 C-16 Michael Wink and Thomas Hartmann, Light-Mediated Control of Chloroplast-Localized Enzymes of Quinolizidine Alkaloid Biosynthesis.
- 11:10 to 11:30 C-17 G. A. Berkowitz and Martin Gibbs, Osmotic Stress Effects on Chloroplast Photosynthesis.
- 11:30 to 11:50 C-18 Yvette Charriere-Ladreix, Roland Douce and Jacques Joyard, Localization of SAM :Methyltransferase and Flavanone-Synthase Within Spinach Chloroplasts.
- 11:50 to 12:10 C-19 James A. Saunders, Distribution and Characterization of Glycosidase Enzymes in Tobacco Vacuoles.

Lunch

H. VanEtten presiding

1:30 to 2:30 S-4 Subcellular Metabolism, Microbodies

A. H. C. HUANG, METABOLISM IN PEROXISOMES (MICROBODIES)

2:30 to 5:00 Coffee and Poster Session

- P-1 Eve Syrkin Wurtele, Susan S. Thayer and Eric E. Conn, Subcellular Localization of Dhurrin Synthesis in Sorghum bicolor Seedling Shoots.
- P-2 Jonathan E. Poulton and Gary W. Kuroki, O-Methylation of Apigenin in Robinia pseudoacacia.
- P-3 M. Gross, G. H. Jacobs and J. E. Poulton, Novel Assay Procedure for Prunasin Hydrolase Activity Employing Purified Mandelonitrile lyase.
- P-4 Wolfgang Knogge, Klaus Fuisting, Christa Beulen and Gottfried Weissenboeck, Distribution of Enzymes of Phenolic Metabolism in Oat Primary Leaf Tissues.
- P-5 Mary Reider and John S. Fletcher, Changes in the Protein Content of Senescing Plant Suspension Cultures.
- P-6 Helen A. Stafford and Hope H. Lester, Proanthocyanidins in Douglas Fir Needles and Cell Suspension Cultures.
- P-7 Margareta Proksch, Gottfried Weissenboeck and Eloy Rodriguez, Biologically Active Flavonoids and Phenolics of Adenostoma fasciculatum and A. sparsifolium (Rosaceae).
- P-8 Richard Beliveau and Richard E. McCarty, Labelling of CF-1 with a Fluorescent Maleimide.
- P-9 J. P. Van Buren, H. Y. Nakatani and J. Barber, Reaction Center II Photochemical Activity Measurement by a Fluorescence Method.
- P-10 Ingrid Thie and Constance Nozzolillo, Chlorophyll Pigments of Touch-Me-Not Seedlings (Impatiens capensis Meerb).
- P-11 Shigeyuki Tajima, Jay Peterson and Thomas LaRue, Fermentative Metabolism in the Soybean Nodule.
- P-12 Li-shar Huang, Indoleacetic Acid Oxidation in Maturing Apple.
- P-13 Renato Amado and Hans Neukom, Degradation of Pectic Substances of Potato Cell Walls in Phosphate Buffer.
- P-14 Mary Starnes Saunders and William J. French, Detection Methods for Phony Peach Disease Including ELISA.

T. Robinson presiding

1:30 to 2:30 S-2 Subcellular Metabolism, Chloroplasts

S. C. HUBER, PHOTOSYNTHETIC CARBON METABOLISM IN CHLOROPLASTS.

Plant Chemistry Session

2:30 to 2:50 C-6 T. Gianfagna, J. A. D. Zeevaart, and W. Lusk, The Metabolism of Steviol by the Fungus Gibberella fujikuroi strain GF-1A.

2:50 to 3:10 C-7 David L. Gustine and Barton G. Moyer, Retention of Phytoalexin Biosynthetic Routes in Legume Callus Cultures.

3:10 to 3:30 Coffee

3:30 to 3:50 C-8 O. T. Chortyk, R. F. Severson and R. F. Arrendale, Surface Chemicals of Green Tobacco Leaf.

3:50 to 4:10 C-9 Joseph D. Olechno, Jonathan Poulton and Eric E. Conn, The Structure of Nandinin, A New Cyanohydrin from Nandina domestica.

4:10 to 4:30 C-10 Bock G. Chan, A. C. Waiss Jr., R. E. Lundin and S. Asen, NMR Spectra of Anthocyanins and Identification of a Cotton Gland Pigment.

4:30 to 4:50 C-11 A. B. Bleecker and J. T. Romeo, Fluorometric Detection of Cyclic Imino Acids.

4:50 to 5:10 C-12 P. S. Jourdan, R. L. Mansell, and E. W. Weiler, Solid-Phase Enzyme Immunoassay for the Determination of PPB-Levels of Limonin in Citrus.

Tuesday August 11, 1981

W. D. Loomis presiding

8:30 to 9:30 S-3 Subcellular Metabolism, Mitochondria

J. N. SIEDOW, CYANIDE-RESISTANT OXIDATIONS IN PLANT MITOCHONDRIA.

Cellular and Subcellular Localization, Session I.

9:30 to 9:50 C-13 Margareta Proksch, Dieter Strack and Gottfried Weissenbock, Studies of Flavonoid Metabolism at the Tissue and Cell Level: Incorporation of 14-C Phenylalanine and Cinnamic Acid into Leaf Sections and Mesophyll Protoplasts from Oat Primary Leaves.

9:50 to 10:10 C-14 Jan A. Miernyk and David T. Dennis, Hexokinase Isozymes from Endosperm of Developing Castor Oil Seeds.

10:10 to 10:30 Coffee

10:30 to 10:50 C-15 M. F. Roberts, C. J. Coscia and T. Kutchan, The Localisation of the Enzymes of Alkaloid Biosynthesis in Papaver somniferum latex Organelles.

PHYTOCHEMICAL SOCIETY OF NORTH AMERICA

1981 Program, Cornell University

Sunday August 9, 1981

- 4:00 to 11:00 Registration, North Campus Union Building
 8:00 to 11:00 MIXER, Johnson Art Museum

Monday August 10, 1981

- 8:00 to 9:00 Registration, North Campus Union
 9:00 to 9:10 Welcome and Announcements, First Floor Meeting Room

H. Stafford presiding

- 9:10 to 10:10 S-1 Subcellular Metabolism, Cell Walls.

M. C. LEDBETTER, MICROTUBULE-PLASMALEMMA CROSSBRIDGES IN FLAX FIBERS ENGAGED IN SECONDARY WALL GROWTH.

- 10:10 to 10:30 Coffee

Physiology and Ecology Session

- 10:30 to 10:50 C-1 Udo Margna and Lembe Laanest, Catabolic Turnover of Endogenous Polyphenols: Does it Really Occur in Plant Cells?
 10:50 to 11:10 C-2 Constance Nozzolillo, A Relationship of Basal Stem Anthocyanin Pigmentation and Internodal Lengths in Lentil Seedlings (Lens Culinaris).
 11:10 to 11:30 C-3 Peter Proksch, Margareta Proksch, Phil W. Rundel and Eloy Rodriguez, Comparative Phytochemistry of Fire Adapted Mediterranean Shrubs.
 11:30 to 11:50 C-4 K. M. Mathur, Changes in Carbohydrate Content Induced by Root-Knot Nematode, Meloidogyne incognita in Carica papaya.
 11:50 to 12:10 C-5 Jonathan Gershenson, Tom J. Mabry, Gerald Kreitner and Charlie E. Rogers, The Structure, Location and Possible Function of Sesquiterpene Lactones in Helianthus maximiliani Schrader.

Lunch

July 1981

PHYTOCHEMICAL SOCIETY OF NORTH AMERICA

Twenty-first Annual Meeting and Symposium, Cornell University

Symposium Topic

CELLULAR AND SUBCELLULAR LOCALIZATION IN PLANT METABOLISMPSNA Officers, 1980-1981

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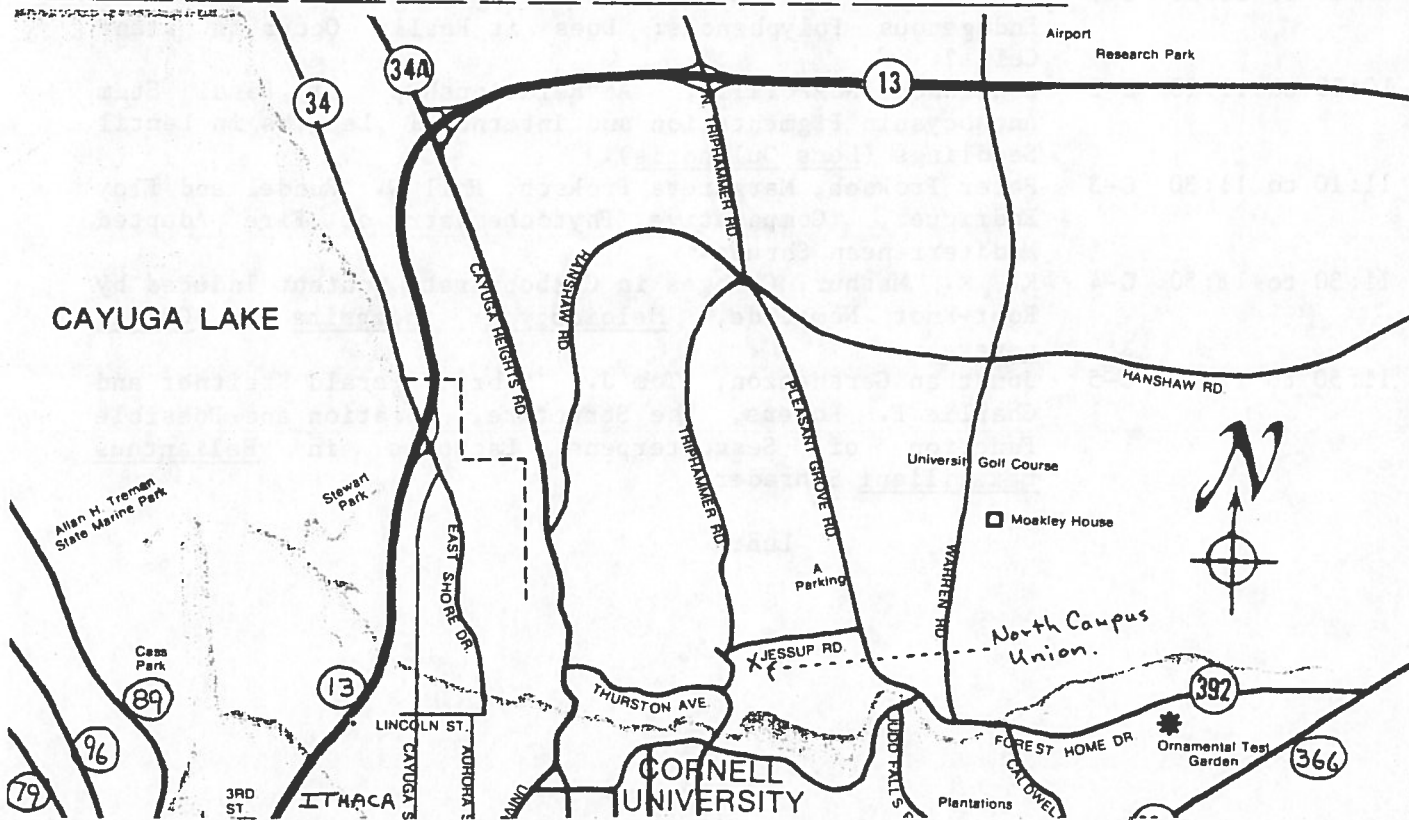
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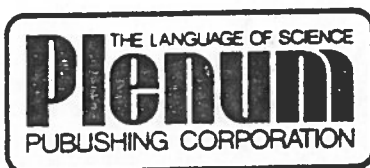
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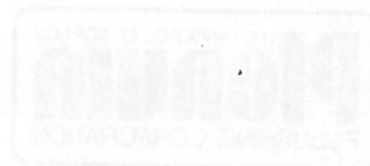
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or other appropriate field is required. Post-doctoral experience is desirable together with evidence of research accomplishment. Send updated vitae, three letters of recommendation and available copies of recent work to: Professor Jerome A. Schiff, Director, Institute for Photobiology, Brandeis University, Waltham, MA. 02254. Salary is negotiable depending on experience. Affirmative Action/Equal Opportunity Employer.

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Post-doctoral Research Assistant to work on aspects of glycoprotein biosynthesis in plants. Available June 1, 1981. Contact: Dr. L. Beevers, Department of Botany & Microbiology, Univ. of Oklahoma, Norman, OK 73019, Tel. (405) 325-3172.

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December 1981

1982 PSNA Annual Meeting - General Information

The Annual Meeting of the PSNA will be held August 2-6, 1982 on the campus of the University of Ottawa. The symposium is entitled "Mobilization of reserves in germination" and the list of invited speakers and their titles is appended. Contributed papers are invited either orally or as posters on any topic of phytochemical interest. Please use the abstract form provided. For oral presentations, 2" x 2" slides can be projected and chalkboards and overhead projectors will be available. Abstracts and registration should be received no later than May 15, 1982 for publication in the July, 1982 Newsletter.

The University of Ottawa is located in downtown Ottawa in Eastern Ontario. As the Capital of Canada, Ottawa is packed with things to see and do that are absolutely free: Museums, The Houses of Parliament, The National Art Gallery, hiking or biking on miles of nature trails. Ottawa and its environs are thus ideal for a family holiday. Numerous lakes and rivers enhance the attractions of the city and the surrounding area. Upper Canadian Village, a glimpse of pioneer life, is situated 100 km to the south on the St. Lawrence Seaway, Gatineau National Park with free public beaches and hiking trails parallels the Gatineau River 25 km to the north in the adjoining province of Quebec, and the lakes of the Rideau Canal system are the focal point of numerous historic towns to the west. And of course, La Grande Villa de Montreal is only a two hour drive away to the east! Information on the city and its environs will be provided on request to the Canada's Capital Visitors and Convention Bureau, 7th Floor, 222 Queen St., Ottawa, Canada, K1P 5V9, Telephone 613-237-5150.

Ottawa can be reached by automobile from Highway 401 via Highways 16, 31, or 5; by train, or by bus. At the present time, only one airline, Eastern, flies directly into Ottawa from points outside Canada, but there are frequent connecting flights from Toronto and Montreal, and by next summer, a direct Ottawa-New York City service should be in operation.

A selected list of hotels, motels, guest homes, and camp sites is appended. Accomodation will also be available in the university residences on campus at the following rates: single room, \$18.50, double room, \$12.50 per person. Meals may be purchased individually in the cafeteria on campus, or at any of the many nearby restaurants. Game rooms and olympic size swimming pool on campus are available to attendees for a small daily fee. For joggers, a run along the Rideau Canal which borders the campus costs nothing!

The symposium and contributed papers sessions will be held in an auditorium near the residences. Coffee breaks morning and afternoon will be held in an adjoining class room which will also serve as the site of the poster display and meeting common room.

Program for the 1982 PSNA Meeting in Ottawa, August 2-6.

Monday evening - Registration and Reception

Tuesday a.m.++ - Registration, formal greetings, symposium papers 1, 2, 3,
p.m. - Symposium paper, contributed paper session.
evening - PSNA Executive Committee meeting.

Wednesday a.m. - Symposium papers 4, 5, 6
p.m. - "Gatineau Hills Tour" or afternoon free for visits to local laboratories, etc.

Thursday a.m. - Symposium papers 7, 8, 9
 p.m. - Contributed paper session, annual business meeting, PSNA.
 evening - PSNA annual banquet and social hour.

Friday a.m. - Symposium papers 10, 11, 12
 p.m. - Free for early departure or visits to local laboratories.

++Monday, August 2, 1982 is a civic holiday - banks, department stores, gov't offices, etc. will be closed.

* We are trying to arrange a setting in which posters can be left on display throughout the meeting in the same room in which coffee, tea, or whatever, will be served during the morning and afternoon breaks.

The Organization Committee: Dr. C. Nozzolillo, Dr., T. Arnason, and Dr. A. Picman, all of the University of Ottawa, welcome suggestions and comments!

PSNA SYMPOSIUM 1982

Title: Mobilization of reserves in germination.

Place & Time: University of Ottawa, Ottawa, Canada Aug. 2-6, 1982.

Symposium Speakers

- Tues. a.m. 1. G. Fulcher, Ottawa Research Station, Agriculture Canada, Ottawa, Ont. K1A 0C6. Histochemical localization of seed reserves.
- Tues. a.m. 2. E. W. Simon, Department of Botany, The Queen's University, Belfast BT7 INN, Northern Ireland. Membranes of the seeds.
- Tues. a.m. 3. B. McKersie, Crop Science Department, University of Guelph, Ontario changes in membrane structure during germination.
- Wed. a.m. 4. A. Oaks, Dept. of Biology, McMaster University, 1280 Main St., W. Hamilton, Ontario L8S 8K1. The relationship between storage reserves and the biosynthesis of metabolites in the young seedling.
- Wed. a.m. 5. P. J. Lea, Rothamstead Experimental Station, Harpenden, Herts AL5 2JQ, England. Amino acid interconversions in germinating seeds.
- Wed. a.m. 6. T. Galliard, The Lord Rank Research Centre, Lincoln Road; High Wycombe, Bucks. HP1 2QR, England. Starch-lipid complexes in cereals.
- Thurs. a.m. 7. G. Maclachlan, Dept of Biology, McGill University, 1205 Ave Dr. Penfield, Montreal, P. Q., Canada H3A 1B1. Transport and metabolism of asymmetrical-labelled sucrose in germinating peas.
- Thurs. a.m. 8. J. D. Bewley, Dept. of Biology, University of Calgary, Alberta, Canada. Interactions between the growing axis and storage tissue in the control of reserve hydrolysis.
- Thurs. a.m. 9. F. Loewus, Institute of Biol. Chemistry, Washington State University Pullman, WA 99164. Myoinositol and phytates.
- Fri. a.m. 10. R. S. Bandurski, Dept. of Botany and Plant Pathology, Michigan State U., East Lansing, Mich. 48824 USA. Indole acetic acid conjugates.
- Fri. a.m. 11. M. Black, Dept. of Biology, Queen Elizabeth College, University of London Campden Hill Rd., London W87AH. The "off-on" control process for gibberellin regulation.

Fri. a.m. 12. P. L. Finney, Western Wheat Quality Laboratory, USDA,
Washington State University Pullman Washington - 99164 USA.
Nutritional benefits of sprouted seeds.

Banquet Speaker - G. A. Rosenthal, School of Biol. Sciences, University
of Kentucky, Lexington, KY 40506. The role of allelochemicals in seedling
protection.

For additional information contact: Dr. Constance Nozzolillo, Dept. of Biology,
University of Ottawa, K1N 6N5 Ontario Canada. Telephone 613-231-2332 or -2954.

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ABSTRACT FORM

22nd Annual Meeting of the Phytochemical Society of North America
University of Ottawa, Ottawa, Canada, K1N 6N5
August 2-6, 1982

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 - d. Example Heading: STRUCTURE OF CAMPHORONE. George H. Doe and Peter B. Stone, Department of biology, Central State University, Central, State, 11111 and Donald E. Smith, Department of Chemistry, Middle State University, Middle, State, 33333.
4. Abstracts should be submitted by May 15, 1982.
5. Mail the original and one copy to: 1982 PSNA Meeting,
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6. Presentation format: Oral (15 min.) _____ Poster _____
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_____	*Wednesday afternoon "Gatineau Hills Tour"	\$25.00 Canada \$20.00 U.S.

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Dr. C., Nozzolillo
Dept. of Biology
University of Ottawa
Ottawa, Canada K1N 6N5

PSNA Welcomes the Following New Members to the Society

- Dr. Adrian J. Cutler, Department of Biochemistry, University of Saskatchewan, Saskatoon, Canada X7N OWO. Interest in metabolism of higher plant natural products.
- Mr. Robert S. Goodwin, 4018 Bedford Road, Baltimore, MD 21207. Interests in Flaionoids, chemotaxonomy of Brickellia.
- Mr. James J. McFadden, Botany Department, Ohio State University, 1735 Neil Avenue, Columbus, OH 43210. Interests in Sucrose translocation. Primary carbon metabolism terpanoid metabolism.
- Mr. Joseph D. Olechno, 104 Briggs Hall, Dept. of Biochemistry & Biophysics, University of California at Davis, Davis, CA 95616. Interests in natural prod. chemistry. Isolation, structure determination, pathways of formation and degradation.
- Dr. Patsy Rhodes, Plant Genetics & Germplasm Institute, USDA, Seed Laboratory, Bldg. 006, Rm 103, BARC-West, Beltsville, MD 20705. Interests in stress physiology: Plant molecular biology.
- Mr. Karl R. Schneider, Box 921, University Station, Lexington, KY 40506. Interests in nitrogen metabolism, non-protein amino acids; trace elements, heavy metal biochemistry.
- Dr. James N. Siedow, Department to Botany, Duke University, Durham, NC 27706. Interests is oxidative metabolism in higher plants.
- Dr. Michail Schaedle, Department of Environmental and Forest Biology, SUNY College of Environmental Science & Forestry, Syracuse, NY 13210. Interests in photosynthesis -- transport.
- Dr. David T. Dennis, Biology Department, Queen's University, Kingston, Ontario, Canada K7L 3N6. Interests in Enzymology.
- Dr. Subhash C. Jain, Box-50, Baker Laboratory, Chemistry Department, Cornell University, Ithaca, NY 14853. Interests in insect/plant interaction; phenomones organic Nat. Prods.; photosynthesis.
- Miss Ingrid Thie, Department of Biology, University of Ottawa, Ottawa, Canada KIN 6N5. Interests in Chlorophyll pigments.
- Mrs. Margareta Proksch, Department of Botany, University of Koein, Gyrhofstr. 15, D-5000 Koeln 41, West Germany. Interests in identification, localization and metabolsin of phenolic compounds.
- Dr. Peter Proksch, University of California, Irvine, Dept. of Ecology & Evolutionary Biology, Irvine, CA 92717. Interests in plant Nat. Prod.; biological activity - application to chemosystematics.
- Dr. Linford Falb, 306 S. Fifth Street, Champaign, IL 61820. Interests in plant physiology, enzymology and cellular metabolism.

Mr. Gary W. Kuroki, Department of Botany, The University of Iowa, Iowa City, IA 52242. Interests in biochemistry of secondary plant products.

Dr. Robert J. Ireland, Biology Department, Carleton University, Ottawa, Ontario, Canada K1S 5B6. Interests in nitrogen (amide) metabolism enzymology.

Upcoming Meeting of Interest to Phytochemists

United States Department of Agriculture, Agricultural Research Service, Beltsville Symposia in Agricultural Research. VII Genetic Engineering Applications to Agriculture, May 16-19, 1982, Beltsville Agricultural Research Center, Beltsville, Maryland. Lowell Owens, Chairman, Beltsville Symposium, VII, Beltsville Symposium VII Office, Room 116, Building 011A, BARC-West, U.S. Department of Agriculture, Beltsville, Maryland 20705, Telephone: (301) 344-4072.

University of Missouri-Columbia, Plant Biochemistry and Physiology Symposium, April 7-8, 1982. The Interdisciplinary Program in Plant Biochemistry at the University of Missouri-Columbia will host a Symposium on selected areas of Plant Biochemistry April 7-8, 1982. The four principle areas in this year's symposium will be Membranes-ATPase-Coupling Factor; Molecular Biology: Nitrogen Fixation-Agriobacterium; Photosynthesis-Photorespiration and Regulation Calcium-Calmodulin-Phytochrome. In addition, poster presentations in any area of Plant Biochemistry and Physiology are invited from all interested persons. It is anticipated that this symposium will be followed by the Annual Stadler Genetics Symposium at the University of Missouri on April 9-10, 1982. For information: Biochemistry Dept., 322-A Chem. Bldg. Columbia, Missouri 65211 (314) 882-7606.

A Symposium (sponsored by the U.S. Department of Agriculture) will be held at the Western Regional Research Center entitled "The Biochemistry and Function of Isopentenoids in Plants", from March 22 to 24, 1982. There will be four sessions (Session I, Chemistry Isopentenoids; II, Biochemistry and Function of Isopentenoids; III, Isopentenoid Bioregulators, Plant Ecology and Physiology; IV, Isopentenoids in Insect and Mannalian Physiology). There will be 30 invited plenary lectures and a keynote speaker as well as a poster session covering the chemistry, biochemistry and physiology of plant sterols and other isopentenoids. For further information contact: W. David NES, Co-chairman of Symposium, Research Chemist, Plant Physiology and Chemistry Research Unit, Western Regional Research Center, 800 Buchanan St., Albany, CA 94710, (415) 486-3253.

Items of Interest to Phytochemists:

The Vaportek Environmental Odor Controller with Exclusive Dial Control.

The Vaportek Environmental Odor Controller neutralizes and does not mask or filter. It destroys odors everywhere by actively neutralizing them without introducing a scent of its own. The environment becomes free of offensive odors, pleasant and comfortable to everyone. Dial control gives you full, precise odor control in any situation. You can change the setting instantly to compensate for sudden odor problems. Whatever setting you dial, the Vaportek Odor Controller maintains its odor neutralizing strength at that level. No continuous readjustment is necessary. The deodorizing chemical is

sealed inside a replaceable cartridge. When the cartridge is spent, simply replace it by inserting a new one. Nothing to open, nothing to pour, no risk of accidental spilling on clothes or objects. The unit broadcasts an invisible vapor that permeates the atmosphere and quickly penetrates walls, floors, ceilings and all objects. Odor is banished from everything without leaving a lingering residue. Distributed by General Scientific Corp., 8741 Landmark Road, P.O. Box 26509, Richmond, Virginia 23261, Attention: Mr. C. Hinkel, Sales Dept. This unit lists for \$144.00, plus freight.

The PSNA was happy to award Life Membership to Dr. S. Brown, E. E. Conn, and S. H. Wender at the annual meeting in Ithaca last year. In addition to the acceptance comments given by Dr. Brown at that meeting, PSNA has received the following two letters:

August 26, 1981 -- Dear Phytochemical Society Executive Committee Members: I was surprised -- but very pleased - to receive your letter and certificate concerning my selection as a Life Member of the Phytochemical Society of North America. I definitely consider this a distinct honor, and I thank you for all your part in making this award to me. Sincerely, Simon H. Wender.

September 12, 1981 -- Dear Dr. Saunders: Your letter of August 19 informing me of my selection for Life Membership in the PSNA reached me here in Japan this week. I am very pleased by the honor and gratefully accept the honor and certificate. Needless to say, if there is any way I can serve the Society, I will be please to do so, if my committments permit it. With best wishes. Sincerely yours, Eric E. Conn.

The following letter was received by PSNA.

We need help in securing data on the phenolic content of common major plant foods, particularly the hydroxy cinnamyl derivatives, gallic acid derivaties, lignans, etc. The major plant foods in which we are particularly interested in include; corn, wheat, rye, rice, soybeans, peanuts, and oats, and include whole grain, "bran" (when applicable), and the stored milled flours (when applicable).

The reason for the interest in terms of cancer studies is that epidemiological studies have linked the incidence of certain cancers such as rectal, colon and breast, to a higher dietary level of fat and meat, and a lower dietary intake of plant products. Various attempts have been made to identify "plant factor(s)" that may be responsible for reducing the incidence of carcinogenesis. Laboratory studies have shown some activity in reducing experimentally induced carcinogenesis by some dietary fibres (particularly the lignin containing wheat bran), indoles and recently the phenolic antioxidants, both synthetic (e.g., BHA, BTH) and natural (e.g. caffeic and ferulic acids). This latter work in particular has focused interest in the plant phenols.

In order to study the relationships of dietary phenols and cancer incidence, it is necessary to be able to quantitate the dietary intake from different dietary sources. A brief review of the literature available to us so far has revealed much qualitative data on the occurrence of phenolic substances in plants, but little quantitative data other than fruit.

We greatly need reliable data on the quantitative and qualitative content of the phenolic substances, particularly the low molecular weight hydroxy cinnamyl compounds, the lignans, gallic acid and derivatives, etc. as they appear in the chief plant products in our diet. This latter would include the grains (wheat, corn, rye, soybeans, peanuts) as well as the common fruits and vegetables.

If anyone has access or knowledge of such data, it would be greatly appreciated to help us in our work. Published data would be excellent help. Unpublished data would be similarly appreciated, and kept confidential if requested. H. L. Newmaker, Ludwig Institute for Cancer Research, Toronto Branch, 9 Earl Street Toronto, Ontario, Canada M4Y 1M4, Telephone (416) 924-0671 Ext. 457.

BOOK REVIEW

Aspects of Photosynthesis of Gaurangakumar Das. Publisher Mitra Das, 121/A, Bipin Behari Ganguly Street, Calcutta 700012, India, 1981 k + 176 + xxvii pages, U.S. \$28.00. Available in U.S.A. and Canada from Dr. G.K. Das, P.O. Box 718, Station B, Ottawa, Canada, K1P 5P8.

This book is a well-written introduction to photosynthesis directed by the author to university teachers and students, and research scientists who wish to grasp quickly an understanding of this vital process. It is divided into 3 parts. Part I, "Fundamentals of Photosynthesis", consists of 9 short chapters and is a concise presentation of the basic facts of photosynthesis including the chloroplast and its pigments, the two photosystems, electron transport, photophosphorylation and CO₂ fixation. Part II, "Controlling factors, genetic role, and bacterial photosynthesis", consists of 3 chapters. The first, Chapter 10, is concerned with the factors affecting higher plant photosynthesis and to this point the book differs from equivalent chapters in textbooks on plant physiology mainly in added details: for examples, four pages are devoted to the Mitchell hypothesis of ATP synthesis and the significance of C₄ metabolism, photorespiration, and glycolate metabolism occupies 12 pages. The author employs extensive cross-referencing as a teaching device. Chapter 11 on genetic control of chloroplast assembly and chlorophyll biosynthesis introduces a current emphasis of research and Chapter 12 adds bacterial photosynthesis usually left out of plant physiology texts. Part II, "Applied aspects of photosynthesis", is a departure from tradition for books of this sort. The discussion of photosynthesis in relation to nitrogen metabolism (Chapter 13) and fruit development (Chapter 14 is of special interest to students of crop science, and is not included in either of the two short books on photosynthesis, one by Devlin and Barker, the other by Fogg, with which this one is otherwise more or less comparable. In summary, this book is a recommended addition to the library shelf where it can serve as a convenient and attractive up-to-date summary of photosynthesis, and, through the 22 page bibliography, conveniently separated into books, reviews, and journal references, as initiation to the extensive literature. The book itself is attractively assembled although somewhat marred by the inevitable printer's errors, most of which the author has painstakingly corrected by hand. The text is liberally endowed with diagrams of pathways and chemical structures and 13 plates of EM pictures, many of them the author's own, are a useful addition at the end. Numerous footnotes serve as cross-links to related chapters and supplement the 2 page glossary of terms. The book is indexed.

C. Nozzolillo, Dept. of Biology, U. of Ottawa.

New Journals:

Two relatively new journals are being published by Martinus Nijhoff/Dr. W. Junk Publishers. They are: Plant Cell, Tissue, and Organ Culture, an international journal on in vitro culture of higher plants. For information contact: Editor-in-Chief, Dr. Donald K. Dougall, W. Alton Jones Cell Sciences Centre, Old Barn Road, Lake Placid, N.Y. 12946, U.S.A.

Also being published is Photosynthesis Research, an international journal, Editor-in-Chief, Dr. R. Marcelle, Laboratory of Plant Physiology, Research Station of Gorsem, Brede Akker 3, B-3800 Sint Truiden, Belgium.

Positions Available (All Positions Listed are Equal Opportunity).

Assistant Professor Plant Biologist, Florida State University. Tenure-track position is available Fall, 1982. Post-doctoral training is preferred. Teaching responsibilities will include participation in the introductory plant diversity laboratory, introductory botany lecture, and an advanced course in speciality. Appointee will be expected to establish a productive research program.

This position in the Department of Biological Science offers an excellent opportunity for the successful candidate to achieve career and personal goals. The Department's 43 faculty members are housed in four buildings on campus. Ancillary facilities include a marine biology laboratory, a greenhouse/field station, and access to ecological areas. Tallahassee, an attractive city of 100,000, has two universities and is the state capital.

To ensure consideration, please arrange for curriculum vitae, statement of future research interests, 2 reprints (if available) and three letters of reference to arrive no later than Jan. 15, 1982. William H. Outlaw, Jr., Chairman of the Search Committee, Department of Biological Science (Unit I), Florida State University, Tallahassee, Florida 32306. Telephone (904) 644-1228. (FSU is an Equal Opportunity/Affirmative Action Employer).

Postdoctoral Position - Plant Biologist, Florida State University. Position to investigate metabolism of stomatal guard cells is available Jan. 1982, or later. Please send application and three letters of reference to William H. Outlaw, Jr., Department of Biological Science (Unit I), Florida State University, Tallahassee, Florida 32306.

Research Geneticist, GS-440-11 or 12, BARC, Plant Genetics and Germplasm Institute, Tobacco Laboratory, Rm 115, BARC-W, Beltsville, Maryland 20705. Knowledge of cell biology and plant development. Able to conduct research on genetical manipulation of tobacco protein and other nitrogenous compounds employing tissue culture, cell culture, somatic hybridization, recombinant DNA and other techniques.. Send resume to T. C. Tso, above address.

Information on Grants

1981 Science and Education Extramural Grant Programs

Science and Education Administration announced three extramural grant programs last year. As a result, they received 793 proposals for USDA Competitive Grants, 510 proposals for Special Grants, and 380 proposals for the Energy Grants program. The following table shows program area, number and dollar amounts of grants awarded in Fiscal Year 1981:

Special Grants

<u>Program Area</u>	<u>No. of Grants</u>	<u>Amount</u>
Antidesertification Research	8	\$ 970,000
Soybean Research	6	485,000
Animal Health Research	59	4,898,000
Aquaculture Research	9	485,000

USDA Competitive Research Grants

<u>Program Area</u>	<u>No. of Grants</u>	<u>Amount</u>
Biological Stress on Plants	55	\$3,395,000
Genetic Mechanisms for Crop Improvement	55	3,395,000
Biological Nitrogen Fixation	31	2,910,000
Photosynthesis	38	2,910,000
Human Nutrition	28	2,910,000

Energy and Alcohol Fuels Research Grants

USDA's Cooperative State Research Service funded five alcohol fuel research projects for \$485,000 and 24 grants for energy research totaling \$1,843,000.

Department of Energy funds administered by USDA supported 51 grants for research in the areas of solar energy, biomass, methane, combustion and gasification, and vegetable oil, for a total of \$3,856,100.

The percentage of grants awarded to each type of institution closely parallels the percentage of applications received from each.

	<u>Percentage of Total Applications Submitted</u>	<u>Percentage of Total Grants Awarded</u>
USDA	3.0	3.7
SAES	26.0	26.0
Land Grant Institutions	35.0	43.0
Public Universities	12.0	6.5
Private Universities	6.0	7.0
Non-Profit Institutions	3.0	3.0
Profit Institutions	2.0	1.0
Veterinary Schools	11.0	9.0
Other Federal Labs	Less than 1	0.0
State and Local Governments	Less than 1	Less than 1
Federal Corporations	Less than 1	Less than 1

It is predicted that the USDA Competitive Grants Program will be accepting proposals in the same five areas as last year. Deadline for submission of proposals will be in late January or February 1982. For further information contact: Dr. David W. Krogmann, USDA Competitive Research Grants Office, 1300 Wilson Blvd., Suite 103, Rosslyn, VA 22209, (703) 235-2628.