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ASPP NEWS

The Newsletter of the American Society of Plant Physiologists

Inside This Issue. . . .

Deadline for the January/February 1997 issue of *ASPP NEWS* is January 6, 1997.

PRESIDENT'S LETTER

From E-Mail To Electronic Journals

Even before I officially took over as ASPP president, I was asked by numerous members of the Society and ASPP staff what initiatives I had planned for ASPP in the upcoming year. While I will admit to some musing about founding the Gude Center Microbrewery and Pub in the basement of the Rockville headquarters building, I have come to realize that, due to the rapid growth of the Society in so many different areas of activity, the priority initiatives are to a much greater extent thrust at new presidents than selected by them. In fact, it is entirely clear that our Society must operate in this way since major initiatives will span several years and thus require the attention of several successive presidents. Who knows, perhaps next year at this time, then-president Keegstra will be occupied with investigating zoning authorization for a new brew pub. While there are quite a number of important areas of activity on this year's ASPP agenda, some of which will be topics of this column in upcoming issues of *ASPP News*, here I would like to focus attention on the emergence of an "electronic ASPP."

Although we tend not to think about ASPP in these terms, it is nevertheless clear that the main business of our Society is information: we create information, we exchange it among ourselves, we disseminate it to others, we archive it, and we work to create an environment conducive to the creation of new information. Thus, as with the rest of our professional lives, the revolution in networking and computer-based information tech-

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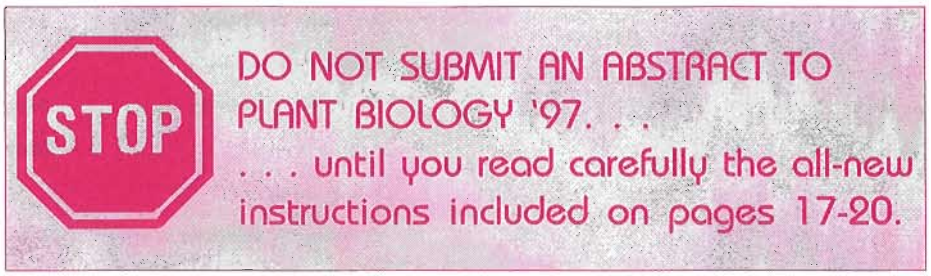

Alert—U.S. Federal Government Employees:

Plant Biology '97: A View from the Pacific Rim, the ASPP/CSPP joint annual meeting, has been designated by some federal government agencies as a ***"foreign"*** meeting.

Check with your travel office by December 1996 to request permission to attend and complete the necessary paperwork. Passports are not required for U.S. citizens traveling to Canada.

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nologies has far reaching implications for ASPP. So much so that indecision or poor decisions in this arena could mean more than just lost opportunities. My central purpose in this short article is to provide a condensed overview of the status and current significant initiatives of ASPP in electronic/network activities as well as to give a largely personal perspective of challenges that I see immediately ahead.

Electronic/ On-line Abstracts. A real highlight of this fall's program committee meeting in Vancouver was seeing fruition of several years of committee interest in initiating electronic submission and on-line access of annual meeting abstracts. Substantial credit goes to Susan Chambers and Jody Carlson for investigating the various electronic abstract options and vendors. The package that we've selected is really quite impressive and includes options for submission of abstracts ranging from filling in a Web page form, to submission by e-mail, to mailing a hard copy. The abstracts will be accessible and searchable on the Web, authors can be given passwords to edit their abstracts, and the Web version will be in a uniform font and appearance that will be the basis for the printed annual meeting abstract booklet. The program committee is 100% behind this venture and it will definitely be a full fledged feature of this year's meeting! While I am sure we should anticipate some "growing pains" as we convert to this technology, I am also very confident that members will quickly see its benefits.

Network Journals. Perhaps the most daunting task before us are decisions regarding the electronic publication of our journals. As many of you are well aware, several biologically oriented journals already offer network subscription options to libraries as well as individuals; the *Journal of Biological Chemistry* is an example familiar to many of us. The publications committee, in close contact with the chief editors and staffs of our journals, has been vigilant in keeping current with network-based scientific publication. While I don't mean to minimize either the importance or complexity of issues pertaining to the actual production of an electronic, network-accessible scientific journal, I think it is fair to say that others have led the way and given us a path to follow. In fact, since both JBC and *Plant Physiology* are printed by Cadmus Journal Services, we are already working with a printer experienced with network journals.

A less obvious, but perhaps more troublesome, obstacle standing in the path of ASPP moving quickly into the arena of network journal publication is the control of distribution. As a Society, we are financially quite dependent on the approximately $2 million generated from institutional (primarily library) subscriptions. With essentially half of the ASPP annual operating budget coming from this single source, it is clear that we must be certain that we fully understand the laws and practices that govern distribution and accessibility of network electronic journals in both this country and abroad. For example, if all state institutions have legal access to journals purchased within the state, the pricing and/or access strategy taken would need to accommodate this fact. Moreover, the subscription trends for these new electronic versions continue to evolve as publishers move from the experimental mode, in which the journals were freely accessible (as with JBC), to charging the full subscription rate. We will be following these journals with much interest as they learn more about the financial implications of going electronic.

It is also worth noting that a major revenue stream for high-manuscript-count journals such as JBC comes from author-supported page charges in addition to institutional subscriptions; thus the path they have followed in controlling distribution may not lead to where we need to travel. However, I will urge that ASPP be among those leading the way in dealing with these issues as I feel there is much to be lost in adopting an overly conservative "wait and see" attitude.

Genesis of the ASPP Web Site. Although still under very active development, I anticipate that it will not be long before the ASPP Web site will become the centerpiece of our Society's communication and information exchange. If you've never stopped by, or if it has been a few months since you've visited there (http://aspp.org), I encourage you to have a look—I think you'll be impressed. Already, you will find the tables of contents and abstracts of the September through November 1996 issues of *Plant Physiology* (with THE PLANT CELL to follow in January), current activities in public affairs, reports on committee activities, weekly job listings, membership listing, the latest information about the '97 annual meeting, and, by late Spring, you will be able to find all submitted abstracts there as well. Through our Web site, it is possible to join the Society, register for our annual meeting, order our journals and books, and, maybe in a few years, Gude Center Microbrewery's special pale ale.

The genesis of the ASPP Web site has been a highly collaborative venture. Bob Buchanan, my predecessor, appointed Dan Bush to chair an ad hoc committee charged to make recommendations regarding the scope, standards, and oversight of the Web site and this committee is in the midst of its activities now. At the same time, headquarters staff has engaged outside assistance to carry out the actual Web page design and art. Many committees are now actively involved in planning their specific wants and needs for the Web. Also last year, the executive committee voted to hire a full time information/technology specialist at headquarters. Perry Masciana has been on staff since January of this year, and his varied duties include technical support of the ASPP web site.

ASPP is in the business of information. Because of this fact I feel confident in predicting that the quite significant strides we've made in the past few years leading to the visible emergence of an "electronic ASPP" will pale in comparison to what will happen over the next year and then again in the year after that . . .

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OBITUARIES

James Bonner

When James Bonner died at the age of 86 on September 13, 1996, in Pasadena, California, the world lost one of its most influential and charismatic plant physiologists. Mentor to 108 graduate students and more than 200 postdoctoral associates between 1939 and 1988, author of hundreds of influential scientific papers as well as co-author of successful textbooks in plant physiology (with A. W. Galston) and plant biochemistry (with J. E. Varner), and member of the National Academy of Sciences, he was also an accomplished flautist, expert skier, and enthusiastic traveler "from Katmandu to Timbuktu to Kota Kinabalu and beyond" (1). Bonner was a member of ASPP for nearly 60 years, from 1936 through 1995. He served the Society as its vice president in 1948-1949 and president in 1949-1950.

During his long professional life, Bonner contributed significantly to an amazing range of diverse subjects in plant biology. As he himself has said: "Some will no doubt complain that it is more profitable for the serious scientist to stick to his problem and flog it to death. To them I say, for myself, browsing in far-flung pastures is more fun" (1). Indeed, working in his group required being enthusiastic about the research under way and having fun. This approach also led him naturally into the area of science and public affairs, in which he lectured and published prolifically.

James Bonner was the eldest sibling in an unusual family with seven children. Their father was head of Chemistry at the University of Utah and their mother an accomplished teacher in the community. After living on a small farm with assigned duties for all children and early education years at home for some, all seven received their bachelor's degrees in chemistry at the University of Utah and then went on to receive Ph.D. degrees. Four ultimately worked in biochemistry, two in physical chemistry, and one in applied mathematics. James first came to the California Institute of Technology in 1929, after his sophomore year at Utah, when his father was taking a sabbatical year in Pasadena. Aside from returning to Utah to complete his undergraduate degree and occasional trips and sabbaticals thereafter, he remained at CalTech until his death.

As a graduate student, Bonner started research on the then newly discovered auxin with Herman Dolk and Kenneth Thimann, aiding the discovery of its chemical nature through his observation that adding tryptophan-containing bactopeptone to the medium increased the production of auxin by the fungus Rhizopus. Shortly thereafter, as a young postdoc working with Frey-Wyssling at Zurich, he discovered an effect of auxin on the dissociation of cell wall microfibrils. With his first graduate student, Fred Addicott, Bonner was probably the first to define thiamin and other B vitamins as essential growth factors for isolated roots; with his first postdoc, James English, Jr., he isolated a putative wound hormone, traumatic acid, now known to be an oxidation product of a jasmonic acid precursor; and on his first leave as a young faculty member, he worked with Karl Hamner at the University of Chicago on a classical study of the physiology of photoperiodism in the short-day plant, Xanthium, a subject investigated over many subsequent years by his graduate student Frank Salisbury.

During World War II, James Bonner was recruited to work for the Emergency Rubber Project on the physiology of growth and rubber formation in a Mexican shrub, guayule (*Parthenium argentatum*) When this project was terminated, he continued to work on the technology of rubber production in Malaysia, but his interests turned increasingly to fundamental aspects of the cellular and molecular biology of plants. Over the years, he collaborated in this area with such colleagues as Sam Wildman, Bob Bandurski, Paul Ts'o, Joe Varner, Ru-chih Huang, Peter Albersheim, Douglas Fambrough, Adele Millerd, and John Littleton. Through his publications and the colleagues he inspired, he will leave a lasting legacy.

Arthur W. Galston
Eaton Professor Emeritus
Yale University

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Jacobo Cardenas

The sudden death of Prof. Jacobo Cardenas has shocked and moved his Spanish colleagues. He died October 28 at the age of 56. His contributions to the development of plant biochemistry and molecular biology in Spain were remarkable. Beginning in the early 1970s at the University of Sevilla, he contributed to the basic knowledge on nitrate assimilation in plants: its biochemistry and physiology, its photosynthetic nature, its action in photosynthetic bacteria, and the use of Chlamydomonas mutants to study its pathway in plants. He was also a pioneer, at the University of Cordoba, in characterizing purine and amino acid metabolism. Recently, he was an eager defender of molecular biology approaches to the study of plant biology, and he successfully developed new lines of research on strawberry fruit maturation and ureide metabolism in legumes. He was also a humanist of science interested in the bioethical aspects of scientific activity. A long list of disciples are indebted to him for his motivated dedication not only to science but also to the training and the future of the new generations of scientists. Dr. Cardenas had been a member of ASPP since 1985.

Emilio Fernandez
University of Cordoba, Spain

Chuxing Sheng

Chuxing Sheng, a postdoctoral research associate who worked for the Agricultural Research Service in Urbana, Illinois, died on July 15, 1996, after a brief illness. His most noteable efforts were in the area of hormone isolation and identification, and his short scientific career resulted in several contributions to the literature on structure and function of plant hormones. He was working on identification of plant signals controlling nodulation in soybean at the time of his death. Dr. Sheng joined ASPP in 1994.

William E. Norris, Jr.

ASPP headquarters was recently informed of the death of Dr. William E. Norris, Jr. Dr. Norris, an emeritus member from Southwest Texas State University in San Marcos, had been a member of ASPP since 1947.

Tom ap Rees

Prof. Tom ap Rees was killed in a bicycle accident in early October near his home in Cambridge, England. Dr. ap Rees was formerly a member of ASPP and served for several years on the editorial board of *Plant Physiology*. A more extensive obituary will appear in the January/February 1997 issue of *ASPP News*.

TURNING POINT

[Editor's note: Following is the sixth of a series of articles that are intended to describe an experiment (or "moment") that was a turning point in research consequential to the field.]

A Turning Point, of Sorts

by John B. Hanson, Professor Emeritus, University of Illinois

In 1953, when I was finishing up my postdoctoral fellowship with James Bonner at CalTech and looking for a job, I applied for a teaching position in the Division of General Studies at the University of Illinois. I didn't get it, but I got a letter from M. B. Russell, the new head of Agronomy. He wanted to introduce physiological studies related to problems with crop production and had been shown my application. Would I be interested? I replied that indeed I would, and he wrote back with an offer that I promptly accepted. On arrival I introduced myself and asked what he wanted me to do. "Do?" he said. "Do? I'm not going to tell you what to do. You're the physiologist. Go around and get acquainted with the faculty, and ask what they see as physiological problems that need investigating." And as I turned to leave he added, "Oh yes, you'd better teach something, something like crop physiology."

I set to work studying agronomic literature and devising a course eventually called "Physiological and Ecological Bases of Crop Production." In the spring M. B. hired a second physiologist, Richard Hageman, another farm boy, just out of Daniel Arnon's lab, and turned over an old soils lab to us. By summer we had a place to start work. Talking with the faculty produced two problems that received experiment station support: one on mechanisms of ion uptake from low soil concentrations, the other on how 2,4-dichlorophenoxyacetic acid kills weeds, a new area for me, which I'll discuss here.

Postemergent auxin herbicides were being used for corn crops. The herbicide specialist, Fred Slife, who became my colleague on the project, showed me some lodged corn brought in by a farmer who thought if one dose was good two-fold would be better. About the time his corn was knee high a driving rainstorm lodged it. Why? Examination showed that the intercalary meristems of the lower nodes had resumed growth, soft, pliable growth that bent or broke in the storm.

I had been introduced to 2,4-D in Bonner's lab, using it as a stable synthetic auxin for a study of ion accumulation during auxin-induced growth—cell enlargement—in slices of Jerusalem artichoke tuber. I knew that 2,4-D, like indoleacetic acid, inhibited growth at higher concentrations, and as an auxin not readily degraded, was used to kill dicot weeds in cereals, but I had no idea how it worked. How could a growth hormone kill?

What I saw in the lodged corn turned my thinking about auxin-induced growth in a new direction. These corn internodes were not weakened by simple cell expansion—the cells had divided, rejuvenating the meristem. Divided! Of course. Well-known auxin response. Root initiation on cuttings. Cambial growth in the spring. Crown gall formation. Perhaps the key to discovering why 2,4-D can kill dicots while not harming the cereals (in proper concentration) lay in the capacity to induce cell division. Perhaps 2,4-D induced division at lower concentrations in dicots. What did the literature say?

Nothing convincing as to why the plants die, but others had already suggested aberrant cell division as a major factor. A folksy witticism expressing this had appeared—2,4-D causes plants to grow themselves to death—but was largely ignored by plant physiologists. The statement arose because, while normal apical growth of shoot and root is inhibited, abnormal growth is induced in other tissues, giving leaf epinasty and stem swelling, sometimes with initiation of callus or root primordia. Recently, nucleic acids had been reported to double in stems of 2,4-D treated bean

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seedlings, and it was postulated they might be involved in the abnormal growth (1). Silberger and Skoog (2) had found indoleacetic acid to increase DNA and RNA in tobacco pith. There were older reports that auxins, including 2,4-D, cause nuclei to swell and nucleoli to enlarge or divide.

We verified these and other observations and extended them, using for different purposes soybeans, weeds, even corn seedlings, and getting into areas beyond the strictly herbicidal question. "We" includes our students who made the investigations. In the space I have here I can only record their names, and summarize their accomplishments as a group—Sherlie West, Joe Key, Maarten Chrispeels, Roger Fites, Jack Shannon, Juan Cardenas, Robert Baxter, Timothy O'Brien, Dean Bottrill, and Thomas Guilfoyle. Slife and I wrote two commentaries on the herbicidal action (3, 4).

In dicots ^{14}C-labeled 2,4-D moves most rapidly from treated leaves to the stem apex, "freezing" growth, and then down into the lower stem where it tends to accumulate, with some moving on into the roots. In some resistant weeds, free 2,4-D is released from the roots, allowing subsequent recovery of apical growth. When 2,4-D is applied to a single leaf and the responses of the plant are followed over the several days leading to death, there is an initial stimulation of growth, photosynthesis, and ion absorption by roots lasting about one day. By the second day, these physiological functions are in decline; the leaves and roots begin senescing, losing protein, nucleic acids, and minerals to the dividing, proliferating cells of the lower stem and taproot, which show marked gains. The cell division is initiated in the region of the vascular bundles and is preceded by large increases in nucleotides (and ascorbic acid) and ribosomes.

The enlargement of the nucleolus and early increase in ribosomes suggested the nucleus as a primary target of the auxin. Chromatin taken from 2,4-D treated plants proved several-fold higher in ribosomal RNA polymerase activity than that from control plants, but 2,4-D added directly to the polymerase reaction was without effect. The increase was due to more rapid synthesis of ribosomal RNA, giving longer chains in unit time, not initiation of more RNA molecules. Indirectly, auxin promoted transcription rates.

The last stages of death are not clearly defined, but are based in the failure of autotrophism: photosynthesis and nutrient ion uptake drop to very low levels. 2,4-D shifts plant metabolism to abnormal growth at the expense of the functional tissues of root and shoot, which senesce to feed it. (Grasses do not have cells in the vicinity of the vascular bundles primed to divide, e.g., make a cambium.) In short the plant can no longer sustain life.

Perhaps Van Overbeek (5) said it better—the abnormal growth is a consequence of hormonal imbalance and it kills like cancer.

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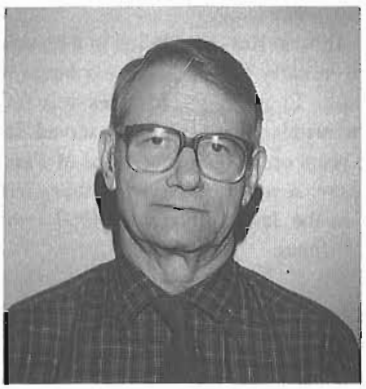

John B. Hanson

John B. Hanson is professor emeritus at the University of Illinois, Urbana-Champaign, where he served on the faculty from 1953 until his retirement in 1985. Hanson, a native of Colorado, earned a bachelor's degree in botany from the University of Colorado in 1948 and a doctorate in plant physiology from Washington State University (then called the State College of Washington), Pullman, in 1952. He joined the faculty at the University of Illinois after serving a postdoctoral fellowship at the California Institute of Technology. Dr. Hanson has a long history with ASPP, including serving as president in 1973-1974, and, most recently, as chair of the board of trustees from 1990 to 1992. ASPP presented him with the Charles R. Barnes Life Membership Award in 1980 and the Adolph E. Gude Award for service to the science of plant physiology in 1989. In his life outside of science, Jack Hanson loves to sing and play the guitar and compose music—he has even published a book and tape of songs for children. (He's a pretty mean dancer, too!)

Plant Biology '97 Abstract Deadline: February 20, 1997.
Abstracts may not be submitted before January 1, 1997.
Call for Abstracts is on pages 17-20 of this newsletter.

Public Affairs

NEW DOE PROGRAM SUPPORTS BASIC PLANT RESEARCH INTO PHYTOREMEDIATION — ASPP URGED FUNDING

The Department of Energy Office of Environmental Management has provided $3.8 million in awards for basic research in the use of plants to clean toxic metals from soil and water (phytoremediation). The awards for basic plant research for phytoremediation are part of the $47 million Environmental Management Science Program of the DOE Office of Environmental Management that has also awarded $12 million for bioremediation research.

This new basic research effort is being undertaken this year to provide new knowledge needed to address problems created by toxic waste, especially with regard to contamination resulting from many years of weapons research at DOE sites. The massive nuclear waste cleanup problem requires advances in basic research to be resolved.

Greg Dilworth and Jim Tavares of the DOE Division of Energy Biosciences worked closely with Office of Environmental Management officials in advance of the awards to explain the importance of supporting research in this area.

ASPP supported Office of Environmental Management funding of phytoremediation research with then-ASPP president Russell Jones's comments submitted on September 29, 1994, to the DOE Office of Environmental Management. Jones explained the need for plant research into phytoremediation and for bioremediation research to help clean up hazardous waste.

Jones explained how a workshop on phytoremediation conducted July 24-26, 1994, in Santa Rosa, California, by the DOE Division of Energy Biosciences and Office of Environmental Management helped define critical research needs of both a basic and applied nature that would have substantial effects on the use of plants in remediation. Jones cited the August 2, 1994, symposium on phytoremediation held during the ASPP annual meeting and discussed research conducted by ASPP members Rufus Chaney of USDA and Ilya Raskin of Rutgers University who were presenters at the symposium. Jones also explained the bioremediation research conducted by ASPP past president Bob Buchanan.

Congressional testimony and visits by ASPP committee on public affairs chair Lou Sherman, president-elect and committee member Ken Keegstra, and ASPP members Alan Darvill, Hans Kende, Peter Albersheim, and their colleagues have explained to key members of Congress in recent years the benefits offered by basic research into phytoremediation. The call for DOE to spend $50 million on basic research for environmental management came from Congress. Congress directed the Office of Environmental Management to provide the funds and manage the program jointly with the DOE Office of Energy Research.

Pioneering research by ASPP members Chaney, Raskin, and others is responsible for showing that plant science research in this area can lead to the use of plants to conduct large-scale remediation of toxic soil and water at a fraction of the costs of conventional approaches.

A number of other factors have contributed to increased recognition of the need for research in this area. For example, the workshop in Santa Rosa coordinated by former director of the Division of Energy Biosciences Bob Rabson, Dilworth, and Tavares helped illustrate to Office of Energy Management officials the opportunities for research in this area. A well-attended forum on phytoremediation conducted by the University of Missouri and coordinated by ASPP board of trustees chair and former committee on public affairs member Doug Randall also helped focus attention on the need for phytoremediation research.

The Office of Environmental Management is expected to provide new awards in its Environmental Management Science program again next year and new awards for basic plant research into phytoremediation may be issued. The DOE support increases the opportunities for both the advancement of research in this area and for broader recognition of the potential benefits offered by this basic plant research.

The DOE Environmental Management new plant science awards this year include:

- more than $325,000 to Jeffrey Harper at the Scripps Research Institute to conduct research on heavy metal pumps in plants.
- more than $575,000 to David Ow of the U.S. Dept. of Agriculture Plant Gene Expression Center in Albany, California, to conduct research on the molecular genetics of metal detoxification: prospects for phytoremediation.
- more than $450,000 to Teresa Fan of the University of California, Davis, to study plant rhizosphere effects on metal mobilization and transport.
- more than $825,000 to R. B. Meagher of the University of Georgia to study phytoremediation of ionic and methyl mercury pollution.
- nearly $500,000 to David Salt of Rutgers University to study molecular dissection of the cellular mechanisms involved in nickel hyperaccumulation in plants.
- more than $650,000 to Stuart Strand of the University of Washington to conduct research using trees to remediate groundwaters contaminated with chlorinated hydrocarbons.
- more than $480,000 for J. I. Schroeder of the University of California, San Diego, to study molecular characterization of a novel heavy metal uptake transporter from higher plants and its potential for use in phytoremediation.

ASPP SUGGESTS DESIGN OF PLANT RESEARCH PROGRAM WITHIN FUND FOR RURAL AMERICA

In letters sent September 12 and November 6 to key U.S. Department of Agriculture officials, ASPP commented on development of the research, education, and extension provisions of the Fund for Rural America. The fund will provide between $33.3 million and $66.7 million each of the next three years for research, education, and extension. The Fund for Rural America could potentially support new areas of plant research. The program is not intended to duplicate the National Research Initiative.

ASPP offered in the September 12 letter, as a matter of illustration, possible examples of the types of problems researchers, particularly multi-disciplinary research teams, could address:

1. Concerted attack on particular local and regional problems, whether it is a particular disease such as fire blight or stress due to particular local physical conditions, such as drought, or local problems such as high amounts of aluminum in the soil.

2. Basic research oriented toward the need for outcomes that provide ongoing solutions to agricultural problems and take into account local ecological and environmental issues.

3. Emphasis on developing understanding of basic processes underlying resistance of plants to both physical and biological stresses in the environment and to the application of integrative pest management and more precise and targeted use of chemical inputs (both fertilizers and pesticides) by local farmers.

4. Exploitation of significant progress made in mapping the genome of Arabidopsis to generate maps of crop plants. Current funding support is particularly inadequate for mapping of minor crop plants.

5. Consideration of the importance of the scale and problems faced by small farms in particular those surrounding urban areas and in certain localities that provide fresh, locally grown produce for suburbs and cities.

6. Research on specialty crops producing natural products or bio-engineered for particular products to understand the different processes that may limit the accumulation of the desired substances or products.

7. Basic and applied research that will provide knowledge for more value-added uses of crop plants and increased variety of planting options for farmers.

There may be research efforts that require scientists from as few as two or three different disciplines within the same university or a collaboration between several scientists from different public and private institutions, ASPP noted.

ASPP also recommended support for derivative research that builds on basic research breakthroughs. For example, NRI support would be considered for research that would show for the first time that a plant seed can be engineered for insect resistance. However, once this research has been successfully conducted, as it was for peas by Maarten Chrispeels, there is not a federal source available to the principal investigator to support use of this knowledge to engineer seeds of other plants for insect resistance. There are a number of other areas of plant research where support for derivative research benefiting farmers and the environment could be provided by the Fund for Rural America, ASPP said. Such support by the Fund for Rural America would fill a gap that currently exists in available funding.

On November 6, ASPP pointed out the authorizing law's requirements that peer review panels determine the scientific merit of proposals submitted to the Fund for Rural America program. Some interest groups are seeking to put non-scientists on the peer review panels. ASPP also cited the eight purposes and objectives of the statute which include development of new crops, new crop uses and new agricultural applications of biotechnology, and preservation of plant and animal germplasm. The September 12 letter was sent by Bob Buchanan and Ralph Quatrano, who were then ASPP president and chair of the committee on public affairs, respectively; the November 6 letter was sent by Don Ort, ASPP president, and Lou Sherman, chair of the committee on public affairs. Sherman also visited Washington to meet with the coordinator of the work group within USDA that is drafting the request for proposal to explain ASPP's suggestions for implementation of the program.

While ASPP's efforts have been in support of plant research, some influential interests are seeking to convince USDA officials to focus the research program more on non-traditional "agricultural" research intended to, for example, promote tourism or abate violence in rural communities.

The Department is expected to publish a request for proposal for the Fund for Rural America research, education and extension program in the Federal Register in early December.

It's subscription renewal time. To assure that you receive your issues of *Plant Physiology* and THE PLANT CELL on time and without interruption in 1997, be sure to mail in your subscription renewals immediately!

DOE Basic Research Funds Increased in Conference

The Department of Energy Basic Energy Sciences and its Division of Energy Biosciences received the President's requested amount of funding for Fiscal Year 1997 from Congress. This reflects an increase over the earlier House recommended levels. Basic Energy Sciences moved up to $649,675,000 in the conference agreement and enacted law from the House-recommended level of $642,960,000. The Division of Energy Biosciences moved up to $28,185,000 after receiving a recommended level of $27,650,000 in the House. ASPP campus contacts sought the higher amount recommended by the Senate and requested by the Department in Conference.

This marked the last energy appropriations bill for House Appropriations Subcommittee on Energy and Water Development Chairman John Myers (R-IN) and ranking Democrat Tom Bevill (D-AL), both of whom are retiring from Congress after 15 terms. Both Myers and Bevill have been strong supporters of basic research. After making a number of strategic moves, Myers managed to get an increase in his subcommittee allocation of about $1 billion to help protect research and other funds.

The next chair of the subcommittee is expected to be Joe Knollenberg (R-MI), who spoke in support of basic research in floor debate this year. Vic Fazio (D-CA), whose district includes the University of California, Davis, and who also has supported energy research, is expected to be the ranking Democrat.

NSF BUDGET INCREASED 2 PERCENT THIS YEAR

The Fiscal Year 1997 appropriations law for the National Science Foundation is at $3.27 billion, which is up $50 million, or about 2 percent, over the FY 1996 level. For Research and Related Activities, the act provides $2.432 billion, which is $118 million, or nearly 5 percent, over the FY 1996 level. The increase is less than 5 percent when it is taken into account that $50 million of the increase is for large-scale academic research instrumentation.

Education and Human Resources is funded at $619 million, an amount equal to the President's budget request. This amount is $7 million above what the House recommended and $5 million below what the Senate recommended.

The Salaries and Expenses account is funded at $134 million in FY 1997, which is equal to the NSF request. This amount averts the staffing and operational disruptions that could have occurred under the earlier level recommended by the House.

ASPP campus contacts wrote to their members of Congress to support funding for NSF. Improvements over some House-recommended amounts were made in conference. NSF survived budget cutting efforts that would have shifted NSF funds to the popular Department of Veterans Affairs account.

DOE, NSF, USDA AWARD GRANTS TO HELP SEQUENCE ARABIDOPSIS

The Department of Energy (DOE), the National Science Foundation (NSF), and the Department of Agriculture (USDA) have funded three groups of researchers to conduct systematic, large-scale genome sequencing of *Arabidopsis thaliana*. The ultimate goal is to sequence the entire Arabidopsis genome at a rate of about 200 genes per month and to develop the first complete gene sequence of a higher plant. The three-year awards total about $12 million.

"Decoding the DNA of this model plant will provide a complete catalog of all the genes involved in the life cycle of the typical plant, from seed to flower and fruit," said Martha Krebs, Director of DOE's Office of Energy Research. DOE is supporting the plant sequencing effort because the applications of the genetic information learned could be used to meet a number of agency mission needs. DOE said potential applications that could lead from this research include improved quality and quantity of biomass products such as alternative fuels and chemical feedstocks that can conserve petroleum resources and use of plants to clean up contaminated soil (phytoremediation) at DOE's former nuclear weapons production sites.

In a news release issued for the project, Mary Clutter, NSF Assistant Director for Biological Sciences, said that what scientists learn from the study of Arabidopsis genes will be immediately applicable to economically important plant species and will lead to the creation of new and improved plants and plant-based products. "Because plants are vital to our existence, increased understanding of the biology of plants will impact every facet of our lives, from agriculture, to energy, to the environment, to health," Dr. Clutter said.

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Catherine Woteki, USDA Acting Under Secretary of Agriculture for Research Education and Economics, said "Mapping the Arabidopsis genome will enable us to use biotechnology to develop a host of new plant varieties for agricul-

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ture and other purposes."

Although the three groups of researchers selected for the current research grants are supported by separate awards, each is part of a single project. Clutter noted that their activities will be coordinated to maximize efficiency and information from the project will be widely disseminated so that researchers will gain maximum benefits.

The U.S. effort is being dovetailed with other large-scale Arabidopsis genome sequencing projects in Europe and Japan. The goal is to complete the sequence by the year 2004. U.S. groups will contribute two-thirds of the sequence.

The three groups of researchers are The Institute for Genomic Research (TIGR) in Rockville, Maryland; a consortium of Cold Spring Harbor Laboratory on Long Island, New York, Washington University in St. Louis, Missouri, and Applied Biosystems in Forest City, California; and a consortium of Stanford University, the University of Pennsylvania, and the University of California at Berkeley.

NRI SUCCESS STORIES REQUESTED

The USDA National Research Initiative Competitive Grants Program chief scientist, Ronald Phillips, requests the assistance of researchers in evaluating the impact of the competitive grants program. The NRI is seeking responses to any or all of the following questions:

- Has the NRI helped in sustaining world leadership in science and engineering directly relevant to agriculture?
- What has been achieved by NRI funding that likely would not have occurred if the Department did not have the NRI?
- What scientific breakthroughs occurred as a result of NRI-funded research that opened new fields of endeavor or new directions for applied research.

Accounts of successful research conducted with the support of the NRI are also being requested. The NRI is looking for descriptions from current and past grantees of research they conducted and how that research created important new knowledge. If possible, include citations documenting the work.

Please send your responses to NRI Awardees Documents, USDA-CSREES-NRICGP, Stop 2241, 1400 Independence Ave. SW, Washington, DC 20250-2241. If you are sending descriptions of successful results from research you conducted, please also send a copy of these descriptions to ASPP Public Affairs, 15501 Monona Drive, Rockville, MD 20855.

Alert—U.S. Federal Government Employees:

Plant Biology '97: A View from the Pacific Rim, the ASPP/CSPP joint annual meeting, has been designated by some federal government agencies as a ***"foreign"*** meeting.

Check with your travel office by December 1996 to request permission to attend and complete the necessary paperwork. Passports are not required for U.S. citizens traveling to Canada.

Plant Physiology Goes Electronic

Tables of Contents and Abstracts Now Available on the Mailing Day

Beginning with the September 1996 issue (Volume 112, Number 1), *Plant Physiology* joined the increasing ranks of journals that are publishing their tables of contents and abstracts on the World Wide Web. THE PLANT CELL will follow suit in January 1997. The service is being offered free of charge and without access restrictions to anyone who is interested.

It's easy to access *Plant Physiology*'s TOCs and abstracts: go to the URL http://aspp.org. Once in, click on Publications, then on *Plant Physiology*, and you'll be there. The files are fully searchable across all abstracts and authors, so, for example, if you ask for a search on the word "arabidopsis," you will be referred to abstracts in all issues presently on line. Each abstract is also linked to the e-mail address of the corresponding author of the article in question to make it possible for readers to be instantly in contact with an author if an article is of vital interest.

Access is best for people who use Netscape 2.0 or later or a comparably powerful browser.

The files are being made available simultaneously with the mailing of the journal, on about the 12th of each month. This means that readers worldwide will have access to each issue's table of contents and abstracts at least one week before delivery of the printed journal in the United States—and three weeks to one month before in the case of our readers in the Pacific.

The site also includes links to the Plant Gene Register and to ASPP's home page, complete with information regarding ASPP's other member services.

ASPP is pleased to provide this service for its subscribers and members. We welcome all comments and suggestions. Send them to webmaster@aspp.org.

ASPP Education Forum

Edited by Bob Wise, Department of Biology, University of Wisconsin Oshkosh, Oshkosh, WI 54901, e-mail wise@uwosh.edu

K-12 Outreach Guidelines Available from the NABT and SFN

In the summer of 1992, the National Association of Biology Teachers (NABT) held a workshop with members of the Society For Neuroscience (SFN) at Wake Forest University. The purpose of the workshop was to develop guidelines for scientists to use when working with K-12 teachers on educational issues. Kathy Frame (NABT) and James Hamos (SFN and the University of Massachusetts) prepared a list of do's and don't's that are available for anyone wishing to become involved in visits to K-12 classrooms. The three-page handout discusses why one might wish to consider an outreach function and advice on what to do before, during, and after the visit to maximize the experience for all parties involved. This valuable guide can be obtained free of charge from Kathy Frame, NABT, 11250 Roger Bacon Drive, #19, Reston, VA, 22090-5202. Ask for the brochure entitled "Guidelines from a Scientist to a Scientist When Working with Teachers."

Plant Pigment Lab Exercises On-Line

Through a grant from the National Science Foundation, a collaboration has been formed between Nebraska scientists and high school science teachers to develop new laboratory exercises involving plant pigments. After the first year, a series of undergraduate exercises is ready. These are in the format of a biochemistry course for non-majors, but could also be utilized for courses in chemistry or biology. The exercises are available at the World Wide Web site for the course (http://www.pigment.unl.edu) which contains both student exercises and teacher's notes. We encourage anyone interested to examine the exercises and try those useful in your own courses. We especially encourage any feedback, corrections, or suggestions for improvement. (Contributed by John Markwell, Departments of Biochemistry and Agronomy, University of Nebraska.)

Electronic Journal for Chemistry Educators Offers View of the Future

Springer-Verlag has begun publishing an electronic journal called *The Chemical Educator* that deals with specific issues involved in chemistry teaching at all grade levels. The contents of Volume 1, Issue 3, were recently posted to the internet at <http://journals.springer-ny.com/chedr>. The journal has materials on classroom activities and teaching demonstrations, a separate section for high school teachers, and an electronic forum for interactive discussion. Also included are stories on the history of chemical education, computers in teaching, jobs, and recent book reviews. Both individual and institutional subscription rates are available.

Although *The Chemical Educator* is not specifically aimed at the plant physiology teaching community, it does contain content that should be of interest to many ASPP members. In addition, it provides a good look at one of the many faces that the future of teaching has to offer.

More Scientific Journals Publish Education Articles

Joe Pelliccia of the NSF Division of Undergraduate Education (DUE) has assembled a list of scientific journals that publish education related articles (or are considering doing so). DUE's goal was to demonstrate to the scientific community the high level of interest in science education by highlighting those societies and journals that publish such articles. This growing phenomonon makes it easier for pedagogical innovations to reach more and more biologists. A second goal was to encourage other societies and journals to join in the dissemination of education related articles. Dr. Pelliccia has offered to maintain and update this list so please send any additions to him at jpellicc@nsf.gov. In addition, some 29 national scientific organizations have special sessions or presentations at their national and/or regional meetings. The ASPP, of course, has a long-standing and increasing role in plant science education. Those journals that publish education articles are:

Advances in Physiology Education
American Biology Teacher
American Society for Microbiology Newsletter*
Bioscene: Journal of College Biology Teaching
BioScience
Bulletin of the Ecological Society of America*
CUR (Council on Undergraduate Research) Quarterly
Desert Tortoise Council
Drosophila Information Services*
Ecological Monographs#
Ecology#
Entomological Society of America Bulletin
Environmental Education and Information (UK)
Environmental Education Research (UK)
Inoculum, newsletter of The Mycological Society of America*
Journal of Biological Education (British)
Journal of College Science Teaching
Journal of Environmental Education
Journal of Environmental Education (Australia)
Journal of Geography
Journal of Natural Resources and Life Sciences Education
Journal of Statistics Education
Plant Physiology
Science
Society of Environmental Toxicology and Chemistry
Teaching of Psychology
Transactions of the Kentucky Academy of Science
Worm Breeder's Gazette*

*Not peer reviewed
#Will consider

SECTION NEWS

WAS-ASPP Crab Feast

On September 20, a gloriously warm and sunny fall day, the Washington Area Section of the ASPP held its annual Crab feast at ASPP headquarters in Rockville, Maryland, as the guests of Ken Beam and the ASPP headquarters staff. The one hundred and one attendees, including WAS members and their guests and fifteen students, did justice to several bushels of Maryland's finest crustaceans. The scent of Old Bay seasoning drifted through the air, along with classic soft rock tunes provided by Al Torzilli and his band, Natural Selection (until local police crashed the party!). The festivities ended with the pungent odor of burned marshmallows under a clear, starlit sky! Life was good!

The meeting was attended by ASPP president Bob Buchanan and representatives of several agencies that fund plant research, including Hans Bohnert (Director, Integrative Plant Biology Program, NSF), Anne Datko (Director, Plant Responses to the Environment Program, NRI CGP, USDA), Greg Dilworth (Director, Divison of Energy Biosciences, DOE), Machi Dilworth (Director of Plant Science Initiatives, NSF) and John Radin (National Program Leader, Plant Physiology, ARS, USDA). Attendees also had the opportunity to talk with Dr. John Goldberg, a member of the professional staff of the House Agriculture Committee, who presented an overview of USDA-supported plant research programs. Dr. Goldberg represented Agriculture Committee Chairman Pat Roberts in gaining improved research provisions in this year's Farm Bill.

Before the last guest departed, WAS-ASPP chair Janet Slovin began making plans for the winter meeting banquet, to be held on Friday evening, February 21, 1997 in College Park, Maryland. Looking ahead to May 8 and 9, 1997, the WAS-ASPP will hold its annual spring meeting and symposium at the U.S. National Arboretum in Washington, D.C. We especially encourage students to attend this meeting and present their research.

Robert D. Slocum
Secretary-Treasurer, WAS-ASPP

OFFICERS ASSUME POSTS FOR 1996-1997

October 1 was the date on which new ASPP officers and committee members took up their responsibilities. Donald R. Ort, USDA/ARS, University of Illinois, became president; Kenneth Keegstra, MSU-DOE Plant Research Laboratory, Michigan State University, became president-elect; and Natasha Raikhel, also at MSU's Plant Research Lab, became an elected member of the executive committee. Other changes on the executive committee include: Douglas D. Randall, chair of the board of trustees; Samuel I. Beale, chair of the publications committee; Ruth Alscher, chair of the committee on the status of women in plant physiology; Eugene Vigil, chair of the minority affairs committee; and Marc Cohn, Southern Section representative.

For the first time in 10 years, James N. Siedow, professor of botany at Duke University, is not a member of ASPP's executive committee. Over the past 10 years, he has served on the executive committee as Southern Section representative, elected member, secretary, chair of the board of trustees, president-elect, president, and immediate past president, the position he relinquished on September 30.

Following is a list of the membership of ASPP's committees for 1996-1997 as announced by President Don Ort:

Publications Committee
Samuel I. Beale (97), chair
Mary A. Schuler (98)
Judy Callis (99)
David Longstreth (00)
Pamela Green (01)

Program Committee
Mary Jo Vesper (97), chair
David Tuan-Hua Ho (97)
Judith A. Verbeke (98)
Michael E. Salvucci (99)
Roger Hangarter (00)
Donald Ort (98), ex officio, past chair
Kenneth Keegstra (97), ex officio, president elect

Nominating Committee
Bob B. Buchanan (97)
Donald R. Ort (98)
Kenneth Keegstra (99)

Education Committee
Dale G. Blevins (97), chair
Dina Mandoli (98)
Robert R. Wise (98)
John P. Markwell (99)
Carol Reiss (00)

Constitution & Bylaws Committee
Phillip D. Reid (98), chair
T. Kaye Peterman (97)
William H. Outlaw, Jr. (99)

Committee on the Status of Women in Plant Physiology
Ruth Alscher (98), chair
Debra Mohnen (97)
Karen E. Koch (97)
Sabine Heinhorst (98)
Elizabeth E. Hood (99)
Cynthia A. Henson (99)

Membership Committee
Jerry D. Cohen (98), Chair
Neil Olszewski (97)
Mary A. Bisson (98)
Laura S. Privalle (99)

Committee on Public Affairs
Louis Sherman (99), chair
Mary Helen Goldsmith (97)
Robert B. Horsch (98)
Ralph S. Quatrano (98)
Elisabeth Gannt (99)
James N. Siedow (00)
R. James Cook (00)
Bob B. Buchanan

Committee on Minority Affairs
Eugene L. Vigil (98), Chair
Sheila Lee Fennoy (97)
Emil M. Orozco Jr. (97)
Deborah A. Cook (98)
Hector Flores (99)
Robert Jones (99)

Reflections on Roots and Scientists

by Hector E. Flores

[Editor's Note: Hector Flores is professor of plant pathology and biotechnology and director of the Science, Technology and Society Program at The Pennsylvania State University. He is also a member of the Intercollege Graduate Program in Plant Physiology and adjunct professor of biology. This essay is based on Dr. Flores's address at the Minority Affairs Committee luncheon given at the 1996 ASPP Annual Meeting in San Antonio, Texas.]

"Would you tell me, please, which way I ought to go from here?"
"That depends a good deal on where you want to go," said the Cat.
"I don't much care where," said Alice.
"Then it doesn't matter which way you go," said the Cat.
"So long as I get somewhere," Alice added as an explanation.
"Oh, you're sure to do that," said the Cat, "if you only walk long enough."
(Lewis Carroll, *Alice in Wonderland*)

I must confess that I have felt like Alice more than once during my career and in writing these thoughts. I also submit that Alice's dialogue with the Cheshire cat has more counterparts in academic life than many of us would like to admit. For the most part, we still cling to the idea of successful scientists as people who know what they want and how to get there. This is such a convenient myth that we seldom stop to question it, let alone think about alternatives to "success." It also overlooks much of the challenge, excitement, and fun that science has been and should continue to be. I would propose that for most of us, whatever we may achieve in science is much closer to a lifelong exercise in improvisation. In *Composing a Life*, Mary Catherine Bateson has created a beautiful metaphor for this view of science and life in general: "We see achievement as purposeful and monolithic, like the sculpting of a massive tree trunk that has first to be brought from the forest and then shaped by long labor to assert the artist's vision, rather than something crafted from odds and ends, like a patchwork quilt, and lovingly used to warm different nights and bodies."

I like Bateson's metaphor for several reasons. First, I can see my own career as a plant biologist being a direct result of chance and serendipity. I do remember the first time my dad gave me a microscope, and the endless hours I spent as a kid looking at Paramecia, Spyrogyra, and rotifers. I also remember my decision to follow a career in biology rather than become a physician like my father. These decisions aside, however, almost everything I have done has been unplanned. After spending almost two years as an undergraduate collecting bibliography on mycoplasma, I stumbled upon a plant physiologist who inducted me into plant tissue culture, which I have used since. The research on root-specific metabolism, which I have been involved with since 1983, started as a practical decision to use "hairy root" culture to study the biosynthesis of putrescine-derived alkaloids. This interest later opened up the opportunity to lead an interdisciplinary effort in root biology at Penn State. More recently, underground plant biology has brought me back to my cultural and biological roots, through a project on the tuber and root crops of Peru, my native country.

The quilt theme of *Composing a Life* is also a healthy reminder of the human dimension of the scientific endeavor. We all inherit and pass on a science quilt, made up of the hopes and triumphs, large and small, of our predecessors and mentors. To varying degrees we all sit on the shoulders of giants, from Pasteur to McClintock. As I reflect on my own career, I am amazed at the extent to which my former mentors and colleagues have influenced my outlook and activities. My love for the history of science started with a birthday present from my dad, a book called *Heroes of Science*, which included the likes of Giordano Bruno and Alcides Carrion. In graduate school, my plant biochemistry profesor, Bruce Stowe, introduced me to Theophrastus's *De Causis Plantarum* and the wealth of classical botanical knowledge, from figs to henbane. My graduate advisor, Art Galston, has been both a scientific and intellectual mentor, especially concerning the relation and responsibilities of scientists to society. And a very gentle woman, Ravindar Sawhney, was not only a colleague and a friend, but also taught me the importance of caring for students and running a lab as a family rather than as a business.

Acknowledging our intellectual debts as scientists also reminds us of the astounding diversity in scientific style which is both possible and necessary. As Peter Medawar states in his *Advice to a Young Scientist*, "Among scientists are collectors, classifiers, and compulsive tidiers-up; many are detectives by temperament and many are explorers, some are artists and others artisans. There are poet-scientists and philosopher scientists and even a few mystics." I would argue that respect for and recognition of each of these models, and more, is essential if we are to hope for future scientists who are capable of embracing risk and engaging in a truly diverse and creative career. As much as we congratulate outselves on the health of the scientific enterprise, we basically take for granted only one model for science and success in science, in which aggressiveness and competitiveness have become the sine qua non requirements for excellence. If this were truly the case, science would be a dull and dangerous endeavor indeed. Many wonderful opportunities and alternatives lie ahead of us. We have barely started to realize the potential of interdisiciplinarity, which should be undertaken not to make ourselves more competitive but because it will open up virtually unexplored intellectual frontiers. We are also a long way from achieving a balance of gender and culture that truly values this essential dimension of scientific diversity. It is especially important to provide alternative role models for women and minority scientists, unless we want to keep perpetuating the stereotypes and status quo that many of us still hold on to.

How can roots help us think about science? As is well known, roots have provided powerful symbols for philosophy, religion, and society. We may also think of them as symbols for a gentler kind of science and scientists. Roots are, of course, very unassuming, performing their work out of sight and out of light. Roots can develop beautiful architectures through the repetition of a very simple growth pattern, rather than with showy displays of color or form. We are just beginning to understand the degree to which roots can exchange signals with biotic and abiotic factors. I would predict that when this capacity is better understood, roots will emerge as the most sophisticated and

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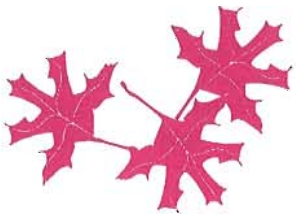
diverse communicators in the whole plant. Roots are also adept improvisers, constantly foraging for nutrients, adjusting to stress, and coping with disease. Perhaps, then, "thinking" like a root may not be a bad idea for a future plant biologist.

Finally, a thought on fun and risk taking may be appropriate. Both of these are becoming harder to have or do with the ever increasing workload and competition for limited funding. The most recent lesson that science can still be fun was taught to me this past summer by a bright undergraduate from Williams College and a student from China. I assigned them the task of establishing an aseptic co-culture of aphids and "hairy roots," and discussed the many possible problems in getting this to work. Two weeks into their project I was shown a beatiful and clean root/aphid co-culture. It turns out that instead of doing this systematically, as I had suggested, they had taken a short cut by dipping the aphids in Clorox. Some aphids died, of couse, but those that survived the treatment provided the aseptic cultures. The rest of the summer, the students had the best of times working on this new system.

This is an exciting and challenging time to be a plant biologist. I truly envy those of you who will live far into the 21st century, as you are sure to witness discoveries that we cannot presently imagine. I believe that our greatest challenge will be not to embrace risk and thrive in diversity, but to develop a successful career while preserving our humanity.

I conclude these reflections by reminding ourselves that we have chosen a very privileged way of life. Perhaps it is time for us to balance the freedom to pursue our fascination with life with respect for it, including our societal responsibilities. This, I propose, will be the true measure of "success" for a plant biologist in the 21st century.



Progress in Plant Biology '97 Is Evident from the Start

Two new approaches to organizing some aspects of the joint ASPP/CSPP annual meeting greet you as you peruse the call-for-abstracts pages contained in this issue of the *ASPP News*.

First, for Plant Biology '97 the program committee has streamlined and updated the list of report categories for abstracts. For one thing, the list now applies to both oral presentations and posters (except for the Education category which is a poster-only topic). This departs from past practice of giving a category list for poster presentations and a separate list for oral/poster presentations.

Poster presentations continue to capture more and more of the abstracts submitted and are very favorably received by those attending ASPP annual meetings. Nearly everyone agrees that posters offer increased viewership opportunities and provide meeting attendees greater access to authors than do oral presentations. Now the opportunity to submit abstracts under the same topics for both oral and poster presentations means the deciding factor for choosing to present your work orally is simply that you prefer an oral delivery format.

With regard to streamling the list, there are fewer categories than in the past, and some topic areas are quite broad The program committee anticipates grouping abstracts that are submitted under the broad topics and composing sessions of more focused content. This focused content will be reflected in the titles of the poster and oral sessions printed in the final program for Plant Biology '97. The committee believes we will build a stronger program with this approach. Our program can now reflect the latest and honest research areas that emerge from the abstracts submitted by our meeting participants. By enacting this revision, we will reduce driving the meeting content by narrowly defined categories and foster showcasing the latest excellent research being done by our participants.

Second, probably the most immediately exciting thing apparent to those planning to submit an abstract is the opportunity to submit your abstract on line. ASPP has acquired the capability of receiving abstracts on-line through the World Wide Web. Furthermore, abstracts will be available on-line for viewing through the ASPP Web site within about six weeks after their receipt (by mid-April). Additional features of this online service include the opportunity to search abstracts by author and key subject words contained both within the title and the body of the abstract.

In other annual meeting program news, we got excellent responses to our call for abstracts for minisymposia that was issued at the meeting in San Antonio and through a mailing sent in September. The task of choosing three presenters for each minisymposium was daunting because each submission was of significant merit. An additional three minisymposia are yet to be composed. The topics and contents of these symposia will emerge from abstracts submitted for the meeting by the February 20 deadline. Together with the minisymposia being organized by the Japanese and Australian societies of plant physiology, that brings our minisymposium number to eight. This expanded number of minisymposia is now a regular occurrence in our annual meetings. And of course the annual meeting will be rounded out by five major symposia selected by the Canadian and American societies.

When the program committee members see the call-for-abstracts issue of the *ASPP News* arrive, our hopes begin to soar as we envision abstract contributions coming in from which we can construct the "best ASPP/CSPP meeting yet." Our meeting participants have never let us down! Now your participation in Plant Biology '97 will yield even greater rewards: focus in our poster and oral sessions to reflect the current state of research, ease of online submission of abstracts, and, early online access to abstract content in a searchable format. Thank you for helping to make progress a generous part of ASPP's/CSPP's good reputation.

Mary Jo Vesper
ASPP Secretary and
Program Committee Chair

CALL FOR ABSTRACTS

PLANT BIOLOGY '97:
A VIEW FROM THE PACIFIC RIM

1997 Joint Annual Meetings of the
American Society of Plant Physiologists and the Canadian Society of Plant Physiologists

Saturday, August 2–Wednesday, August 6, Vancouver, B.C., Canada

Deadline: Thursday, February 20, 1997
Do not submit abstracts before January 1, 1997.

PLEASE READ THE FOLLOWING CAREFULLY BEFORE SUBMITTING ABSTRACTS FOR PLANT BIOLOGY '97

Abstracts to Be Submitted and Viewed Electronically for Plant Biology '97

Beginning with Plant Biology '97, the joint annual meetings of the American Society of Plant Physiologists and the Canadian Society of Plant Physiologists, major changes are coming to the way abstracts are submitted and presented for ASPP annual meetings. For the first time, abstracts may be submitted via the World Wide Web, and the annual abstract supplement will be available for viewing and searching on the Web beginning in April 1997. We will also publish a printed version of the abstract supplement in 1997.

This exciting change will mean that abstracts will be available for viewing much earlier than has previously been the case. Program details will be attached to the abstracts, making it possible for you to plan your visit to the annual meeting with precision long before you get to the meeting. The Web site will make it possible for you to actually prepare and print out a personal program to guide you at the meeting.

The deadline for submission will be Thursday, February 20, 1997. Abstracts may not be submitted before Wednesday, January 1, 1997.

The new system will work best for members who have access to the World Wide Web through a forms-capable Web browser such as Netscape 2.0 or later (which can be easily downloaded from the Web for all who have appropriate system configurations) or Internet Explorer. We strongly urge all members who are able to do so to use this method of submission. The more abstracts that are received via the Web, the better the electronic abstract supplement will work.

In recognition that not all members have access to the Web or to the proper browsing software, abstracts may also be submitted via e-mail (as MIME-encoded attached files in Microsoft Word 6.0 or later or WordPerfect 6.0 or later) or via physical mail. Although these methods of submission will work, they are cumbersome and expensive to convert to the Web file. Again, we urgently request everyone who has World Wide Web capability to use that format to submit his or her abstract.

In the case of all three methods of submission, authors will be strictly limited to 1800 characters in the body of the abstract.

Automatic acknowledgments will be sent to all who submit, regardless of the method they use.

Inside this insert are the new instructions for submitting your abstracts electronically (or by regular mail if you don't have access to the Web or to e-mail). For this new electronic submission project to work effectively, it is critical that you read and follow these new instructions carefully when you send your abstracts for Plant Biology '97. If you have any questions, contact Susan Chambers at chambers@aspp.org or 301-251-0560, ext. 11.

Remember the following four guidelines:

- **Limit the body of your abstract to 1800 characters .**
- **Do not submit any abstracts before January 1, 1997.**
- **Be sure to submit by Thursday, February 20, 1997.**
- **Most important:**

IF AT ALL POSSIBLE, SUBMIT BY WORLD WIDE WEB.

FOLLOW THE ENCLOSED INSTRUCTIONS EXACTLY.

Call for Abstracts—Plant Biology '97: A View from the Pacific Rim

1997 ASPP and CSPP Joint Annual Meetings

Vancouver, B.C., Canada, Saturday, August 2–Wednesday, August 6

HOW TO SUBMIT AN ABSTRACT TO PLANT BIOLOGY '97

We urge all who have the electronic capability to use the World Wide Web. The least desirable method of submission is via physical mail.

I. Via the World Wide Web

1. Select first and second choice report categories from the list below. Oral or poster presentations may be made in any category other than Education, which will be limited to poster only.
2. A member may submit or sponsor one research abstract and one Education abstract.
3. Deadline for receipt is Thursday, February 20, 1997. DO NOT USE FAX.
4. DO NOT include any graphics or tabular material in the body of your abstract.
5. Access URL **http://aspp.org/abstract**. You must have a forms-capable browser (for example, Netscape 2.0 or above or Internet Explorer).
6. Detailed instructions will be provided on the screen. Enter the information called for in each field. If you use special characters (super- or subscripts, italics, or bold), you will be asked to enter some simple text mark up codes. The codes will be provided in the instructions on screen. Spell out all Greek letters (i.e., alpha for α, beta for β, and so forth). The system will provide an immediate proofing copy to ascertain that you have entered the codes properly. The system will count the characters (minus the codes) and will not permit you to enter an abstract of more than 1800 characters.
7. After proofing, press the "Submit" button. Acknowledgment will be sent to you by e-mail.

II. Via E-Mail

1. Select first and second choice report categories from the list below. Oral or poster presentations may be made in any category other than Education, which will be limited to poster only.
2. A member may submit or sponsor one research abstract and one Education abstract.
3. Deadline for receipt is Thursday, February 20, 1997. DO NOT USE FAX.
4. DO NOT include any graphics or tabular material in the body of your abstract.
5. E-mailed abstracts will be accepted only as attached files in Microsoft Word or Wordperfect 6.0 or later. To obtain a template for your attached file, send an e-mail to **mswabs@aspp.org** if your file is in Microsoft Word; send to **wpabs@aspp.org** if your file is in WordPerfect. It is not necessary to enter anything in the subject line or message area. An attached file template in which to prepare your abstract will be e-mailed back to you within a very short time.
6. Enter the information called for on each line of the template. Follow the instructions on the template very carefully. Type the abstract in the area provided. DO NOT exceed 1800 characters. Spell out all Greek letters (i.e., alpha for α, beta for β, and so forth). Super- and subscripts, bold, and italic may be used.
7. E-mail your abstract as a MIME-encoded attached file to **abstract@aspp.org**. Acknowledgment of receipt will be sent to you by e-mail.

III. Via Physical Mail

1. Select first and second choice report categories from the list below. Oral or poster presentations may be made in any category other than Education, which will be limited to poster only.
2. A member may submit or sponsor one research abstract and one Education abstract.
3. Deadline for receipt is Thursday, February 20, 1997. DO NOT USE FAX.
4. DO NOT include any graphics or tabular material in the body of your abstract.
5. Use this method of submission *only* if you do not have access to the World Wide Web or to e-mail with the accepted word processing software.
6. Fill in the form on the opposite page exactly as it is shown and within the space provided.
7. Type the abstract in the area provided; DO NOT exceed 1800 characters. Spell out all Greek letters (i.e., alpha for α, beta for β, and so forth). A proofing copy will be e-mailed to you; if you do not have or do not provide an e-mail address, the proofing copy will be sent by fax.
8. Mail two flat, unfolded copies (original and photocopy) of your abstract to Plant Biology '97 Abstracts, 15501 Monona Drive, Rockville, MD 20855-2768 USA.

Acknowledgments will be sent automatically to all authors at their e-mail addresses. If you do not have an e-mail address, an acknowledgment will be mailed. Address any questions to Susan Chambers, chambers@aspp.org or 301-251-0560, ext. 11.

REPORT CATEGORIES

Abstracts for both poster and oral presentations may be submitted in 21 of the following 22 categories. Abstracts submitted in the Education category will be accepted only as posters. Posters will be on display in two groups of two days each with the exception of Education posters, which will be on display for four days.

1. Reproductive Biology
2. Vegetative Development
3. Seed Physiology
4. Signal Transduction
5. Cell Walls and Cytoskeleton
6. Interactions of C and N Metabolism
7. Lipids and Related Molecules
8. Mitochondria and Respiration
9. Natural Products, Medicinals, Ethnobotany
10. Protein Processing, Trafficking, and Assembly
11. Root Physiology
12. Transgenics and Biotechnology
13. Assimilate Partitioning and Allocation
14. Environmental Response and Adaptation
15. Enzymology and Metabolism
16. Gene Structure/Characterization
17. Growth Regulators and Hormones
18. Membrane Transport
19. Photosynthesis
20. Plant Interactions with Other Organisms
21. Regulation of Gene Expression
22. Education (Posters only; on display for four days)

DEADLINE FOR SUBMISSION: THURSDAY, FEBRUARY 20, 1997. DO NOT SUBMIT BEFORE JANUARY 1, 1997.

FOLLOW THIS FORM EXACTLY TO SUBMIT AN ABSTRACT TO PLANT BIOLOGY '97 BY PHYSICAL MAIL
(Type information directly onto this form and mail this original and one photocopy.
Please submit via physical mail only if you lack the electronic capability to submit via the Web or e-mail.)

ABSTRACT TITLE (Type in sentence style: capitalize first word only; type all other words except proper names in lower case letters):

AUTHOR: AFFILIATION:
AUTHOR: AFFILIATION:
AUTHOR: AFFILIATION:
AUTHOR: AFFILIATION:

REPORT CATEGORY (select from list at the bottom of page 2 of the call for abstracts):
FIRST CHOICE: SECOND CHOICE:

SUBMITTING OR SPONSORING MEMBER (a member may submit or sponsor one research abstract and one education abstract):
NAME: MEMBER OF (check all that apply): [ ] ASPP [ ] CSPP [ ] JSPP [ ] AUSPP

CSPP MEMBERS ONLY: PAPER BEING SUBMITTED FOR THE CSPP PRESIDENT'S AWARD STUDENT PAPER COMPETITION? [ ] YES [ ] NO

PRESENTER'S NAME (if e-mail address cannot be provided, fax number must be provided) :
MAILING ADDRESS:

TELEPHONE: E-MAIL ADDRESS: FAX:

METHOD OF PRESENTATION (oral presentations are limited to 12 minutes; program committee reserves right to assign oral reports to poster sessions): [ ] ORAL [ ] POSTER

SPECIAL EQUIPMENT NEEDS (other than an overhead projector or a 2x2 slide projector):

ARE YOU WILLING TO CHAIR THE SESSION IN WHICH YOU ARE PRESENTING (check one)? [ ] YES [ ] NO
ARE YOU WILLING TO OPERATE A PROJECTOR IN THE SESSION IN WHICH YOU ARE PRESENTING (check one)? [ ] YES [ ] NO

BODY OF ABSTRACT: (Abstract must fit into space below, and it *must not* exceed 1800 characters. Present all elements of a research report [introduction, materials and methods, results, discussion] but **without headings**. End abstract with acknowledgment of funding sources, if applicable. Do not indent first line of abstract. DO NOT break copy into paragraphs. DO NOT include graphics or any tabular material. Spell out all Greek letters [e.g., alpha for α, beta for β, and so forth]. Super- and subscripts, bold, and italics may be used. Abstracts submitted by physical mail will be retyped to be put into the electronic file that will appear on the Web and be used for printing the abstract supplement. Mail two flat, unfolded copies of this abstract (this form and a photocopy) to Plant Biology '97 Abstracts, 15501 Monona Drive, Rockville, MD 20855-2768 USA.)

NEW THIS YEAR!

Submit your abstract for Plant Biology '97 via the World Wide Web.
(Abstracts will also be accepted by e-mail as attached files or by physical mail. Faxed abstracts will not be accepted.)

All abstracts submitted for Plant Biology '97 will be accessible for browsing and searching on the World Wide Web beginning in April 1997.

IMPORTANT NOTICE

To be able to submit and view abstracts on the World Wide Web, instructions for authors have been significantly changed from previous years. It is essential to read and follow carefully the enclosed new instructions for submitting abstracts to Plant Biology '97. The new system will work best for abstracts submitted via the World Wide Web. All authors who have the electronic capability to submit via the Web are urgently requested to do so.

Deadline for Receipt of Abstracts THURSDAY, FEBRUARY 20, 1997. Do not submit before Wednesday, January 1, 1997.

Gatherings

The newsletter publishes dates, titles, locations, and contact names and addresses for meetings, courses, seminars, and the like that are of interest to ASPP members. Submit announcements via e-mail to sbraxton@aspp.org or mail to Sylvia J. Braxton, *ASPP NEWS*, 15501 Monona Drive, Rockville, MD 20855-2768 USA. **Faxed transmissions are not accepted.**

FUTURE ASPP ANNUAL MEETING SITES

1997: Vancouver, British Columbia, Canada
Saturday, August 2, through
Wednesday, August 6

1998: Madison, Wisconsin
Saturday, June 27 through
Wednesday, July 1

1999: Washington, D.C.
Saturday, July 31, through
Wednesday, August 4

1997

JANUARY

January 9-12, 1997
Sixth Western Regional Photosynthesis Conference
Asilomar Conference Center
Pacific Grove, California
For circular, contact: Rick Debus, Department of Biochemistry, University of California, Riverside, CA 92521-0129; telephone 909-787-3483; fax 909-787-3590; e-mail debusrj@citrus.ucr.edu; or Gerry Edwards, Department of Botany, Washington State University, Pullman, WA 99164-4238; telephone 509-335-2539, fax 509-335-3517, e-mail edwardsg@mail.wsu.edu.

January 12-17, 1997
Protein Purification Course
Rutgers University, New Brunswick
New Jersey
Contact: Dr. Gina-lee Toaldo, Office of Continuing Professional Education, Rutgers University-Cook College, P.O. Box 231, New Brunswick, NJ 08903-0231; telephone 908-932-9271.

January 16-18, 1997
Annual Symposium in Plant Physiology
A Look Beyond Transcription: Mechanisms Determining mRNA Stability and Translation in Plants
University of California, Riverside
Organizers: Julia Bailey-Serres and Dan Gallie. Contact: Cindi McKernan, conference organizer for registration information. Botany and Plant Sciences Department, University of California, Riverside, CA 92521; telephone 909-787-3423, fax 909-787-4437, e-mail cindi.mckernan@mail.ucr.edu.

January 19-23, 1997
Eucarpia Tomato 97
Jerusalem, Israel
Contact: ISAS International Seminars, P.O. Box 34001, Jerusalem 91340, Israel; telephone 972 2 6520574, fax 972 2 6520558, e-mail isas@netvision.net.il. Deadline for 150-250 word abstract is August 15, 1996.

January 25, 1997
Annual Meeting of the New York Area Plant Molecular Biologists
Lehman College
City University of New York, Bronx
Contact: Tim Short, e-mailtws$biol@qc1.qc.edu, telephone 718-997-3414, or Elli Wurtzel, e-mail etwlc@cunyvm.cuny.edu, telephone 718-960-8643 for more details.

January 20-26, 1997
Keystone Symposia Conference
Evolution of Plant Development
Taos, New Mexico
Organizers: Susan R. Wessler, Michael Freeling, Elliot Meyerowitz. Contact: Keystone Symposia, Drawer 1630, Silverthorne, CO 80498; telephone 800-235-0685 or 970-262-1230, fax 970-262-1525, e-mail keystone@symposia.com.

January 26-31, 1997
Gordon Conference
Temperature Stress in Plants
Colony Harbortown Hotel
Ventura, California
Organizers: Donald Ort, chair, Charles Guy, vice chair. Contact: Gordon Research Conferences, University of Rhode Island, P.O. Box 984, West Kingston, RI 02892-0984; telephone 401-783-7644, fax 401-783-4011, e-mail grc@grcmail.grc.uri.edu.

FEBRUARY

February 9-14, 1997
Gordon Conference on Agricultural Sciences:
Design and Discovery in Crop Protection
Harbortown Marina Resort
Ventura, California
For information, please contact: Rene Feyereisen, e-mail feyereisen@biosci.arizona.edu, fax 520-621-1150, or Mani Subramanian, e-mail subramanian@palres.dnet.sandoz.com, fax 415-857-1125.

MARCH

March 13-16, 1997
39th Annual Maize Genetics Conference
Clearwater Beach, Florida
For a Registration Packet contact: Paul Sisco, USDA/ARS, Dept. of Crop Science, 1238 Williams Hall, Box 7620, North Carolina State University, Raleigh, NC 27695-7620; telephone 919-515-3309, fax 919-515-7959, e-mail sisco@ncsu.edu.

March 17-21, 1997
Recombinant DNA Techniques Course
Rutgers University
New Brunswick, New Jersey
Contact: Dr. Gina-lee Toaldo, Office of Continuing Professional Education, Rutgers University-Cook College, P.O. Box 231, New Brunswick, NJ 08903-0231; telephone 908-932-9271.

March 21-26, 1997
Information Processing Systems in Plants: Their Evolution and Function
University of California, Davis
Contact: Dr. Bill Lucas, Section of Plant Biology, University of California, Davis, CA 95616 USA; fax 916-7525410, e-mail wjlucas@ucdavis.edu.

APRIL

April 1-5, 1997
The Fourth International Symposium: Responses of Plant Metabolism to Air Pollution and Global Change
Badhotel 't Zuiderduin
Egmond aan Zee, The Netherlands
For more information and applications contact: Luit J. De Kok or Ineke Stulen, Department of Plant Biology, University of Groningen, P.O. Box 14, 9750 AA Haren, The Netherlands; telephone 31 503632277/2373/2281, fax 31 503632273, e-mail l.j.de.kok@biol.rug.nl or e-mail g.stulen@biol.rug.nl.

April 6-11, 1997
Keystone Conference
Metabolic Engineering in Transgenic Plants
Copper Mountain, Colorado
Organizers: Richard A. Dixon, Charles J. Arntzen. Contact: Keystone Symposia, Drawer 1630, Silverthorne, CO 80498; telephone 800-235-0685 or 970-262-1230, fax 970-262-1525; e-mail keystone@symposia.com.

April 7-8, 1997
Metals & Genes Symposium
Canterbury, United Kingdom
Contact: Professor Nigel J. Robinson, Biochemistry and Genetics, Medical School, Newcastle University, Newcastle, NE2 4HH, UK; fax +44 191 222 7424, e-mail n.j.robinson@newcastle.ac.uk or Dr. Andy P.Morby, Biochemistry, University of Wales, Cardiff, CF1 3AX, UK; fax +44 1222 874116, e-mail morby@cardiff.ac.uk.

April 14-19, 1997
9th International Congress on Isozymes, Genes, and Gene Families
San Antonio, Texas
Contact: Ms. Daphne Wright, Congress Liaison, Southwest Foundation for Biomedical Research, P.O. Box 28147, San Antonio, TX 78228-0147; fax 210-670-3337, e-mail isozyme@darwin.sfbr.org.

April 16-19, 1997
Sixteenth Annual Missouri Symposium
Signs and Roadways: Protein Traffic and the Cytoskeleton
University of Missouri, Columbia
Contact: IPG Symposium - 1997, Attn: Registration, University of Missouri-Columbia, 117 Schweitzer Hall, Columbia, MO 65211; telephone 573-882-7796, fax 573-882-5635, e-mail Whitney Keller at whitney_j._keller@muccmail.missouri.edu..

MAY

May 4-9, 1997
International Conference on Nitrogen Assimilation: Molecular and Genetic Aspects
Tampa, Florida
Contact: Nitrogen Assimilation Meeting, University of South Florida, College of Medicine, Department of Biochemistry and Molecular Biology, 12901 Bruce B. Downs Boulevard, Tampa, FL 33612; telephone 813-974-3393, fax 813-974 5798, e-mail acannons@com1.med.usf.edu.

May 20-27, 1997
Short Course: Microinjection Techniques in Cell Biology
Marine Biological Laboratory
Woods Hole, Massachusetts
Application deadline March 11, 1997. Contact: Carol Hamel, Admissions Coordinator, Marine Biological Laboratory, 7 MBL Street, Woods Hole, MA 02543-1015; telephone 508-289-7401, e-mail admissions@mbl.edu, World Wide Web site http://www.mbl.edu.

May 20-June 1, 1997
Eighth NATO Advanced Study Institute Course: Cellular Integration of Signaling Pathways in Plant Development
Maratea, Italy
Pending NATO approval. Organizers: Natasha Raikhel, Michigan State University, East Lansing, Michigan, USA; Rob Last, Boyce Thompson Institute, Ithaca, New York, USA; Fiorella Lo Schiavo, University of Padova, Padova, Italy, and Giorgio Morelli, National Institute of Nutrition, Rome, Italy. More information available in the middle of October; contact: Rob Last, e-mail rll3@cornell.edu, or Fiorella Lo Schiavo, e-mail pmb@civ.bio.unipd.it.

May 22-24, 1997
Radical Biology: An International Symposium in Root Biology
The Pennsylvania State University, University Park
Contact: Dr. Hector E. Flores, The Pennsylvania State University, 315 Wartik Laboratory, University Park, PA 16802; telephone 814-865-2955, fax 814-863-7217, e-mail hector_flores@agcs.psu.edu or visit our web site at http://www.cas.psu.edu/docs/cashome/confshort/des95.html.

May 25-30, 1997
5th International Symposium on Grapevine Physiology ISHS OIV
Jerusalem, Israel
Organizer: Ben Ami Bravdo, Faculty of Agriculture, Rehovot, POB12, Israel, 76100, telephone 972 89471094, fax 972 89468263, e-mail bravdo@agri.huji.ac.il.

JUNE

June 1-3, 1997
The 9th Annual Meeting of the National Agricultural Biotechnology Council (NABC): Resource Management in Challenged Environments
University of Saskatchewan
Saskatoon, Saskatchewan, Canada
Contact: NABC, 419 Boyce Thompson Institute, Tower Road, Ithaca, New York 14853; telephone 607-254-4856, e-mail NABC@cornell.edu.

June 2-5, 1997
RNA Isolation and Analysis Course
Rutgers University
New Brunswick, New Jersey
Contact: Dr. Gina-lee Toaldo, Office of Continuing Professional Education, Rutgers University-Cook College, P.O. Box 231, New Brunswick, NJ 08903-0231; telephone 908-932-9271.

June 14-18, 1997
1997 Congress on in Vitro Biology: Cellular Mechanisms
Washington, D.C.
Contact: Tiffany McMillan, telephone 410-992-0946, fax 410-992-0949, e-mail shillitor@am.abru.cg.com, World Wide Web http://webtutor.tamu.edu/student9/cong1997.htm.

June 25-29, 1997
8th International Arabidopsis Meeting
Madison, Wisconsin
Contact: Arabidopsis, e-mail arabidopsis@biochem.wisc.edu, fax 608 262-3453.

JULY

July 12-18, 1997
'97 Seventh International Controlled Atmosphere Research Conference
Davis, California
For information contact: Ms. Pamela Moyer, Department of Pomology, University of California, Davis 95616; telephone 916-752-6941, fax 916-752-8502, e-mail pvmoyer@ucdavis.edu.

July 12-18, 1997
European Symposium on Photomorphogenesis (ESOP)
University of Leicester, Leicester, UK
Organizer: Harry Smith, Secretary: Carol Webster. To receive second circular contact: Carol Webster, Department of Botany, University of Leciester, Leicester, LE1 7RH, UK; telephone +44-116-252-3381, fax +44-116-252-2791, e-mail cw17@le.ac.uk.

July 20 - 25, 1997
International Symposium on Iron Nutrition and Interactions in Plants
Universität Hohenheim, Stuttgart, Germany
For information, contact: Dr. Volker Römheld, Institut für Pflanzenernährung, Universität Hohenheim, D 70593, Stuttgart, Germany; telephone +49 711 459 3714, fax +49 711 459 3295.

AUGUST

August 2-6, 1997
Plant Biology '97
A View from the Pacific Rim
Vancouver, BC Canada
The quadrennial annual meetings of the American Society of Plant Physiologists and The Canadian Society of Plant Physiologists. Contact: Susan Chambers, 15501 Monona Drive, Rockville, MD 20855; telephone 301-251-0560 ext. 11, fax 301-279-2996, e-mail chambers@aspp.org or on the World Wide Web see URL http://aspp.org.

August 13-15, 1997
Symposium on Seed Biology and Technology: Applications and Advances
National Seed Storage Laboratory
Fort Collins, Colorado
For information contact: http://www.ars-grin.gov/ars/NoPlains/FtCollins/SEEDBIO/ or Eric E. Roos, USDA National Seed Storage Laboratory, 1111 South Mason St., Fort Collins, CO 80521-4500, e-mail: eroos@lamar.colostate.edu, telephone 970-495-3205, fax 970-221-1427; or Greg Welbaum, Department of Horticulture, Saunders Hall, Virginia Tech Blacksburg, VA 24061-0327, telephone 540-231-5801, fax 540-231-3083.

August 25-29, 1997
5th International Congress on Amino Acids
Chalkidiki, Greece
Contact: Bijay K. Singh, American Cyanamid Company, P.O. Box 400, Princeton, NJ 08543-0400; telephone 609-716-2066, fax 609-275-5216, e-mail singhb@pt.cyanamid.com or Maria Liakopoulou-Kyriakides, Department of Chemical Engineering, Aristotle University of Thessaloniki, 54006 Thessaloniki, Greece; telephone 3031 99 6193, e-mail markyr@verginia.eng.auth.gr.

SEPTEMBER

September 7-11, 1997
International Symposium on Boron in Soils and Plants
Chiang Mai, Thailand
Contact: Dr. B. Rerlkasem, Multiple Cropping Center, Chiang Mai University, Chiang Mai, Thailand 50200; fax 66-53-210000. Please request the 2nd circular.

September 15-17, 1997
Third International Conference on Oxygen, Free radicals and Environmental Stress in Plants
Pisa, Italy
Contact: Flavia Navari-Izzo, e-mail fnavari@mailserver.agr.unipi.it; Riccardo Izzo, e-mail ricizzo@mailserver.agr.unipi.it; Mike Frank Quartacci, e-mail mfquart@mailserver.agr.unipi.it; Cristina Sgherri, e-mail csgherri@mailserver.agr.unipi.it. Istituto di Chimica agraria, Via S. Michele degli Scalzi, 2 56124 Pisa Italy; telephone +39 50 571557 or 571558,
fax +39 50 598614.

September 21-27, 1997
5th International Congress of Plant Biology
The Republic of Singapore
Organizers: Nam-Hai Chua, Rockefeller University, and Robert Haselkorn, University of Chicago. Contact: Congress Secretary, ISPMB, Department of Biochemistry & Molecular Biology, University of Georgia, Athens, GA 30602-7229; fax 1 706 542 2090, e-mail ldure@uga.cc.uga.edu.

September 29-October 3, 1997
International Symposium on Biotechnology of Tropical and Subtropical Species
Brisbane, Australia
Conference convenor: Dr. Rod Drew, fax 61 7 32863094, e-mail drewra@dpi.qld.gov.au For more information or to receive announcements contact: Organizers Australia, PO Box 1237, Milton Q4064, Australia; fax 617 33671471, e-mail oa@bnec.design.net.au.

Regulation of Plant Growth and Development by Light

Edited by
Winslow R. Briggs, Robert L. Heath, Elaine M. Tobin

Proceedings
18th Annual Riverside Symposium in Plant Physiology
January 18-20, 1996

Current Topics in Plant Physiology: An American Society of Plant Physiologists Series, Volume 17

Regulation of Plant Growth and Development by Light

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American Society of Plant Physiologists
PO Box 64209
Baltimore, MD 21264-4209 USA

Proposal/Suggestion for Mini-Symposium or Workshop
Plant Biology '97
1997 Annual Meeting, August 2 - August 6, Vancouver, British Columbia, Canada

The Program Committee for the 1997 ASPP/CSPP annual meeting (August 2 - August 6 in Vancouver, British Columbia, Canada) solicits and welcomes any ideas, suggestions, proposals, volunteer organizers for mini-symposia and workshops to be offered at that meeting or future meetings. Please complete the form below.

Name _____

Department/Institution _____

Address _____

State/Country _____ Zip _____ Telephone _____ Fax _____ E-Mail _____

Proposed topic/title: _____

_____

Brief summary of presentation (including objective, breadth of appeal, timeliness): _____

_____

_____

_____

_____

Potential presenters/expertise for topic (3 or 4 for a mini-symposium): _____

1. _____

2. _____

3. _____

4. _____

Please submit suggestions for potential future symposia: _____

1. _____

2. _____

3. _____

If necessary to provide complete information, add no more than one sheet to this form. Mail, fax, or e-mail to

Program Committee
c/o ASPP Headquarters
15501 Monona Drive
Rockville, MD 20855-2768 USA
Fax 301-279-2996 • E-Mail chambers@aspp.org • Telephone 301-251-0560, ext. 11

ASPP Placement Service

This form may be used only by members of the American Society of Plant Physiologists.
Please print or type your placement information on this form (curriculum vitae will not be accepted) and send it to:
Estella Coley, ASPP headquarters, 15501 Monona Drive, Rockville, MD 20855-2768

LAST NAME _____ TITLE _____ FIRST NAME _____ INITIAL _____

STREET ADDRESS _____

CITY _____ STATE _____ ZIP _____ COUNTRY _____

TELEPHONE _____ FAX _____ E-MAIL _____

I am seeking the following position (check all that apply):

[ ] Permanent [ ] Temporary [ ] Postdoctoral [ ] Industrial
[ ] Academic [ ] Government [ ] USA only [ ] Outside USA

US citizen? [ ] Yes [ ] No **Date available:** _____

Fields of interest, specialities, and publications titles: _____

Thesis, dissertation topics, professor: _____

Professional societies and honors: _____

Degree/year	Major	Minor	College/University and its location

Postdoctoral study (specialty and with whom, where, when): _____

Employer and location	From	To	Position, Title, Duties

References (names, addresses, telephone numbers):

ASPP Job Placement Service

I. Registering with the ASPP Placement Service and Obtaining Placement Files

ASPP headquarters in Rockville, MD, operates a placement service in which are kept active two files of résumés of individuals who are seeking employment. Employers are urged to survey the résumé files for those seeking permanent positions and those seeking postdoctoral or similar positions. The files cost $25 each and may be ordered from Ms. Estella Coley, ASPP Placement Service, 15501 Monona Drive, Rockville, MD 20855-2768 USA. Those seeking employment should complete the Placement Service Form on the facing page to be included in the service.

II. Placing a Position Ad in ASPP News and on the ASPP World Wide Web Homepage

- POSTDOCTORAL, GRADUATE ASSISTANTSHIP, AND TECHNICIAN POSITIONS (academic and government installations): Limited to 100 words; no charge; ad will run in one issue of ASPP News.
- TENURE-TRACK OR EQUIVALENT POSITIONS (academic and government installations): Limited to 200 words; price is $150; ad will run in one issue of ASPP News.
- ALL PRIVATE COMPANY POSITIONS: Limited to 200 words; price is $150; ad will run in one issue of ASPP News.
- ALL ADS WILL BE AUTOMATICALLY PLACED AT NO CHARGE ON ASPP'S WORLD WIDE WEB HOMEPAGE (http://aspp.org/JOBS); list of job ads updated each Friday; ads will run on the homepage for twelve weeks from posting date unless we are notified to delete before that time.

GRADUATE FELLOWSHIP ANNOUNCEMENTS: Announcements of programs and fellowships or traineeships for students seeking advanced degrees will be grouped at the end of the job placement section of ASPP News at no charge. They will run one time full length with no restrictions on length; the second time, they will include location, contact name and address, and reference to original posting. These announcements will also run on the ASPP World Wide Web Homepage at no charge for twelve weeks from the date of posting.

Submit ads by e-mail to: sbraxton@aspp.org. Alternatively, mail your copy to Sylvia J. Braxton, ASPP News, 15501 Monona Drive, Rockville, MD 20855-2768 USA. FAXED ADS ARE NOT ACCEPTED. If you submit a chargeable ad by e-mail, be certain to include complete billing information. If you mail a chargeable ad, include a purchase order or a credit card number, expiration date, and signature.

ACADEMIC/GOVERNMENT/INDUSTRY PERMAMENT POSITIONS (PH.D)

Group Director
Ohio State University, Columbus
(Received 10/22)

The Ohio State University invites applications for the position of director of Plant Molecular Biology and Biotechnology (PMBB). The PMBB group includes faculty involved in research and teaching in plant molecular biology and biotechnology at The Ohio State University; its mission centers on studies of basic molecular mechanisms in plant development, plant productivity, and plant-microbial interactions. Currently, there are 23 faculty involved in basic and applied research in PMBB on the main campus in Columbus and at the Ohio Agricultural Research and Development Center in Wooster. The director will lead efforts to recruit several additional faculty over the next three years. An attractive start-up package, competitive salary, and an excellent research laboratory suite will be provided. Applications, curriculum vitae, and the names of four references should be sent to: F. Robert Tabita, Head of the PMBB Search Committee, Office of the Dean, College of Biological Sciences, The Ohio State University, Rm. 148A BioSci, 484 West 12th Avenue, Columbus, Ohio 43210-1292. Applications will be evaluated after December 15 until the position is filled. The Ohio State University is an equal opportunity/affirmative action employer. Qualified women, minorities, Vietnam-era veterans, disabled veterans, and individuals with disabilities are encouraged to apply.

Faculty Position
Rutgers University, Newark, New Jersey
(Received 10/16)

Applications are invited for a tenure-track faculty position in genetics in the Department of Biological Sciences. Our research-oriented department is particularly interested in candidates using molecular genetic approaches to investigate problems in cellular and developmental biology. The successful candidate is expected to develop and maintain an active research program and to teach on the graduate and undergraduate levels. Applications will be reviewed beginning December 15, 1996. Send curriculum vitae and three letters of recommendation to: Dr. Edward G. Kirby, Chairman, Department of Biological Sciences, Rutgers University, 101 Warren Street, University Heights, Newark, NJ 07102. http://silk.rutgers.edu/ Rutgers University is an equal opportunity employer.

Assistant Professor
University Of California, Berkeley
(Received 10/07)

The Department of Plant and Microbial Biology and the Agricultural Experiment Station at the University California, Berkeley, has an opening for a tenure-track assistant professor position (nine-month appointment) starting July 1, 1997. Applications are invited from outstanding individuals whose research includes the area(s) of biochemistry/biotechnology, cell biology, development, or molecular genetics of algae. The successful candidate is expected to develop and teach an undergraduate course in the biology of algae, to contribute to teaching at the graduate level, and to develop a strong and independent research program. Applicants must have a Ph.D. degree and at least two years of postdoctoral experience. A curriculum vitae,

MAXIMIZE YOUR JOB PROSPECTS!
Check ASPP's World Wide Web site (http://aspp.org/JOBS/) every Friday for new job listings.
Jobs with early application deadlines are listed on the Web site, but might not appear in *ASPP News*.

a statement of current and future research interests, a statement of teaching experience and/or goals, and names of three references, should be sent by December 1, 1996, to: Chair, Algal Biology Search Committee, Department of Plant and Microbial Biology, 111 Koshland Hall, University of California Berkeley, CA 94720-3102. The University of California is an equal opportunity/ affirmative action employer.

Research Associate Scientist
Texas Tech University, Lubbock
(Received 10/11)
A full-time position is available at Texas Tech University. Applications will be taken until December 1, 1996, or when a suitable applicant is identified. The primary responsibility will be to assist the project leader in the management of the laboratory and to conduct research on molecular genetic mapping. Excellent organizational and English communication skills are essential. Candidates with Ph.D. degree and experience in molecular biology techniques are preferred. Submit a letter of interest, a complete resume, copies of college transcripts and names of three references to: Dr. Henry T. Nguyen, Professor, Plant Molecular Genetics Laboratory, Department of Plant and Soil Science, Texas Tech University, Lubbock, TX 79409-2122; telephone 806-742-1622, fax 806-742-0775, e-mail bwhtn@ttacs.ttu.edu.

Assistant Professor
Iowa State University, Ames
(Received 10/13)
Iowa State University, Department of Botany, invites applications for a tenure-track faculty position at the assistant professor level in plant physiology, cell biology or molecular biology. Applications will be accepted from individuals using molecular techniques and conducting research with plants, photosynthetic microbes, or filamentous fungi. The Botany Department has active, collaborative research groups in plant molecular biology, physiology, genetics, systematics, and ecology. In addition, there are nearly 200 plant biologists, housed in 11 different departments at Iowa State, who are involved in a variety of interdisciplinary collaborations. The successful candidate will be expected to establish a competitive research program and to contribute to graduate and undergraduate education. For further information about Iowa State University, the Botany Department, and graduate programs, see: http:// www.public.iastate.edu , or contact rodermel@iastate.edu. Candidates should send, by December 15, 1996, a curriculum vitae, statement of research and teaching interests, and selected reprints, and arrange for three letters of recommendation to be sent to: Dr. Steven Rodermel, Search Committee Chair, Department of Botany, Iowa State University, Ames, IA 50011-1020. Iowa State University is an equal opportunity/affirmative action employer. Women and members of minority groups are encouraged to apply.

Assistant Professor
Florida State University, Tallahassee
(Received 10/17)
The Department of Biological Science at Florida State University seeks applications for a tenure track faculty appointment. We are seeking a person of outstanding promise who uses molecular and genetic approaches to investigate fundamental problems in plant biology. The successful candidate will join several new faculty representing the department's expanding presence in cellular/molecular biology. Opportunities include competitive salary and startup funds and well-equipped departmental core facilities. Responsibilities include development of an extramurally funded research program and instruction at the undergraduate and graduate levels in a broad-based biology department. Send curriculum vitae, research plan, and three letters of recommendation to: Dr. George W. Bates, Search Committee Chair, Department of Biological Science, Florida State University, Tallahassee, FL 32306-3015. Applications will be reviewed after December 12, 1996. Visit http://www.fsu.edu/ biology for more information. Florida State University is an affirmative-action, equal-opportunity employer.

Faculty Position
Purdue University, West Lafayette, Indiana
(Received 10/24)
Applications are invited for a tenure-track faculty position in the Department of Biochemistry at the rank of assistant professor. Candidates with excellent training and accomplishments at the postdoctoral level in eukaryotic molecular biology will be considered. We are seeking an exceptional candidate who employs innovative approaches to investigate fundamental problems in plant biochemistry and molecular biology. The successful candidate will be an active participant in the teaching programs of the department, which include undergraduate, graduate, and medical curricula. A significant part of the evaluation of faculty candidates will be the perceived effectiveness of the candidate as a teacher. Competitive start up funds and excellent laboratory space will be provided. University-wide support facilities include antibody production, peptide and DNA synthesis and sequencing, mass spectrometry, macromolecular NMR analyses, and the computing center. Curriculum vitae, the names and addresses of three individuals who can supply letters of reference, and a two-page summary of research interests are required for an application. The screening of applications will commence immediately and will continue until the position is filled. Contact: Biochemistry Search Committee, Department of Biochemistry, Purdue University, West Lafayette, IN 47907-1153. Purdue University is an affirmative action/ equal opportunity employer.

Assistant Professor
North Carolina State University, Raleigh
(Received 10/30)
The Department of Botany, North Carolina State University, invites applications for a 12-month tenure-track position as assistant professor, available July 1, 1997. We are seeking an individual to establish an innovative, competitively funded research program in vascular plant systematics, with complementary teaching activities. Responsibilities will include supervision of graduate students and academic advising of undergraduates. The incumbent will also be responsible for curating the NCSU Herbarium. Excellent interpersonal and communication skills and the ability to participate in interdisciplinary research are required. Postdoctoral experience is preferred. Send résumé, statements of teaching and research interests, and three letters of recommendation to: W. F. Thompson and T. R. Wentworth, Co-Chairs, Plant Systematist Search Committee, Department of Botany, Box 7612, North Carolina State University, Raleigh, NC 27695-7612. Applications received prior to January 1, 1997, will be assured of full consideration. North Carolina State University is an affirmative action/equal opportunity employer.

Assistant Cooperative Extension Specialist/ Weed Ecologist
University of California, Davis
(Received 09/20)
This 11-month, career-track extension (70%), experiment station (30%) position will be located at the USDA/UC Research Center in Salinas but is an integral part of the UC Davis Department of Vegetable Crops. Appointee will develop/implement an extension and applied research program in vegetation management using ecologically sound approaches, emphasizing horticultural and vegetable cropping systems in the California Coastal Valleys. Appointee will provide statewide extension leadership, interact with numerous clientele groups, provide farm advisor training/advising. Appointee will participate in departmental teaching and in directing undergraduate and graduate research. Requirements: a Ph.D. in weed science, horticulture, agronomy, crop ecology, plant physiology, or related discipline; demonstrated ability/experience

in irrigated agricultural production systems; understanding of weed research and extension; and record of scholarly achievement. Send curriculum vitae, statement of extension and research interests, documentation of extension, research, and teaching experience, official transcripts if within 5 years of graduation, and names and addresses of at least three professional references by December 1, 1996 to: Dr. W. Thomas Lanini, Search Committee Chair, Department of Vegetable Crops, Weed Science Program, University of California, Davis, CA 95616; telephone 916-752-4476, fa x916-752-4604. For additional information, see the departmental homepage at http://veghome.ucdavis.edu.

POSTDOCTORAL POSITIONS

Postdoctoral Position
University of Wyoming, Laramie
(Received 09/06)

A postoctoral position is available to study aspects of phostosynthesis within leaves. We are interested in the interactions among leaf anatomy, cellular and chloroplast metabolism, and light. The position will involve measuring PAR inside leaves (in collaboration with Dr. Thomas C. Vogelmann); measuring electron transport and O2 evolution in paradermal leaf sections; quantification of various polypeptides including electron transport components across leaves; and related activities. A person with experience in photosynthesis, plant biochemistry, and/or molecular genetic techniques will receive high consideration. Please send letter of interest, curriculum vitae, and list of at least three references with address, phone number, and e-mail address to: John N. Nishio, Department of Botany, University of Wyoming, Laramie, WY 82071-3165; telephone 307-766-4967, e-mail nishio@uwyo.edu.

Postdoctoral Position
University of California, Los Angeles
(Received 09/16)

A two-year postdoctoral position is available for a recent Ph.D. with a strong background in biochemistry and molecular biology. The position is available now and will remain open until a suitable candidate is identified. The successful applicant will study the molecular and biochemical basis for subcellular calcification in a marine coccolithophorid. Salary and benefits are competitive for the Los Angeles area. Please send a cover letter which includes a brief statement of career goals and a curriculum vitae, and arrange for three letters of reference to be sent to: Professor Elma Gonzalez, Department of Biology, UCLA, Los Angeles, CA 90095-1606; fax 310-206-3987, e-mail gonzalez@biology.lifesci.ucla.edu.

Postdoctoral Position
The Pennsylvania State University, University Park
(Received 09/25)

A position is available immediately to study the role of nitrogen in ozone-induced accelerated foliar senescence in hybrid poplar. Emphasis will be placed on mechanism by which protein degradation products contribute to signaling events leading to compensatory responses elsewhere in the canopy. Candidates should have a familiarity with tree physiology and biochemistry. Background in molecular biology is desirable. Send curriculum vitae, transcripts, and names, addresses, e-mail addresses, and telephone numbers of three references to: Eva Pell, 210 Buckhout Laboratory, The Pennsylvania State University, University Park, PA 16802; telephone 814 865-0323, e-mail ejp@psu.edu . An affirmative action/equal opportunity employer. Women and minorities are encouraged to apply.

Postdoctoral Position
University of Florida, Lake Alfred
(Received 10/04)

The study will focus on N transformation, mineralization, N uptake and partitioning within tree, denitrification, and leaching losses of N. The candidate must have a good background in soil chemistry, soil physics, plant physiology, environmental chemistry, solute transport, dynamics of N in soils including 15 N studies, and application of computer models to study leaching losses. Experience in tree crop nutrition and N budgeting is preferred. The position is availabe immediately for a year's appointment likely to be renewed subject to availability of funding. Contact: A. K. Alva, University of Florida, Citrus Research and Education Center, Lake Alfred, FL 33850; telephone 813-956-1151, fax 813-956-4631, e-mail aka@gnv.ifas.ufl.edu.

Postdoctoral Position
USDA-ARS, Lubbock, Texas
(Received 10/15)

A postdoctoral position is available to investigate the genetic basis of aquired thermotolerance in Arabidopsis thaliana. Studies will include mapping of mutants and the production of transgenic plants expressing antisense heat shock constructs. Knowledge of Arabidopsis genetics and the ability to perform genetic analyses is required. Experience with molecular biology is preffered. Send a cover letter describing research experience, a curriculum vitae, and a list of the names and addresses of three references to: Dr. John Burke, USDA-ARS, Route 3, Box 215, Lubbock TX 79401; telephone 806-746-5353, fax 806-744-4402, e-mail jburke@mail.csrl.ars.usda.gov.

Postdoctoral Positions
Texas A & M University, College Station
(Received 10/15)

Available immediately to study plant-virus interactions that occur during virus replication, cell-to-cell movement, long distance spread, and associated symptoms or resistance responses. Projects are available to work with the following model systems: tomato bushy stunt virus in spinach, panicum mosaic virus (PMV) in millet, and the role of PMV associated satellite viruses and satellite RNAs. Experience in molecular biology required, preferably in plant virology. Please send curriculum vitae and list with three references to: Dr. Herman B. Scholthof, Department of Plant Pathology and Microbiology, Texas A&M University, College Station, TX 77843; telephone 409-862-1495, fax 409-845-6483, e-mail kbgs@acs.tamu.edu.

Postdoctoral Research Positions
USDA, ARS, New Orleans, Louisiana
(Received 10/16)

Two postdoctoral research positions are available immediately for two-year projects to characterize the expression of developmentally regulated genes during cotton fiber development. Candidates should be experienced in DNA sequencing, northern and/or ribonuclease protection assays. Salary will start at the GS-11 level ($34,295) and will include health and life insurance benefits. To apply for a position, send a résumé including the names of three references before December 1, 1996, to Dr. Barbara Triplett, USDA-ARS-Southern Regional Research Center, P.O. Box 19687, New Orleans, Louisiana 70179; telephone 504-286-4275, fax 504-286-4419, e-mail btriplet@nola.srrc.usda.gov. The USDA-ARS is an affirmative action/equal opportunity employer.

Postdoctoral Position
Agricultural Research Service, USDA Albany, California
(Received 10/17)

GS-11 ($38,119, plus benefits) position to work on wheat molecular biology and transformation. Candidate to join a project working to bioengineer wheat fungal resistance and to improve wheat transformation technology. Candidates must have strong background in molecular biology and plant tissue culture experience is desired. Position is currently funded for one year with anticipated extension for additional 1-3 years. Must be U.S. citizen or resident in U.S. and citizen of treaty nation. Send letter and curriculum vitae to Dr. Olin D. Anderson, WRRC, ARS, USDA, 800 Buchanan Street, Albany, CA 94710; telephone 510-559-5773, e-mail oandersn@pw.usda.gov. Position to be filled

and begin as soon as selection is made and candidate can report. Minorities are encouraged to apply. The USDA is an equal opportunity employment employer.

Postdoctoral Position
Texas A&M University, College Station
(Received 10/18)
A postdoctoral position is available to study the function and regulation of genes involved in xylem development in forest trees (pine and poplar). Experience in molecular biology is required. Experience in protein purification and characterization is desirable. Please send a statement of research interests, curriculum vitae, and the names addresses, and fax and telephone numbers of three references to: Dr. Carol Loopstra, Crop Biotechnology Center, Texas A&M University, College Station, TX 77843-2123; e-mail loopstra@rsgis4.tamu.edu. The Texas A&M University system is an equal opportunity employer.

Postdoctoral Fellow
New Mexico State University, Las Cruces
(Received 10/28)
NMSU is seeking candidates for a postdoctoral fellow (12 month appointment) in the Plant Genetic Engineering Laboratory. Ph.D. is required in plant biochemistry/molecular biology. Full time position is contingent upon funding. Salary is commensurate with qualifications and experience. Applications must be received by November 11, 1996, or until a suitable candidate is found. Send letter of application, unofficial transcripts, and résumé with list of three references to: Dr. John Kemp, Director, Plant Genetic Engineering Laboratory, Box 30003, Dept. 3GL, New Mexico State University, Las Cruces, NM 88003. NMSU is an EEO/AA employer.

Postdoctoral Position
North Carolina State University, Raleigh
(Received 10/28)
A postdoctoral position is available immediately to work on genetic transformation of turfgrass species. A strong background in plant tissue culture and transformation is essential. Experience in monocot transformation and/or molecular techniques will be an extra. Send curriculum vitae and names, addresses and phone numbers of three references to: Dr. Rongda Qu, Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7620; telephone 919-515-7616, fax 919-515-7959.

Research Positions
ExSeed Genetics, Ames, Iowa
(Received 10/31)
Postdoctoral and/or research assistant (MS) positions are immediately available to study biochemistry and molecular biology of starch synthesis. We have an especial interest in building upon considerable investments in starch biotechnology to manipulate starch quality and quantity in grains through metabolic engineering. Candidates must have at least two years direct research experience and a good training in protein purification, enzymology and molecular biology. Expertise in screening and characterizing transgenic plants and knowledge in starch structure analysis are highly desirable. ExSeed will offer a competitive salary, with company benefits and a challenging research environment. Please forward two copies of your applications and full curriculum vitae to: Dr. Hanping Guan and Dr. Peter Keeling, ExSeed Genetics, Food Science Building, Ames, Iowa 50011-1061. Deadline for application is January 15, 1997. Web site: http://www.exseed.com.

Postdoctoral Position
University of Berne, Switzerland
(Received 11/01)
Three-year postdoctoral position with possible three year renewal available from January 1, 1997. Research on the vegetative shoot apical meristem (Plant Cell 5: 297; Plant J 10: 745). Limited teaching. Required: Ph.D. in cell, molecular, or developmental biology; knowledge of German, or willingness to learn. Starting salary CHF 70,000 pa. The deadline for application is December 15, 1996. Inquiries and address of application should be sent to: Professor Cris Kuhlemeier, Institute of Plant Physiology, Altenbergrain 21, CH-3013 Berne; telephone 41 31 631 4911, fax 41 31 332 2059, e-mail kuhlemeier@pfp.unibe.ch.

Postdoctoral Position
Michigan State University, East Lansing
(Received 11/01)
Postdoctoral position is available to identify and characterize nuclear and cytoplasmic ribonucleases that participate in mRNA degradation. It is expected that the initial phase of the work will involve protein purification and in vitro characterization, followed by microsequencing, cloning, and functional inactivation via molecular genetic approaches in Arabidopsis. This project will interface with other efforts to elucidate mRNA decay mechanisms (see http://www.bch.msu.edu/pamgreen/green.htm). Candidates with a strong background in biochemistry are encouraged to send a curriculum vitae, reprints, and the names of three references by December 10, 1996, to: Dr. Pam Green, Plant Research Laboratory, Michigan State University, East Lansing, MI 48824-1312; e-mail 22313pjg@ibm.cl.msu.edu. MSU is an AA/EO Employer.

Postdoctoral Position
University of California, Albany
(Received 11/01)
A postdoctoral position is available to investigate the function of plant homeodomain proteins. The objective of this work will be to isolate potential targets of a family of transcription factors and determine if they are directly related by kn1. Experience in maize genetics and molecular biology is essential. Knowledge of plant transformation is preferred. Send curriculum vitae and names of three referees, by January 15, 1997, to: Dr. Sarah Hake, Plant Gene Expression Center, 800 Buchanan St., Albany, CA , 94710; fax 510-559-5678. The University of California is an equal opportunity/affirmative action employer.

RESEARCH/TECHNICAL POSITIONS (NON-PH.D.)

Support Scientist Position
Agricultural Research Service, USDA
Albany, California
(Received 10/17)
Position available in molecular biology laboratory. Candidates must have at least a master's degree and experience in molecular biology. Plant tissue culture experience desired. Position is classified as a Category 3 Scientist, GS-9 ($31, 505, plus benefits) with promotion potential to GS-11, and is a career permanent position. Duties include contributing to research to engineer improved wheat varieties and assumption of duties of laboratory manager under supervison of project leader. Must be a U.S. citizen. Send letter and curriculum vitae to Dr. Olin D. Anderson, WRRC, ARS, USDA, 800 Buchanan Street, Albany, CA 94710; telephone 510-559-5773, e-mail oandersn@pw.usda.gov. Position to be filled and begin as soon as selection is made and candidate can report. Minorities are encouraged to apply. The USDA is an equal opportunity employment employer.

Staff Research Associate I
Agricultural Research Service, USDA
Albany, California
(Received 10/17)
Biological laboratory technician position is available to support molecular genetic research in cereal crops. At least one year full-time practical experience required in molecular biology laboratory methods including DNA clone isolation, DNA analysis, and other techniques such as library preparation and PCR. Primary duties

include the curation of a collection of DNA clones, distribution of clones to laboratories worldwide, and development of new clones for cereal genetic mapping and gene isolation. Position is through the University of California system and is renewable yearly. Salary $27,000, plus benefits. No U.S. citizenship requirement but must be U.S. resident. Send letter and curriculum vitae to Dr. Olin D. Anderson, WRRC, ARS, USDA, 800 Buchanan Street, Albany, CA 94710; telephone 510-559-5773, e-mail oandersn@pw.usda.gov. Position to be filled and begin as soon as selection is made and candidate can report. Minorities are encouraged to apply. The USDA is an equal opportunity employment employer.

Computer Specialist Position
Agricultural Research Service, USDA
Albany, California
(Received 10/17)
Assemble and curate genetic, molecular, and other cereal crop data. Position involves data assembly, formatting, and analysis, and contributing to database and network access/presentation. Knowledge and experience with Unix and networking concepts. Familiarity with associated software tools and capabilities: i.e., perl, emacs, sed, gopher, http file serving, etc. Familiarity with personal computers and software. Basic knowledge of genetics and molecular biology. More extensive knowledge of biology can substitute to some extent for computer experience. Position is renewable yearly. Salary $32,000, plus benefits. No U.S. citizenship requirement. Send letter and curriculum vitae to Dr. Olin D. Anderson, WRRC, ARS, USDA, 800 Buchanan Street, Albany, CA 94710; telephone 510-559-5773, e-mail oandersn@pw.usda.gov. Minorities are encouraged to apply. The USDA is an equal opportunity employment employer.

Facility Manager
Northern Illinois University, DeKalb
(Received 10/22)
The Plant Molecular Biology Center of Northern Illinois University is seeking an individual to run a core facility providing automated DNA sequencing and custom oligonucleotide synthesis. Minimal requirements: B.S. (M.S. preferred) in biological sciences or related field, and appropriate laboratory skills and experience. Competitive salary, commensurate with experience; full benefits. Send letter of interest, current curriculum vitae, and three letters of reference to: Director, Plant Molecular Biology Center, Northern Illinois University, DeKalb IL 60115; telephone 815-753-7841, fax 815-753-7855, e-mail pmbc@niu.edu. Position available immediately. Application deadline, November 27, 1996. AA/EEO

FELLOWSHIPS, TRAINEESHIPS, GRADUATE ASSISTANTSHIPS, AND ETC.

Graduate Research Assistantships
University of Florida, Gainesville
(Received 10/03)
Research assistantships, with competitive stipends and tuition waivers, are available through the University of Florida Interdepartmental Program in Plant Molecular and Cellular Biology (PMCB). Faculty in the PMCB program are affiliated with the Departments of Agronomy, Botany, Environmental Horticulture, Forestry, Horticultural Sciences, Microbiology and Cell Science, and Plant Pathology. Entering Ph.D. students participate in a 6-9 month rotation program closely interacting with 3-6 different faculty laboratories. Assistantships without a rotation may also be available through direct application to individual PMCB faculty members working in your desired area of interest. Faculty research interests include plant biochemistry, genome organization and mapping; chromatin structure; gene structure and regulation; responses to environmental stress; organelle genetics and biogenesis; developmental genetics; cell culture, regeneration and transformation; molecular physiology, metabolic engineering, and plant-microbe interactions. For a complete information packet, including a listing of faculty and their research interests, please contact Dr. Robert R. Schmidt, Graduate Coordinator, PMCB Program, Microbiology and Cell Science Department, P.O.Box 110700, University of Florida, Gainesville, FL 32611-0700; telephone 352-392-0237, fax 352-392-5922, e-mail pmcb@gnv.ifas.ufl.edu; or visit our web site at http://www.ifas.ufl.edu /~PMCB/.

Graduate Assistantships
Purdue University, West Lafayette, Indiana
(Received 10/11)
Purdue University announces outstanding opportunities for graduate study in the Interdisciplinary Plant Biology Program. Research and teaching assistantships are available to qualified students working toward the Ph.D. degree in plant biology. These assistantships carry a stipend of $1,250 per month or $15,000 per year and include waiver of in-state and out-of-state tuition. Graduate assistants receive full medical coverage at a nominal cost. Our program brings together over 40 nationally and internationally renowned plant scientists from seven academic departments, providing students diverse educational opportunities. Students in the plant biology program specialize in: (1) plant biochemistry and molecular biology; (2) plant physiology; (3) plant cell and developmental biology; or (4) plant ecology, evolution, and systematics. Incoming students rotate among three or more laboratories during the first year of study before choosing a major professor. For further information and application materials write: Dr. William R. Woodson, Program Director, 1165 Horticulture Building, Purdue University, West Lafayette, IN 47907-1165, or e-mail wrw@hort.purdue.edu.

Graduate Research Assistantships
Pennsylvania State University
University Park
(Received 10/16)
Graduate research assistantships (Ph.D.) available in (1) root architecture and nutrient efficiency in crops, emphasizing genetic and computer modeling approaches, and (2) responses of root cells to mineral stress emphasizing quantitative fluorescent microscopy. Contact: Dr. Jonathan Lynch, Department of Horticulture, Pennsylvania State University, University Park, PA 16802; telephone 814-863-2256, e-mail jonathan_lynch@agcs.cas.psu.edu. Penn State is an affirmative action/equal opportunity employer, women and minorities are encouraged to apply.

NSF Graduate Research Training Program
Arizona State University, Tempe
(Received 10/21)
Arizona State University's Graduate Research Training Program supported by the National Science Foundation offers excellent integrated, multidisciplinary training on molecular aspects of energy transduction. Participating are: the Graduate Program in Molecular and Cellular Biology, Center for the Study of Early Events in Photosynthesis, and Departments of Chemistry & Biochemistry and Botany. Research areas include: structure and function of photosynthetic reaction centers, synthetic reaction center models, plant molecular biology, cell growth and development, mechanisms of biogenesis of organelles, expression of photosynthetically important genes, and environmental factors affecting photosynthetic productivity. Interaction between laboratories and "brainstorming" sessions to stimulate critical scientific thinking are integral parts of the program. The departments are exceptionally well equipped with laser spectrometers, fluorescence equipment, and laboratories for protein and nucleic acid chemistry. Facilities are available for NMR spectroscopy, molecular modeling, electron microscopy, and plant growth. Each student is provided a combination of research and teaching assistantships for four years. Annual financial support is $16,800. Out-of-state and in-state tuition are waived. Applicants must be U.S. citizens or permanent residents.

Women and minorities are encouraged to apply. Send requests for information and application forms to: Larry Orr, Coordinator, Graduate Research Training Grant Program, Arizona State University, P.O. Box 871604, Tempe, Arizona 85287-1604; telephone 602-965-1963, fax 602-965-2747; e-mail larry.orr@asu.edu; URL http://photoscience.la.asu.edu/photosyn/grt.html

Undergraduate Summer Research Fellowships in Root Biology
The Pennsylvania State University, University Park
(Received 10/25)

Our program is funded by the National Science Foundation and is a unit of the DOE/NSF/USDA Collaborative Research in Plant Biology program. The goal of our program is to train a new group of plant biologists capable of solving the unique conceptual and technical problems presented by plant roots. The undergraduate trainees will be active participants in our group effort, working directly with faculty, postdocs, and graduate students in a collaborative project of their choice. Financial support includes a $2,500 stipend and $600 for living expenses. Women and minorities are especially encouraged to apply. Applicants please submit curriculum vitae, transcripts, and three letters of recommendation to: Dr. Hector E. Flores, Plant Pathology Department, The Pennsylvania State University, 315 Wartik Laboratory, University Park, PA 16802; telephone 814-865-2955, fax 814-863-7217, e-mail hector_flores@agcs.psu.edu. Available to U.S. citizens and residents only. Deadline for Summer Research Traineeship application: February 28, 1997.

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