ASPB News

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Inside This Issue

President's Letter

Time to Vote Again!

Voting for the elected leadership positions in our Society is a process of vital importance, and I hope all of you will participate. This year we will be voting for president-elect, secretary, elected member, and corresponding member.

Rick Amasino

It is easy to receive the ballot or e-mail, intend to get back to it, and then neglect to do so. More than once in the several decades I have been an ASPB member, I have been guilty of forgetting to vote. In the past few years, the technique I have used to ensure that I do not forget to vote is to complete and return the ballot as soon as I see it—I do not set it aside or let it be buried in the e-mail "pile" that I intend to answer later.

The voting process is simple. On April 6 the ballot will be posted on the voting web page (www.aspb.org/voting) and mailed to those members who have requested paper ballots. Some find it difficult to choose between two people they do not know. To help you learn more about the candidates, the ballot and web page provide information about and statements from each candidate.

It is clear in many ways—for example, two high-quality journals that depend on membership participation and a great annual meeting—that we have a strong and vibrant Society. Please help to make a high level of voter participation this year yet another sign of the vibrant nature of our Society.

Richard Amasino
amasino@biochem.wisc.edu

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ASPB Officers & Staff

ASPB News

Headquarters Office
15501 Monona Drive
Rockville, MD 20855-2768 USA
Phone: 301-251-0560
Fax: 301-279-2996

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Contact: Nancy A. Winchester, Editor, *ASPB News,* 15501 Monona Drive, Rockville, MD 20855-2768 USA; nancyw@aspb.org; 301-251-0560, ext. 117.

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	K0126-10-ASPB	10 g	$59.00
	K0126-25-ASPB	25 g	$103.00
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	R0146-25-ASPB	25 g	$319.00
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	T0190-10-ASPB	10 g	$176.00
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GOLD BioTechnology, Inc.
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Plant Biology & Botany
2007 JOINT CONGRESS

WOW! Chicago...

Chicagoans will be the first to tell you that the Windy City is one of the world's most cosmopolitan metropolitan areas and a premier global location—yet it has a great hometown feeling. And this summer it will be the site of a historic event when it hosts the annual meeting of four professional scientific societies.

From July 7 to 11, 2007, more than 2,000 plant scientists will gather at the Chicago Hilton Hotel. Members of the American Fern Society, American Society of Plant Biologists, American Society of Plant Taxonomists, and Botanical Society of America will cohost their annual meetings, offering attendees more networking across disciplines, more workshops, more symposia, and plenty of breakthrough science.

Top 10 Reasons to Visit Chicago

1. Chicago's magnificent architecture—take a tour.
2. The blues at Buddy Guy's Legends (one block from the Hilton, our headquarters hotel).
3. Millennium Park—80,000 flower bulbs have been planted from the International Flower Bulb Center Expo.
4. The Field Museum.
5. The Shedd Aquarium.
6. The Adler Planetarium.
7. The Art Institute of Chicago.
8. The White Sox game (a tentative schedule has home games July 7 and 8)
9. An incredible diversity of restaurants in all price ranges, as well as the world-famous Taste of Chicago food festival, which will take place across the street from our hotel.
10. Plant Biology & Botany Joint Congress 2007!

Thanks to Pat Herendeen, ASPT member and former Chicago resident, for supplying nine of the 10 reasons!

Traveling to and Around Chicago

With two major international airports—O'Hare and Midway—Chicago offers more than 3,600 flights a day, making it the most accessible destination in the United States. The flights include direct nonstops to more international and domestic destinations than any other city on the planet—46 international and 134 domestic business centers. Chicago is at the center of the U.S. interstate highway and rail systems, making it accessible from anywhere in the country.

And although Chicago is a big city, it's remarkably easy to get around. Most of the hotels, cultural institutions, shopping, dining, and entertainment are concentrated in a relatively small area. Everything can easily be reached by walking, public transportation, or short cab rides. In addition, the city's rapid transit system provides quick, safe rail service to downtown from both O'Hare and Midway airports.

Airfare Discounts

ASPB has negotiated discounts with United Airlines. Call 1-800-521-4041 and reference Meeting ID 565HS. Note: Not all flights will have discounts available.

Other Chicago Attendee Perks

The Field Museum is providing free admission to all conference attendees (with conference badge) from Monday, July 9, to Wednesday, July 11. http://www.fieldmuseum.org/

Visit Roger Hangarter's s*L*owlife Exhibit at the Chicago Botanic Garden. http://www.chicagobotanic.org/pr/press06/slowlife.html

The Hilton Chicago

The Hilton Chicago is a landmark downtown property located on the Michigan Avenue Cultural Mile. It overlooks Grant Park and Lake Michigan.

ASPB Preferred Rates

Single room: $149 per night
Double room: $169 per night
Triple room: $189 per night
Quad room: $209 per night

If you would like to find a roommate, contact our housing manager at jointcongresshousing@conferencemanagers.com.

About the Program

The schedule of the Joint Congress will combine scientific sessions and events from all four societies. Attendees will be able to participate in all events. This is a unique opportunity for ASPB attendees to participate in events offered by the other societies and to share plant science in many research areas.

The meeting will feature special joint sessions, mini- and major symposia, workshops, exhibits, and poster sessions, as well as field trips and educational forums for researchers and educators who wish to make their science accessible for students at all levels.

Some Highlights

Undergraduate Networking Poster Session (Saturday afternoon)
Undergraduate attendees are encouraged to display their posters. Students will be free to mingle with each other, society leaders, and other meeting participants to share their research, network, and learn how to get the most out of the meeting. After this event, students may take their posters to the main poster area marked for undergraduate posters.

Education Forum (Saturday)
ASPB members are invited to participate in the annual Education Forum that BSA organizes each year as part of its annual meeting.

Perspectives of Science Leaders
(Saturday evening)
Jim Collins, associate director for biology at the National Science Foudation, will present.

Career Workshops I & II (Saturday evening)
This year's Workshop I *(Where Are the Jobs?)* will feature career opportunities outside academia. Meanwhile, Workshop II *(Getting the Most Out of Your Postdoc Experience)* will offer perspectives on finding the "right" postdoc position and using it to advance your career.

Small Colleges/PUI Networking Breakfast (Sunday morning)
This annual event brings scientists from primarily undergraduate institutions together to network, explore new opportunities, and share strategies for teaching and conducting research in plant biology.

Minority Affairs Committee–Sponsored Symposium (Sunday afternoon)
Entitled *Plants and Human Nutrition,* this year's MAC symposium will feature a series of presentations by speakers from diverse backgrounds on the ways in which we use plants for food.

Botany Plenary Speaker (Sunday evening)
Judge John E. Jones III presided in 2005 over the landmark case of *Kitzmiller v. Dover School District.* He held that it was unconstitutional to teach Intelligent Design within a public school science curriculum.

All-Society Opening Mixer
(Sunday evening)
Open to all meeting registrants, this welcoming event in the Exhibit Hall is a perfect way to reconnect with old friends, meet new people, and network with other meeting participants.

USDA Reception
All employees of the U.S. Department of Agriculture are invited to attend this annual reception. Enjoy the opportunity to share a beverage and mingle with this diverse group.

Digital Art Workshops
In this age of electronic content, submitting and publishing papers has never been faster or more convenient. However, constantly changing information, software, and file formats make the preparation of digital images challenging. Three workshops—one by BSA and two by ASPB—will be held this year.

Women in Plant Biology Committee–Sponsored Speaker and Luncheon
(Monday afternoon)
Speaker: Jo Handelsman
The Women Don't Need Fixing: The Role of Institutions in Advancing the Participation of Women in Science

Exclusive Poster and Exhibit Sessions
(Monday evening, Tuesday afternoon)
Visit exhibitors and view posters while enjoying snacks and beverages during these exclusive sessions.

Field Trips
(Saturday, Sunday, and Thursday, July 12)
Exciting outings are planned to showcase the plant science offerings of Chicago and the northern Illinois area.

Plant Biology 2007 Major Symposia and Speakers

(as of March 15, 2007)

Plant Biology in Africa
Organizer:
Debby Delmer, *University of California, Davis*
Speakers:
Mande Semon, *The Evolutionary History of the African Rice* Oryza glaberrima
Cosmos Magorokosho, *Diversity and Origins of African Maizes*
James Ogwang, *Recent Advances in Biological Control in Uganda*
Dionne Shepherd and Betty Owor, *Diversity of Maize Streak Virus and Transgenic Resistance to MSV in Maize*

Manipulation of Host Signaling by Pathogens
Organizer:
Barbara Kunkel, *Washington University*
Speakers:
Shauna Somerville, *Carnegie Institution*
Eric L. Davis, *North Carolina State University*
Sheng Yang He, *Michigan State University*

Evolutionary Development
Michael Zanis, *Purdue University*

Charles Albert Shull & Stephen Hales Prize Awardee Symposium
Xuemei Chen, *University of California, Riverside*
Ken Keegstra, *Michigan State University*

ASPB President's Symposium
Organizer:
Rick Amasino, *University of Wisconsin*
Speakers:
Kirsten Bomblies—*When Good Genes Behave Badly: Hybrid Incompatibility in* Arabidopsis thaliana
Kathy Barton, *The Role of HD-ZIPIII/LITTLE ZIPPER Interactions in the Establishment of Leaf Polarity*
Jorge Dubcovsky, *The Vernalization Pathway in the Temperate Cereals*
Harry Klee, *Control of Ethylene-Mediated Developmental Processes by Receptor Turnover*

There's a lot you won't want to miss at the 2007 Joint Congress. As Om Parkash Dhankher (assistant professor, University of Massachusetts, Amherst) said of Plant Biology 2006, "Here we can see that—WOW!—we are all doing great science!"

For more details and updates, see http://www.aspb.org/meetings/pb-2007/.

Postcards from Sarah

ASPB's 2005 AAAS Mass Media Fellow Sarah Nell Davidson is sending a series of "postcards" back to the ASPB News *as she spends the current academic year abroad doing research for her PhD thesis.*

Sticky rice or "Khao Niaw" is served in woven bamboo baskets that easily can be carried to the field. Photo by Isabel Dréan.

"Khao Niaw—An Artistic Look at Sticky Rice" is currently on display at Kopnoi Gallery in Luang Prabang, Laos. Photo by Simon Côté.

A Lao woman working in the paddy field. Photo by Isabel Dréan.

IRRI Researchers Collaborate with Artists to Depict Role of Sticky Rice in Lao Culture

Declared a UNESCO World Heritage Site in 1995, Luang Prabang is situated alongside the Mekong River in the foothills of Northern Laos. Well preserved architecturally and culturally, the former capital of Laos is a living museum. The pace of the town matches that of the big river that slowly flows by. Groups of saffron-robed monks walk to the town's many temples in the early morning as food market vendors set up their makeshift stalls and girls in uniform and shaded by parasols bicycle off to school. Perhaps because of war, lack of infrastructure, and the rugged terrain that surrounds the area, Luang Prabang maintains an old-Asia charm that other cities have lost to motorcycle mania and a more assiduous use of time. It is in this verdant land of Laos that glutinous rice, or *Oryza sativa var. glutinosa,* originated.

Nestled behind the city's centerpiece, Mount Phousi, sits a quaint gallery, the Kopnoi export promotion center. With support from the International Rice Research Institute (IRRI), it is home to the exhibition "*Khao Niaw*—An Artistic Look at Sticky Rice." The exhibit reflects the relationship between the Lao people and sticky rice, their single most important food item.

Gallery owners and current exhibitors Isabel Dréan and Simon Côté began looking at the societal role of sticky rice for a book project one and a half years ago. The exhibition grew out of the project last fall, when the artists put together the show in two short months before the vernissage in December.

IRRI's intellectual support helped the artists convey the agronomic aspects of rice production alongside the cultural aspects that Dréan and Côté have captured in photography and sculptures. Benjamin Samson, an agronomist at the IRRI–Lao branch in Luang Prabang, sees these types of activities as an essential part of publicly funded, science-based organizations. "The dialog serves to demystify the organization and make its products more accessible to users and builds up support for our work," Samson said. "Participation in these kinds of projects ensures that reliable information is disseminated."

Sticky rice is so integral to the diet of the Lao people that the verb *to eat* in Lao literally means *to eat sticky rice.* The Lao people have a discerning palate when it comes to eating rice. "It's just like choosing a good bottle of wine," says Dréan. "People here are very particular about the aromatic qualities of their sticky rice."

The Lao people hold close the principle "you are what you eat." "According to the Lao people, if you do not eat *khao niaw*, you are not Lao," Dréan explained. Côté and Dréan see sticky rice as a mirror that reflects the whole of Lao culture. "If you understand sticky rice, you can understand the Lao people," Dréan said.

Sticky rice is cooked in the morning and kept in woven bamboo baskets with tight-fitting tops that help to maintain the moisture and warmth of the rice throughout the day. These baskets serve as a communal source of food, with everyone eating out of the same vessel.

Rice plays a critical role in all the local festivals, and the growing season establishes the annual work calendar. Because the rice in most regions of Laos is rain fed, farmers can grow only one crop per year. The rice is planted in the wet season of June, transplanted in July, and finally harvested in October or November. The exhibit uses multiple media to depict the entire growing cycle from seed to supper table.

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The Bioethics Imperative XXVIII

Hybrids: Cases That Involve More Than One Type of Allegation

"Mokita": The truth we all know and **agree** not to talk about. *Papua New Guinea*

In recent discussions with Jim Kroll, head of administrative investigations at the Office of the Inspector General (OIG) of the National Science Foundation (NSF), I have learned how the OIG identifies and categorizes allegations of misconduct. Whereas the fictitious cases I presented in earlier articles were simple, real-world cases are not! It is not uncommon for cases to involve multiple allegations or to have new allegations arise as the case is investigated. Sometimes cases involve allegations of one or more instances of research misconduct and/or civil or criminal violations; Kroll referred to these cases as "hybrids."

This article is based on my discussions with Kroll. I offer a simple interpretation of four cases and then describe what the OIG did. Interestingly, the U.S. Attorney often does not prosecute in these types of cases but rather hands them back to the NSF to apply appropriate sanctions. In keeping with other TBI columns, the names of the investigators used in the real cases that follow are playful and utterly fictitious.

Case 1. Upset that a colleague did not "pull his weight," Dr. Bea Koncerned alleged that Ahn Break inappropriately vacationed on NSF monies rather than collecting research data. Dr. Koncerned stated that Ahn's data might be fabricated because Ahn had been at the research site for only two weeks rather than the full four weeks of data collection. Then a new problem cropped up: As a part of the investigation, a review of financial documents of this grant showed that the institution had overcharged $7,000 in indirect costs to a subawardee.

The OIG reviewed the grant documents and interviewed Dr. Break, and it dismissed the allegations of data fabrication and fraud. The data fabrication charge was deemed unfounded because Ahn Break's research notes were reasonable, albeit messy. Dr. Break had taken two weeks' vacation in southern Europe, but the leave was properly accounted for, and he returned the advanced per diem to the university. The institution also reimbursed the NSF for the $7,000 overcharge on indirect costs, which the OIG ascribed not to fraud but to incorrect calculations with no intent to deceive on the part of the institution.

Case 2. Dr. I. Takit was a peer reviewer of a proposal (the source document) that Dr. Mai Data submitted to an international funding agency. Dr. Takit later submitted a proposal to the NSF with text taken from the source document. Dr. Mai Data happened to be the peer reviewer for the NSF proposal and (naturally) identified his own work. Mai Data also noted that in the proposal, Investigator Takit claimed some of Data's scientific ideas as his own. A third party in the case, Dr. Noh Maill, never responded to the OIG's initial inquiry letter. University investigation revealed that I. Takit had removed the OIG letter from Maill's mailbox—in other words, Dr. Takit intercepted a confidential letter meant for Dr. Noh Maill.

The initial allegation of plagiarism also included misstatement of the source of original scientific ideas, which is intellectual theft. In addition, tampering with the U.S. mail is illegal. The U.S. Attorney declined to prosecute in lieu of administrative action by the NSF. I. Takit was debarred for two years and was prevented from being a peer reviewer for two years.

Case 3. During a peer review process, an allegation of plagiarism was made against Dr. Bade Tu Wurst. A review of his three most recent proposals indicated that all three were 85% plagiarized. Dr. Wurst denied the allegation of plagiarism, saying that original documents submitted to FastLane (the NSF's web site for communicating with researchers) contained all the necessary quotes. A review of the documents at the NSF proved that Wurst's claim was false. As part of the university investigation, Dr. Wurst offered his hard drive as evidence that the original documents contained proper attribution. Forensic analysis of the hard drive showed that Bade Tu Wurst had switched his hard drive and doctored the files to make them look as if they supported his claim.

In this case, the charges were plagiarism for the proposal writing and obstruction of justice for switching the hard drive. Was it fear of reprisal that drove Dr. Bade Tu Wurst to compound his difficulties by switching his hard drive, thus making the charges more severe? The U.S. Attorney declined to prosecute for obstruction of justice in lieu of agency administrative action. The agency proposed debarring Wurst from NSF activities for three years.

Case 4. An allegation of making false statements was made against Kopi Kat, owner of a small business. In a proposal, Kopi claimed that three patents were the result of a previous grant. However, a review of the patent data indicated that the patents were filed long before the original grant. A more detailed review of Kopi's 13 most recent proposals indicated a pattern of deception in her letters of support. Dr. Kat had received 10 original letters of support for two separate grants. She then photocopied the letters, altering some by changing the date, leaving the date blank, or reducing the photocopy to 90% of the original size to make it look different. She photocopied and submitted the 10 original letters 27 times in 13 proposals over a period of about two years. Many of the later proposals had no scientific connection to the proposals associated with the original letters of support.

Regarding both the patents and the letters of reference, the charge was making a false statement. It is illegal to make a false statement to the government. Page 2 of the cover

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Succeeding in a Flat World

by Elizabeth E. Hood, PhD
Associate Vice Chancellor for Research and Technology Transfer, Professor of Agriculture and Professor of Biology, Arkansas State University

We all know that the world is not flat. However, the phrase strikes a cord and sparks a discussion about the fact that technology is shrinking the distance among communities. It is also broadening access to resources while increasing the competition for those resources. Information technology and the Internet are increasing our ability to easily collaborate with colleagues but concomitantly escalate the expectation that we will collaborate. Gone are the days of puttering around in the lab by oneself. However, born are the days of interdisciplinary approaches that produce unique and interesting answers to old and new questions.

A few years back, I wrote an essay for Science's Next Wave on the ups and downs of my career. I entitled it "Riding the Waves," because crests and troughs were driving my career into decision situations that I didn't initiate but had to deal with. Sometimes a career is a straight path from graduate school to postdoc to professorial promotions. However, more and more often, one's career is the stringing together of multiple opportunities that appeared along the way. One makes decisions based on the data at hand, just as in an experiment. However, unlike an experiment, one's career must be interpreted not only analytically but also personally, because the interpretation affects the decision-making process, and it is life, not publications, that are the result. Mary Catherine Bateson called it "composing a life" in her book of that title.

I have been employed as an academic faculty member, as a research manager in a large company, as a founder of a small startup company, as a program director in a national funding agency, and once again in academia as a researcher and an administrator. I did not set out on my career with this path in mind, but obstacles at many points required that I change course. Although transition is difficult, each of these experiences offered growth opportunities that were valuable to my career, and I have no regrets about any of these choices.

I started college and was married during the 1970s, when Earth Day was established and *The Population Bomb* (by Paul Erlich) was popular. I became and still am an organic gardener, a recycler, a disease prevention advocate, and an environmentalist. Although I started out as a sociologist, the importance of these issues drove me to pursue biology, particularly plant biology, instead. Plant biology has been my passion for 30 years. Thus, the underlying theme in my career choices was ensuring my ability to stay active in research and make contributions to conservation, environmental issues, and renewable resources. These issues appealed to me because of the need for stewardship of the world we live in to promote our own health and that of future generations. My graduate school focus was motivated by these interests, as was my subsequent research. When I learned that we could genetically engineer plants with new traits, I was ecstatic about the opportunity to create new ways to protect the environment that were compatible with the efficient monocultures that had dominated agriculture for many decades since the green revolution.

One of the most exciting times in my career was when I was working in a plant biotechnology startup company, ProdiGene. We were doing all the things that made me happy—performing neat experiments, making products, collaborating on teams. I had the opportunity to work on a project to use maize as a biofactory to produce enzymes for industrial applications—green chemistry! What a perk—combining my love for plant biology with my motivation to improve the environment. It's such a wonderful thing to be able to do what you love and get a paycheck to boot.

Research is very special to me. With each career change I have made, I have worked hard to maintain my program. Gaining knowledge about plants and their processes is very exciting and special. My ultimate motivation is finding a way to make life more livable through applications of the research work in which I am involved. The best advice I can offer new researchers is to do what you love and make choices that allow you to do so.

References

Bateson, M. C. (1990) *Composing a Life.* New York: Plume.
Erlich, P. (1968) *The Population Bomb.* Cutchogue, NY: Buccaneer Books.

Bioethics
continued from page 7

sheet of an NSF proposal states that "Willful provision of false information in this application and its supporting documents or in reports required under an ensuing award is a criminal offense" (*U.S. Code,* title 18, sec. 1001). Dr. Kat provided the letters of support to give panelists the impression that the businesses that signed the letters supported that particular proposal, when in reality the support was for completely unrelated projects. The stronger allegation, research misconduct (falsification), did not stick. The U.S. Attorney declined to prosecute for making false statements, but the NSF sent Kopi Kat a letter with a stern warning that her actions were not acceptable practice.

Next time: Snowballs! Cases Made Worse by Subsequent Actions.

Dina Mandoli
mandoli@u.washington.edu

Jacquin: Immortalized Through Nature and Art

The Belvedere Palace in Vienna is perhaps best known for its collection of paintings by celebrated Secessionist artists of the late 19th and early 20th centuries, such as Gustav Klimt and Egon Schiele. These works, including Klimt's famous piece *The Kiss,* are indeed wonderful to behold, and I came away with a small reproduction of a landscape by Schiele. But in magnificent Old World palaces and museums, I usually find myself drawn to earlier works, and Belvedere proved to be no exception.

I entered with the first group of visitors when the palace opened one morning, and while most stayed on the lower floor to begin with the famous Secessionists, I started in a far corner on the top floor, reasoning that it would be less crowded. This strategy worked out even better than I expected, and thus it was that there was no one else around when I first discovered what for me proved to be the most magnificent piece in the entire collection. When I entered the room, I was initially drawn to the painting because of its size (it was almost as high as the ceiling) and because it appeared to be a floral still life similar to those of the Dutch Masters, for which I have a particular fondness (a framed poster of one of my favorites, Rachel Ruysch's 1706 *Vase of Flowers,* hangs in my front hall; happily, I was also able to view the original of this piece at the Vienna Kunsthistorisches Museum).

As I approached and began to study the piece in front of me, it quickly became clear that this was no ordinary floral still life. There was an enormous bouquet of flowers on a large stone pedestal into which was carved the bust of a man with a group of children gathered at his feet (no doubt he was a teacher). Littered around the base of the pedestal was a large assortment of exotic fruits, vegetables, mushrooms, and animals: a number of insects, but also a cockatoo, a little monkey, a tiny hummingbird perched on a branch, a bowl of fish, and even a few seashells. A niche in a stone wall behind and to the right of the pedestal held a large decorative urn, and a single name was carved into the stone underneath the urn: *Linnaei.*

Detail from *Homage to Jacquin* (1821–1822), by Johann Knapp 1821/1822.

This exceptional work of art is Viennese painter Johann Knapp's *Homage to Jacquin,* commissioned by the University of Vienna in 1821–1822 to commemorate Baron Joseph von Jacquin (1727–1817), who was professor of botany and chemistry and director of the university's botanical gardens. This was a highly distinguished position, as the Viennese nobility loved plants (especially flowers) and spared no expense on their gardens. Jacquin took part in the first Austrian expedition to the West Indies (1755–1759), bringing back many of the exotic plants and creatures depicted in the painting. Importantly, Jacquin was a champion of the Linnaean classification system and was responsible for introducing the system to Austria. He carried on an active correspondence with Carl Linnaeus from 1759 until 1776 (after which Linnaeus became increasingly ill from a series of strokes). One of the remarkable features of the painting is that the magnificent bouquet at the heart of the work includes detailed and painstakingly accurate examples from each of the 24 classes of plant Linnaeus defined.

An inscription on the side of the stone pedestal, barely legible as it recedes into the dark shade of the overhanging foliage, reads *Vocat Natura Artem Utraque Te Immortalem.* I could not find an exact translation, but it suggests that Jacquin is immortalized through both nature and art, the former perhaps because he named many plants using the Linnaean system; thus, his name is part of the formal description (e.g., *Pleurotus ostreatus* [Jacquin: Fries] Kummer) of these plants. In this wonderful city full of Old World treasures, it was gratifying to see this homage to a mere botanist maintain pride of place as one of the most important works in the Belvedere collection.

Nan Eckardt
neckardt@aspb.org

Postcards
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Through his many years of working with IRRI–Lao, Samson has seen firsthand the integral role rice plays in Lao culture. "Local people say that there is hunger in their households if there is no rice to eat. This is in spite of the fact that there might be other sources of carbohydrate on the table." Indeed, Lao people get nearly 70% of their calorie and protein intake from rice, and self-sufficiency in rice is equated with self-sufficiency in food.

According to Samson, "Comfort and contentment is a basket of *khao niaw* and a bowl of ground-up chili peppers and herbs collected along the footpath to the upland rice field."

Sarah Nell Davidson
snd2@cornell.edu

Membership Corner

ASPB members share a common goal of promoting the growth, development, and outreach of plant biology as a pure and applied science. This column features some of the dedicated and innovative members of ASPB who believe that membership in our Society is crucial to the future of plant biology. If you are interested in contributing to this feature, please contact ASPB Membership at info@aspb.org.

Name: Jane Geisler-Lee
Title: Research Professor
Place of Work or School: Southern Illinois University of Carbondale
Research Area: Plant Biology
Member since: 1992

1. **Why has being a member of ASPB been important?**
   ASPB helps me keep myself updated in the field.
2. **Was someone instrumental in getting you to join ASPB?**
   No.
3. **What would you tell colleagues to encourage them to join?**
   ASPB membership helps one to have role models, to nurture one's knowledge in plant biology, and to have friends and colleagues in plant biology.
4. **Have you enhanced your career using ASPB job postings or through networking at an ASPB function?**
   It's been quite helpful.
5. **Have you had any success at finding candidates as a result of a job posting at the meeting or on our online Job Bank?**
   I am not yet in a position to hire people.
6. **Do you read print journals? If so, where do you usually read them?**
   I read my subscriptions, like *Science,* at home. Nowadays, I browse most of the time.
7. **What do you think is the next "big thing" in plant biology?**
   Integration of all fields (i.e., systems biology) to study and manipulate metabolism.
8. **What person, living or deceased, do you most admire?**
   My late grandmother, kind and gentle as a person and with tremendous curiosity about plants. She was able to grow orchids from seeds, which I brought from Honolulu, to flowering!
9. **What are you reading these days?**
   Journal e-alerts, Faculty 1000, articles and books on positive thinking, and comics.
10. **What are your hobbies?**
    Gardening, reading, traveling, and learning foreign languages. I can't speak a second one, but I have tried to learn three in the past 10 years! I have lived on three continents and enjoyed different cultures, natural wonders, and habitats.
11. **What is your most treasured possession?**
    My own diaries, which remind me of my past and to be humble.
12. **What do you still have left to learn?**
    Too much.

Future ASPB Meetings

2007: Chicago, Illinois

July 5–7
Hilton Chicago
Laboratory Leadership Workshop for senior postdocs and junior faculty.
Visit http://www.aspb.org/meetings/pb-2007/labmanagement.cfm for more information.

July 7–11
Hilton Chicago
ASPB will hold its 2007 annual meeting in conjunction with the Botanical Society of America, the American Fern Society, and the American Society of Plant Taxonomists. Visit www.aspb.org/pb-2007 for more information.

Plant Biology 2008

Mérida, Mexico
June 27–July 2

Plant Biology 2009

Honolulu, Hawaii
July 18–22

For more information go to http://www.aspb.org/meetings/

Call for Proposals: MAY 1, 2007, DEADLINE

ASPB Education Foundation—Grant Awards Program

ASPB's Education Foundation seeks proposals from ASPB members to support education and outreach activities that advance knowledge of and appreciation for basic concepts and contributions of plant biology.

In support of the mission of ASPB, the Education Foundation was established in 1995 to provide information and education to increase the public's knowledge about the role of plants in all areas of life.

The Foundation reaches its goals through programs that

- promote a broad understanding of the importance of plant science in providing an ongoing supply of affordable, high-quality food, fiber, and renewable resources
- provide education on the importance of plants to agriculture, medicine, the environment, and more
- make available accurate information on the latest developments in genetic modification of crops and plant biotechnology
- contribute to the knowledge of plant biology among K–12 schoolchildren through developing educational materials and assisting teacher development
- encourage young scientists to pursue careers in the growing field of plant biology
- increase plant science activities in science museums and discovery centers by developing programs, exhibits, background information, and links to scientists.

In this call for proposals, the ASPB Education Foundation seeks projects that address the aims of the Foundation (see sidebar) and at the same time catalyze new opportunities for ASPB members to educate the public about the importance of plant biology.

Proposals must be submitted to the Foundation by **May 1, 2007,** and should be sent by e-mail to the Education Foundation Assistant at info@aspb.org. No forms are needed, but full name and ASPB member number should be in the body of the submitted e-mail. Attached documents should be in Word (.doc extension) or saved as a PDF file.

Each grant proposal should include

1. a one-page cover with the title of the project; the names of the member project manager and others who are submitting the project; and the member's ASPB number and contact information, including address, phone, e-mail, and fax
2. a project description that is no more than five pages in length, double-spaced
3. an itemized budget of up to $30,000, with justification for each item.

Guidelines for the 2007 program:

1. The project manager must be a current member of ASPB.
2. Proposals that leverage funds from the Foundation with support from other sources are encouraged, particularly with regard to larger grant requests.
3. No indirect costs (overhead) will be covered by the Foundation for project awards.
4. No language translations.
5. No direct publishing.
6. No support of other foundations.
7. No support to projects that would more appropriately receive their money from another source, especially when that project serves a limited audience (i.e., one campus).
8. The Foundation seeks projects with wide dissemination.
9. ASPB expects to have the right to the use of projects developed with grant funding.
10. Proposals are encouraged from members from both within and outside the United States, and projects may serve communities from any country.
11. Projects may run beyond one year, but grant funding will be made in one payment only, issued between September 1 and December 1, 2007, not to exceed $30,000.
12. All recipients agree to advise future applicants who seek their consultation on developing winning proposals.

Proposals will be reviewed, and awardees will be notified by e-mail and announced during Plant Biology & Botany 2007, which will be held in Chicago July 7–11.

Refer to the ASPB website for details and to view the recipients of the 2004–2006 awards: **http://www.aspb.org/education/foundation/gap.cfm.**

DOE Office of Science Announces $75 Million in Support of Three Bioenergy Research Centers in Fiscal Year 2008

The proposed fiscal year 2008 budget of the Department of Energy (DOE) Office of Science, Office of Biological and Environmental Research, supports the creation of three bioenergy research centers. A total of $25 million per center per year will be provided over five years to establish and operate these centers, to be set up and operational by the end of fiscal year 2008.

The goal of the research centers is to make transformational discoveries in basic science to make the production of cellulosic ethanol, sunlight-to-fuels, and other biofuels truly cost competitive and economically viable. Advanced systems biology research will be conducted on microbes and plants to learn to exploit nature's own conversion methods and develop a new generation of optimized bioenergy crops. The research will concentrate on

- understanding metabolic pathways in microbial bioconversion processes
- analyzing plant cell wall structure and assembly
- fine-tuning microorganisms and plants to each other
- pursuing both microbial and biomimetic conversion methods.

Innovative multidisciplinary approaches are to be used. No funds will be provided for construction; the centers will undergo a rapid start-up, build on the latest biotechnology advances, and have access to sophisticated instruments in the DOE complex (e.g., high-intensity light sources). There will be an open competition to establish these centers; universities, national labs, nonprofits, private firms, and partnerships of such entities are invited to compete.

ASPB has been very active in encouraging the DOE Office of Science to conduct a basic research initiative on plants and microbes to produce cellulosic ethanol. ASPB began its campaign in 2005. Other plant-related bioenergy research programs have also been announced since that time.

The total budget request for Biological and Environmental Research is $532 million, representing an increase of $22 million, or 4.2%. Overall, the DOE Office of Science request is $4.4 billion, an increase of $296 million, or 7.2%. For the Office of Basic Energy Sciences, the request is $1.5 billion, an increase of $78 million, or 5.5%.

USDA Proposes 10-Year, $500 Million Agricultural Bioenergy and Biobased Products Research Initiative

USDA unveiled its 2007 Farm Bill Proposals on January 31, 2007. Included in the USDA proposal is the establishment of an Agricultural Bioenergy and Biobased Products Research Initiative with $500 million over 10 years to advance fundamental scientific knowledge about and improve production of renewable fuels and biobased products.

ASPB President **Rick Amasino,** Committee on Public Affairs Chair **Gary Stacey,** and Committee on Public Affairs member **Roger Innes** recommended establishing a plant-related bioenergy research initiative in communications with USDA officials over the past year. The ASPB public affairs office also met with USDA and other officials in support of developing the initiative. Department of Agriculture Undersecretary for Research Education and Economics **Gale Buchanan** informed ASPB representatives in one of the meetings last year that he hoped to have new funds for investment in bioenergy research.

The following are excerpts from the 2007 Farm Bill Proposals summary:

At present, 60 percent of the petroleum used in the U.S. is imported, primarily from countries in unstable parts of the world. The nation's dependence on these imports poses a threat to our national economy and security. Ethanol and related products produced from agricultural feedstocks (biomass) are beginning to be utilized instead of petroleum as energy and as components of carbon-based products such as plastics and fabrics. Additional research and development on biobased products are needed to advance these alternatives to petroleum-based products, as well as help meet the goals set forward in USDA's BioPreferred Program.

The Administration proposes the creation of the Agricultural Bioenergy and Biobased Products Research Initiative to enhance the production and conversion of biomass to renewable fuels and related products. Approximately $50 million of annual mandatory funding will support a USDA bioenergy and biobased product laboratory network utilizing existing USDA research facilities as well as engaging universities through a competitive process and connecting them to the laboratory network.

The new initiative will focus research and development efforts on two objectives: 1) improving biomass production and sustain-

ability and 2) improving biomass conversion in biorefineries. This proposal will accomplish the following—

1. Leverage the Department's existing broad scientific capabilities in plant genetics and breeding; crop production; soil and water science; agricultural waste utilization; carbohydrate, lipid, protein, and lignin chemistry and biochemistry; enzyme development; fermentation; and microbiology.
2. Support new bioenergy and biobased product research that will help achieve the goals of the Advanced Energy Initiative and the BioPreferred Program.
3. Identify leading universities in bio-energy and biobased products research and capitalize on the respective strengths of USDA, DOE and the university community.

These three components will take full advantage of the USDA's internal and external research programs together with the network of extensive knowledge and capabilities that reside within the Land Grant universities and other research institutions throughout the U.S. At the same time, these activities will be closely coordinated with the Department of Energy (DOE), and its national labs and centers of excellence to ensure that there is no duplication of effort and that each organization's respective strengths are maximized.

In order to meet the growing demand for biofuels, new varieties of starch and oil-based crops that will grow abundantly nationwide will be needed. New methods must be developed to convert agricultural waste materials such as corn stover and wood chips to produce enough biofuels and other combustible bioenergy products to increase our use of renewable resources and decrease our Nation's dependence on foreign oil. Additionally, significant economic opportunities exist to produce a wide range of industrial products from the byproducts of bioenergy production. To further develop these industrial products, an intense, broad-based research effort is needed.

Research conducted and/or funded by the USDA has already led to significant advances in technology that make agricultural biomass a viable alternative to petroleum. However, as the President outlined in his Advanced Energy Initiative and at the recent renewable energy conference hosted by USDA and DOE, there is a need for more research on bioenergy.

UC Berkeley, U. of Illinois, and LBNL Partner with BP in $500 Million Bioenergy Research Institute

ASPB Members to Lead Research Effort

BP plans to invest $500 million over the next 10 years to establish a dedicated biosciences energy research laboratory attached to the University of California (UC) at Berkeley and its partners—the University of Illinois at Urbana–Champaign and the Lawrence Berkeley National Laboratory (LBNL). It will be the first facility of its kind in the world.

The BP Energy Biosciences Institute (EBI) will explore the application of bioscience and the production of new and cleaner energy, principally fuels for road transport. Efforts will focus on developing new biofuels components, devising new technologies, and using modern plant science to develop fuels from nonfood crops. The EBI will also pursue bioscience-based research in the conversion of heavy hydrocarbons to clean fuels, improved recovery from existing oil and gas reservoirs, and carbon sequestration.

ASPB members **Chris Somerville** and **Steve Long** are expected to have leadership roles in the bioenergy research effort. In addition to its research remit, the EBI hopes to facilitate the cross-training of a new generation of researchers focused on coupling biotechnology and energy production, making the institute a focal point for interactions with leading biotech companies playing a major role in developing and applying energy biosciences.

The institute will be unique in both its scale and its partnership between BP and others in the private sector and academia. Dedicated facilities on the campuses of UC Berkeley and the University of Illinois will house EBI research laboratories and staff. The LBNL will carry out supporting research. Up to 50 BP staff located on the two campuses will work in partnership with university faculty and researchers. BP and its partners will share governance of the EBI and guidance of its research programs.

USDA Proposes 10-Year, $1 Billion Specialty Crop Research Initiative for Farm Bill Research Title

As part of its 2007 Farm Bill Proposals, USDA proposes investing $1 billion over 10 years to establish a Specialty Crop Research Initiative to provide science-based tools for the specialty crop industry. In a summary of this plant research proposal, USDA explained that enhanced research, extension, and education programs are needed to help the specialty crop industry address a number of challenges.

The administration proposes investing $100 million in mandatory annual spending to create a new Specialty Crop Research Initiative to address the critical needs of the specialty crop industry. The initiative will support both intramural and extramural programs across the nation and provide science-based tools to address the needs of specific crops and regions. Focus areas would include the following:

1. fundamental work in plant breeding, genetics, and genomics to improve crop characteristics such as product appearance, environmental responses and tolerances, nutrient management, pest and disease management, and enhanced phytonutrient content, as well as safety, quality, yield, taste, and shelf life
2. continuing efforts to identify threats from invasive species such as citrus greening and glassy-winged sharpshooter
3. optimization of production through more technologically efficient and effective application of water, nutrients, and pesticides to reduce energy use and improve production efficiency
4. development of new innovations and technology to enhance mechanization, thus reducing reliance on labor
5. improvements in production efficiency, productivity, and profitability over the long term.

The U.S. specialty crop industry comprises producers and handlers of fruits, tree nuts, vegetables, melons, potatoes, and nursery crops, including floriculture. It is a major contributor to the U.S. agricultural economy. Specialty crops accounted for 10 million harvested cropland acres in 2004. The value of total U.S. specialty crops ($49.0 billion in sales) now exceeds the combined value of the five major program crops ($45.8 billion in sales). "One of the principal opportunities to enable the specialty crop industry to remain competitive in the global environment and to continue contributing to the U.S. economy is to support research programs that facilitate continued advancements in productivity and technology," USDA noted in its Farm Bill Proposals summary.

USDA's National Agricultural Research, Extension, Education and Economics Advisory Board recently recognized this need in their report on specialty crops. Specialty crop producers requested that USDA address their research needs in developing the Farm Bill. ASPB, including its public affairs office, coordinated with USDA officials on a USDA Cooperative State Research, Education, and Extension Service Stakeholders' Workshop on Plant and Pest Biology on November 16, 2005, at which the United Fresh Fruit and Vegetable Association, Minor/Specialty Crop Pest Management IR-4, and American Society for Horticultural Science explained the need for specialty crop research. Some 20 science, grower, and other organizations participated in this ASPB-coordinated workshop.

USDA Proposes Research, Education, and Economics Mission Area Reorganization

USDA has recommended a major reorganization of research agencies in its 2007 Farm Bill Proposals. The reorganization would consolidate USDA's Agricultural Research Service (ARS) and the Cooperative State Research, Education, and Extension Service (CSREES) into a single agency named the Research, Education, and Extension Service (REES), which would coordinate both intramural and extramural research, extension, and education programs. In addition, the Research, Education, and Economics (REE) mission area would be renamed the Office of Science. Leadership would continue through the undersecretary and deputy undersecretary.

The department's proposal said that consolidating agency administrations would ensure that USDA's intramural and extramural science programs are well coordinated and maximize resources. In addition, this consolidation would ensure that USDA's research arm is able to respond to emerging issues and address some of the most critical issues facing agriculture.

The reorganization summary noted that the land grant universities have also called for more coordination of USDA's research programs. This call is reflected in their Creating Research, Extension and Teaching for the 21st Century (CREATE-21) proposal, which advocates a consolidation of USDA's research agencies.

continued on next page

USDA Seeks $256.5 Million for NRI, $1.06 Billion for ARS

The fiscal year 2008 budget request for the National Research Initiative (NRI) is $256.5 million, an increase of $67.5 million. A total of $45.1 million of this increase is a proposed transfer to the NRI of Section 406 programs.

As part of the department's bioenergy and biobased fuels initiative, $19.0 million of the proposed increase in the NRI and $9.8 million of Hatch multistate funds will support biomass activities.

ARS funding would be at $1.02 billion in fiscal year 2008, down from the fiscal year 2007 estimate of $1.06 billion.

NSF Research Support Up 4.1 Percent for Biological Sciences in Fiscal 2008 Request

The National Science Foundation (NSF) Biological Sciences Directorate has requested $633 million—an increase of $25 million—for fiscal year 2008. The budget request includes a 7.7% increase for NSF Research and Related Programs. A major new plant research initiative—$5 million to $10 million for a Plant Science Cyberinfrastructure Collaborative—is included in this budget request.

The requested increases were higher for physical sciences directorates than for biological sciences directorates, up 4.1%, and for the Directorate for Social, Behavioral and Economic (SBE) Sciences, up 3.9%. The approximate increase of 6% to 9% for physical sciences reflects the emphasis on physical sciences in the American Competitiveness Initiative (ACI), which follows recommendations for supporting the physical sciences in the National Academy of Sciences report "Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future." Physical scientists were overrepresented on the NAS panel.

The budget request for Education and Human Resources is $751 million, an increase of $34 million, or 4.8%, over fiscal year 2007. The overall NSF request for fiscal year 2008 is $6.4 billion, an increase of $409 million, or 6.8%.

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The USDA Farm Bill Proposals would create REES through the merger of ARS and CSREES. This new agency would be under the leadership of a chief scientist who would have authority over REES program offices, program implementation, and administrative and resource management.

The department proposes retaining authorities for the 1890, 1994, and Hispanic Serving Institutions. However, a new consolidated authorization would be sought to support the overall REES program. Funding under this consolidated line item would be under the authority of the REES chief scientist and support both intramural and extramural activities. The REES chief scientist, in concurrence with the Office of Science undersecretary, would have administrative responsibility for allocation of funds.

This integration of programs would provide better coordination and allow for enhanced efficiency and effectiveness of program implementation and resource allocation, the department said. Duplication of efforts between intramural and extramural programs would be minimized, and the comparative strengths of USDA's in-house capacity and university partners and other stakeholders would be better identified and used, the summary added.

Bipartisan Support for the President's ACI Research Initiative in 2007 Continuing Resolution

The House of Representatives approved the continuing resolution for fiscal year 2007 on January 31. Fortunately, there was bipartisan support to make modifications to the earlier short-term continuing resolution to adopt the president's American Competitiveness Initiative (ACI).

The following changes will influence funding for scientific research:

- **National Science Foundation (NSF):** A total of $4.7 billion goes to NSF's research account to fund Innovation Programs. The bill specifies that an increase of $335 million, or 7.7%, be made to NSF Research and Related Programs. This amount equals the president's budget request and the amount requested in the ACI. The appropriations summary noted that this increase is a down payment toward enhancing U.S. global competitiveness by investing in basic science research. ASPB has joined with other science societies in supporting NSF, which would receive a 6% increase under the continuing resolution.
- **Department of Energy (DOE), Office of Science:** The House allocated $3.8 billion, an increase of $200 million, to support research on new energy technologies such as improved conversion of cellulosic biomass to biofuels. Particular mention was made in the summary of the need to support DOE's Office of Science Research in research on cellulosic ethanol. ASPB has been campaigning in support of plant research leading to cellulosic ethanol since early 2005.
- **DOE, Energy Efficiency and Renewable Energy Resources:** A total of $1.5 billion, an increase of $300 million, was allocated to accelerate research and development activities for energy efficiency and renewable energy programs.
- **Department of Agriculture:** The continuing resolution calls for fiscal year 2007 spending of $190 million for the National Research Initiative (NRI) Competitive Grants Program. This funding represents a strong show of support for the NRI by the appropriations committee and leadership in a continuing resolution with overall limited funds. In action that was not completed last year on fiscal year 2007 appropriations, the House had approved $189 million for the NRI, and the Senate appropriations funding level for the NRI was $190 million. Many programs are not doing as well under the continuing resolution. For example, House Joint Resolution 20 calls for the elimination of earmarks. At the same time, provisions were made for earmarked Agricultural Research Service (ARS) funding to go directly to the agency and then be sent to ARS labs. Earmarked dollars for the Cooperative Research, Education, and Extension Service are instead to be distributed in formula funds among the land grant institutions.
- **National Institutes of Health (NIH):** The House allocated $28.9 billion, an increase of $620 million, to reverse a projected decline in new NIH research project awards, support an additional 500 research project grants and 1,500 first-time investigators, and expand funding for high-risk and high-impact research.
- **National Institute of Standards and Technology Innovation Programs:** A total of $50 million in new funding was set aside for physical science research and lab support for nanotechnology and neutron research.

The appropriations summary can be found at http://appropriations.house.gov/News/pr_070129.shtml.

Soot in Air Increases Heart Risk: Another Cost of Using Petroleum-Based Instead of Plant-Based Fuels

A study published February 1, 2007, in the *New England Journal of Medicine* found that air polluted by soot increased the risk of cardiovascular death by 150% in postmenopausal women—nearly the same impact as being an active smoker.

The study focused on the most deadly kind of soot—fine particulate matter—which results from burning fossil fuels such as gasoline, diesel fuel, and coal. Cities with the highest soot levels—outdoor fine particulate matter levels of 19.6 micrograms per cubic meter or higher—are Pittsburgh, Pa.; Riverside–San Bernardino, Calif.; Cincinnati, Ohio; Bakersfield, Calif.; and Birmingham, Ala. In addition, large population centers like New York City; Washington, D.C.; Houston, Tex.; and many other U.S. cities have levels of 15.0 or higher. Each increase in fine soot levels of 10 micrograms is associated with a 76% increase in risk of cardiovascular death. Some of the lowest soot levels in the nation are found in Honolulu, Hawaii, with a level of 5.0; Albuquerque, N. Mex., at 8.1; and Reno, Nev., at 9.0.

Investment in plant research to increase production of biofuels could displace the use of oil-based fuels by the nation's motorists. Biofuel use would contribute to cleaner air with lower levels of soot in addition to reducing the release of stored greenhouse gases.

A Plethora of Possibilities

Activities Promoting Plant Science at the Plant Biology & Botany 2007 Joint Congress

An "Education and Outreach" minisymposium will be held on Monday, July 9, at 8:30 a.m., featuring a talk by ASPB President Rick Amasino, along with other speakers. Also on Monday, the Education Workshop will focus on how to get from "Ideas to Impact." Members who have developed and disseminated educational and broader outreach materials and representatives from funding agencies and professional societies will be available to discuss practical aspects of moving forward with your ideas. The workshop will feature drinks and hors d'oeuvres and take place on Monday, July 9, from 5 p.m. to 7 p.m. There is no charge to attend, but preregistration is required.

The Education Booth will feature several outstanding displays, including Fast Plants activities presented by Paul Williams, the "Images of Plant Cells" DVD presented by Brian Gunning, and information about serving as a mentor for students via the Planting Science program (www.plantingscience.org/). Two exhibitors will be selected from the ASPB Ed Booth competition. Stop by the booth and see what's new and hot in education and outreach.

Finally, because this year's conference is sponsored jointly by ASPB and the Botanical Society of America (BSA), ASPB members will have the opportunity to participate in the Education Forum that takes place at the BSA annual meetings. The Education Forum takes place on Saturday, July 7, and Sunday, July 8; activities include workshops, panel discussions, informational sessions, and scientific field trips (www.2007. botanyconference.org/Forum/ForumOverview.php). All events and activities are open to members of either society as well as to members of the American Fern Society and the American Society of Plant Taxonomists. See the registration form for additional information.

See you in Chicago!

ASPB Education Committee

Math in the Garden: Hands-on Activities Using Plants

Short-sighted educational policies can cause teachers to minimize their time spent teaching science to focus instead on preparing students for reading and math standards testing. The curriculum team at the Lawrence Hall of Science (LHS) at the University of California at Berkeley has responded by developing programs with high-quality science content that also help teachers meet reading and math benchmarks. The best-known LHS curriculum is GEMS (Great Explorations in Math and Science; www.lhsgems.org), which offers carefully developed and supported activities covering a broad range of science topics. Unfortunately, though, very little plant biology has been included so far. Another LHS program that focuses on literacy is currently under development with support from the National Science Foundation and will become available this spring. Called "Seeds of Science/ Roots of Reading," it involves young students "doing, reading, writing, and talking about science" (www.seedsofscience.org).

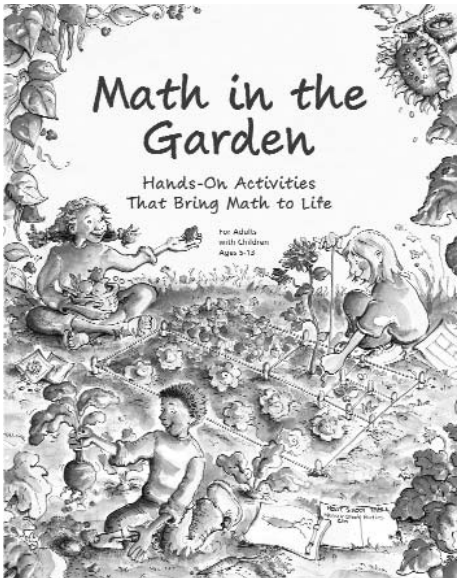

Image courtesy of the National Gardening Association

Again, in spite of the name, little plant content is included.

Math in the Garden, a book developed through a collaboration between the University of California Botanical Garden and the LHS, does emphasize plants (www.botanicalgarden.berkeley.edu/education/eduMIG.shtml). *Math in the Garden* provides mathematical activities designed to be carried out in a garden or other outdoor setting for students in grades K through 8. Parents and plant biologists will appreciate the novel and creative ways the activities engage children in thinking about plants, and teachers will also appreciate the specification of the math and science standards each activity meets. Each activity clearly indicates the materials and preparation needed, has colorful and useful diagrams to clarify and illustrate the activity, and includes questions to prompt students to think more deeply about their observations.

Among the 36 activities are "How Many Seeds in a Tomato?" "Symmetry Inside Fruit," "What's in Garden Soil?" "Ratios of Shoots and Roots," and "Plant Study—Measuring Growth." Not all the activities have

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Plants in Print

In this edition of Plants in Print, I review two very different books, *Seeds of Wealth: Four Plants That Made Men Rich,* by Henry Hobhouse, and *Killer Algae: The True Tale of a Biological Invasion,* by Alexandre Meinesz. In keeping with the theme of this column, the main protagonist of each book is "plant." These two books share the theme of nonbiological aspects of the plant–human relationship with *The Botany of Desire,* reviewed in the November/December issue of the *ASPB News.* In *Seeds of Wealth,* the focus is on the economic and cultural impacts of plants—and the ways people exploit plants to generate wealth. *Killer Algae,* as emphasized in the dramatic and somewhat ironic title, focuses on the surprising political intrigue that can surround "plant."

By focusing on four plant products—timber, wine, rubber, and tobacco—Hobhouse, an English journalist, reveals fascinating historical threads spanning five centuries and many continents that illustrate how plants have dramatically affected the global economy and the histories of many nations. Hobhouse's essays make up an intricately detailed tapestry woven of facts about these plant products, which lie at the very foundation of 21st-century global capitalism. Hobhouse supplies great dinner-party vignettes in his book. Here is one you can use next time you are out: In England, at the end of Queen Elizabeth's reign in 1603, domestic firewood had become so hard to find and so expensive that coal was being used to supply over half the heating requirements of London, already a bustling city of more than 200,000. By 1700, London burned more than 300,000 tons of coal a year, and London had been nicknamed "the Big Smoke." The famous London smog generated by coal burning persisted until the first clean air act was introduced in 1956. Thus, this early wood shortage drove England to start using coal in large quantities before any other country.

High demand for coal rapidly exhausted the easily accessible surface coal, driving coal mines ever deeper. The depth of these mines sparked the invention of the steam engine, required for pumping of floodwaters from the mines, first developed by Savery in 1695 and Newcomen in 1698 and then perfected by Watt around 1770. The advent of the steam engine as an efficient power source ultimately led to the initiation of the Industrial Revolution in England 50 years earlier than in any other country—all because England ran out of wood!

The availability of coal as a cheap energy source in the 17th century also affected many other industries. For example, before 1550, salt was produced in England by evaporating seawater in large, shallow wooden pans in sunny places. A century later, seawater evaporation using coal as a fuel was well established, allowing the production of large amounts of cheap salt. The availability of cheap salt allowed the growth of the salt cod economy; both salt and cod make for fascinating stories, which you can read about in *Cod: A Biography of the Fish That Changed the World* and *Salt: A World History,* both by Mark Kurlansky.

Hobhouse also highlights the impact of timber on the New World. If there had been no shortage of timber in Britain and no commercially useful timber on the northeast coast of British America, fishing, whaling, shipping, ship building, mast building, and the timber, tar, and iron trades would have been impossible in the form they took. Americans would never have been as rich as they were, and U.S. history would have been very different.

Hobhouse takes a similar approach with wine, rubber, and tobacco. He explains how rubber affected the world economy and played an integral part in the building of three countries—Singapore, Malaysia, and Indonesia. Virginia, home to many of the United States's founding fathers, was economically viable only because of tobacco. And the facts and stories just keep on coming.

Hobhouse's book is not a quick read, but it is a rich and complex book that can be dipped into and out of to find great little facts and spurious connections, or, given a cold day, a warm fire, and a comfortable chair, it can be digested whole, in all its complexity.

Killer Algae is a very different book from *Seeds of Wealth.* Hobhouse builds his narrative around plant as commodity—the invisible hand of photosynthesis guiding human economics and social history. In his title, Meinesz (University of Nice, France) casts plant as the villain, but once you delve into the book, the picture is not so black and white. Perhaps it is Meinesz who is the protagonist and the French political establishment the antagonist, and plant just provides the canvas on which the age-old battle between science and the establishment is drawn—a battle with many famous heroes, such as Copernicus, Galileo, Newton, Darwin, and Einstein. (More on the theme of *The Scientist as Rebel* can be indulged by reading Freeman Dyson's book of the same title.) Perhaps I should explain.

In the Meinesz incarnation, "plant" is *Caulerpa taxifolia,* which various sources have dubbed "killer algae" for reasons detailed by Meinesz and summarized here. *C. taxifolia* is a native of tropical waters, including the Caribbean, Indo-Pacific, and Red seas. But in a story that might be likened to the fanciful classic *The Day of the Triffids* (by John Wyndham), a prolonged period of captivity in aquaria, starting off in the Stuttgart Zoo, led to the generation of a mutant plant, a *C. taxifolia* strain that can form dense carpets on any surface, including rock, sand, and mud, with extreme rapidity (1 cm/day); most importantly, it can do this at water temperatures many degrees cooler than the tropical waters of its native habitat. This new strain of *C. taxifolia* has become dramatically invasive, spreading and forming infestations throughout the Mediterranean coastline and more recently in the Australian provinces of

South Australia and New South Wales and San Diego County, Calif. Meinesz details the initial stages of this invasion, which started in the Mediterranean Sea off Monaco, adjacent to the Oceanographic Museum of Monaco, around 1984, and the failed attempts to stop it. Amazingly, genetic analyses (internal transcribed spacer sequences) have clearly established that this mutant strain of *C. taxifolia* is identical at all sites where infestations have been identified—"attack of the mutant clonal killer algae" is an apt description of its impact. This strain of *C. taxifolia* has come to be known as the "aquarium strain" in scientific circles and as "killer algae" in the popular media. The idea that a highly invasive mutant strain of plant can be incubated in something as benign as an aquarium and then released into the world is startling, and the understatedness of the phrase *aquarium strain* perfectly captures the frightening girl-next-door quality of this story. Wherever infestations of *C. taxifolia* have occurred, they devastate the ecosystem, and because of its chemical defense mechanisms (*toxic killer algae* is also a favorite of the media), *C. taxifolia* appears to have no predators.

Meinesz's story starts in 1988, when he learns of a square-yard patch of *C. taxifolia* growing beneath the seaward-looking window of the Oceanographic Museum of Monaco. At that time, the *C. taxifolia* patch could easily have been removed by hand, but it wasn't. Meinesz explains in great detail his own and other scientists' efforts to warn of the dangers this new invasive form of *C. taxifolia* poses to both the Mediterranean ecosystem and beyond. He describes in sometimes brutal detail the political missteps, obstructions, inactions, and threats (veiled and not) that surrounded these efforts. Despite his best efforts, over many years, no government agencies in France were willing to take responsibility for *C. taxifolia,* and as the buck got passed, the algae grew from the square-yard patch outside the Oceanographic Museum of Monaco to many thousands of hectares off the coasts of France, Spain, Italy, and Croatia, and it has spread further afield to Australia and the United States since Meinesz wrote his book in 1999.

Meinesz's book provides much food for thought, all of which is worth digesting. I highlight one morsel here. One of the central themes of Meinesz's book is how to respond appropriately to dangers that are hypothetical and poorly understood. Meinesz does not raise this question in his book; he is personally sure about what to do in the situation he finds himself in—he blows the whistle. Meinesz relies on his personal judgment, based on fact and experience, to try to eradicate *C. taxifolia.* He uses his intuition to predict what will happen if he does not act. Science and fact can take us only so far down any given decision-making path: At some point we have to make a leap of faith, based on our best scientific judgment, that what we are doing is right. Meinesz understood what needed to be done and why. The French authorities did not, however, and were unable to formulate an appropriate response. Leadership—the ability to decide on the best course of action in an uncertain world—can be assisted by science and logic, but these are only tools, and the final decision depends on our leaders.

Dyson, in *The Scientist as Rebel,* nicely highlights two opposing views on this subject. The first, the precautionary principle, "says that when there is any risk of a major disaster, no action should be permitted that increases the risk." This principle prohibits an action even if there are possible benefits as well as risks—there is no attempt to balance them. The other view, which Dyson calls libertarian, "holds that risks are unavoidable . . . and that a prudent cause of action must be based on a balance of risks against benefits." The most widely used description of the precautionary principle is in fact found in Principle 15 of the Rio Declaration on Environment and Development of 1992:

> In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

This is the form of the principle that Meinesz advocates. In the situation Meinesz describes in his book, his actions were clearly informed using the precautionary principle. Based on the appearance of one square yard of *C. taxifolia* in 1988 in the Mediterranean and the fact that it was able to overwinter and prosper, Meinesz called for its eradication. Others applied the libertarian model in trying to balance risk and benefit, suggesting that the growth of *C. taxifolia* was helping to remediate otherwise highly degraded environments. The remediation benefit turned out to be minor, however, compared to the risks. One way to interpret the tale of *C. taxifolia* is as an allegory for the climate change scenario that is currently playing out in both the physical and metaphysical worlds we inhabit. Given how the story of the killer algae pans out, this is a sobering note to our story.

Meinesz also raises the issue of the dominance of reductionist (a code word for molecular and cellular biology) science over natural history or ecological science and how this debate is affecting our ability to make informed decisions about the environment. My wife is requesting that I go out for coffee with her on this crisp Sunday afternoon, so I will let you discover for yourself how that argument goes. Enjoy.

David E. Salt
Purdue University
dsalt@purdue.edu

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Math in the Garden
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plant biology content, but all use plants and/or soil and take place in the garden setting. I found a lot of terrific ideas that I could use informally or formally with my kids or with their classes or scout groups.

This book is well researched and creative and has engaging illustrations. I'd recommend it for anyone looking for plant-based activities to do with kids or as a gift for a teacher.

If you're not already a fan of the LHS programs, take a few minutes to learn more about their impressive efforts to keep engaging, inquiry-based science curricula in the schools (and ultimately to keep students in the classrooms).

Mary Williams
mary_williams@hmc.edu

For more information or to purchase this book, see www.kidsgardening.org.

Obituaries

The ASPB News *has assembled links to all obituaries published in the newsletter since January 2003 at http://www.aspb.org/newsletter/obituaries.cfm. Please contact the editor at nancyw@aspb.org with questions or suggestions.*

Paul R. Gorham

Paul R. Gorham was born April 16, 1918, in Fredericton, New Brunswick, Canada, and obtained his first degree at the University of New Brunswick in 1938, followed by a master of science at the University of Maine (Orono) in 1940 and a PhD at the California Institute of Technology (Pasadena) in 1943.

Paul returned to Canada and began his scientific career with Agriculture Canada in Ottawa, Ontario, where he worked on the physiology of rubber-bearing plants as part of Canada's war effort. In 1945, he joined the National Research Council (NRC) of Canada, also in Ottawa, working on vitamin analysis of stored foods. In 1948, with the creation of NRC's new Plant Physiology section, he shifted his focus to the photosynthetic process and the identification of toxins produced by cyanobacteria (blue-green algae).

In 1969, he accepted a position as a full professor of botany at the University of Alberta in Edmonton. There he continued his pioneering research on the translocation of photosynthetic assimilates and cyanobacterial toxins. He also took part in studies of submersed aquatic macrophytes in relation to thermal effluents. Paul served as chairman of the botany department from 1971 to 1979. He retired as emeritus professor in 1983.

Paul was very involved with the development of a number of professional associations. He played a major role in the formation of the Canadian Society of Plant Physiologists (CSPP) and was its first president in 1958. He was instrumental as well in the creation of the International Association for Plant Physiology and the Canadian Botanical Association (CBA) and was awarded the Mary E. Elliott Medal in 1979 for services to the latter. He also served for 10 years on the editorial board of *Plant Physiology.*

Paul gave a great deal of his time to community activities, serving on the boards of the Edmonton Art Gallery and Friends of the University of Alberta Devonian Botanic Garden for many years. In particular, he was a driving force behind the creation of the botanic garden's five-acre Kurimoto Japanese Garden. For these and other services to his country, he was awarded the Canadian Centennial Medal in 1967 and the Queen Elizabeth Silver Jubilee Medal in 1978.

His scientific contributions, reflected in a long list of publications in established journals, were recognized by his election as a fellow of the Royal Society of Canada in 1961; the bestowment of an honorary DSc by his alma mater, the University of New Brunswick, in 1978; his election as a fellow of the Rawson Academy of Aquatic Science in 1979; and the awarding by the CSPP of its Gold Medal in 1987 and by the CBA of its Lawson Medal in 1988.

A deeply compassionate man, Paul was a generous friend and mentor to numerous graduate students, postdoctoral fellows, and colleagues over the years. Paul leaves his widow Evelyn, three children, and five grandchildren. A memorial service was held at the Westwood Unitarian Congregation in Edmonton on November 23, 2006. Memorial donations can be made to the Edmonton Cardiac Institute (111 Avenue & Groat Road, Edmonton, Alberta T5M 3L7 Canada) or the University of Alberta Devonian Botanic Garden (Edmonton, Alberta T6G 2E1 Canada).

Harriet Gorham
hgorham@sympatico.ca

Connie Nozzolillo
(retired) University of Ottawa

Abraham H. Halevy

Abraham H. Halevy was born in Tel Aviv, Israel, in 1927. He completed his PhD studies in 1958, and in 1964 he established the Department of Floriculture at the Faculty of Agriculture of the Hebrew University of Jerusalem.

Abe, as he was known by his many friends, was one of the best-known Israeli plant scientists and a world-recognized leader in the field of floriculture and ornamental horticulture. He was the founder of the Israeli flower industry and the initiator of teaching and research on this topic in Israeli academic institutes.

The research projects Abe was involved with encompass almost all theoretical and practical aspects of floriculture. His research was motivated both by the needs of the rapidly expanding Israeli floriculture and ornamental industry and by the quest to decipher the elusive floral induction mechanism. During his postdoctoral research with H. M. Cathey at USDA at Beltsville, Maryland (1958–1959), he became aware of the tremendous potential of growth retardants and other plant growth regulators for improving plant performance. Thus, the role of plant hormones in plant developmental processes became a central theme in Abe's

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Abraham H. Halevy
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research. He investigated floral induction in citrus, rose, and other ornamentals; sex expression in cucurbits; and senescence of flower organs, all from the hormonal standpoint, without neglecting the effects of light, temperature, and other environmental cues. Aspects of postharvest physiology and handling of ornamentals received his special attention because of their practical significance. Abe strived toward the elucidation of floral induction in model plants such as *Pharbitis nil,* examining the role of plant hormones, calcium, and lipids.

He went abroad searching for new ornamental plants, brought them to Israel, studied their floral physiology, and introduced them as new ornamental crops for Israeli growers. Some of these plants eventually became major cut flowers worldwide, among them *Chamelaucium* (wax flower) and *Gypsophila.* His acquaintance with a large number of flowering plants prompted him to compile the six-volume *Handbook of Flowering* (Boca Raton, Fla.: CRC Press, 1985–1989), which described the flowering of well over 300 botanical species.

Abe published his results in nearly 400 scientific articles. In addition to his permanent professorship at the Hebrew University, he served for many years as a visiting professor at the University of California, Davis. He was the initiator and first editor of the *Flowering Newsletter* and founder of the International Working Group on Flowering. He received numerous awards and prizes, including the Prize of Israel for Agriculture in 2002.

Abe's numerous students and colleagues will remember him as a warm, friendly, and highly inspiring person who was always eager and excited about science.

Eliezer E. Goldschmidt
Raffi Goren
David Weiss
The Robert H. Smith Institute of Plant Sciences and Genetics in Agriculture
The Kennedy–Leigh Centre of Horticulture, Faculty of Agricultural, Food and Environmental Quality Sciences
The Hebrew University of Jerusalem

John W. Radin

John W. Radin died of leukemia on January 24, 2007. With his passing, we lost a fervent architect and illuminator of the plant and agricultural sciences. Known for his original scientific findings and special administrative skills, he had retired January 3 after spending his entire career with the Agricultural Research Service (ARS).

His formative years were in the western United States. He grew up in Albuquerque and attended Cal Tech and then the University of California, Davis, where he received a PhD in 1970. John met his wife Tari at Davis. Bob Loomis, his PhD adviser, viewed plants as integrating organisms that could be modeled from detailed functional knowledge. With Bob and Barbara Webster, John worked on the factors affecting roots growing in culture media. He also became aware of the central roles of nitrogen and water in the Loomis models. When he joined ARS in 1971 to study cotton physiology in Phoenix, he focused first on nitrogen.

His early work showed that cotton regulated nitrate reduction differently in roots and shoots, and nitrate reduction had little impact on the development of the fiber. Because he was located in a semiarid region, he noticed a resemblance between nitrogen-deficient cotton and plants acclimated to low water availability. There followed several articles on this interaction, with the interesting finding that nitrogen deficiency caused earlier stomatal closure during a water deficit if the plants were nitrogen deficient than if they were well supplied with nitrogen. As a result, the nitrogen-deficient plants remained relatively hydrated, while the plants with adequate nitrogen desiccated rapidly.

Above: John and his wife Tari attend a plant physiology symposium at the University of Delaware in June 2005. John was a speaker at the symposium.

Recognizing that water was a central limitation for cotton production, he investigated whether the differences in stomatal behavior could be explained by differences in abscisic acid (ABA) accumulation in the leaves. He and several coworkers concluded that nitrogen metabolism and water deficiency interact in the production of ABA and thus stomatal function. In a critical test using a pressure chamber, Bob Ackerson and John found that the differences in ABA production could be explained not by differences in turgor but rather by altered water content of the dehydrated leaves. There followed a fruitful collaboration with Wolfram Hartung and Don Hendrix showing that dehydrating cotton leaves displayed an increased pH of the apoplast solution. This finding supported the

Friends, family, and colleagues traveled from near and far to express warm regards for John (seated left) at his retirement party January 18. John's wife Tari is seated to his left.

USDA–ARS Administrator Ed Knipling (left) and ASPB member John Boyer and his wife Jean participated in the retirement party for John Radin.

notion that ABA was partitioned to the apoplast from the source in the mesophyll because of the increased pH, allowing diffusion of the ABA to the guard cells and initiating stomatal closure.

When John became aware of the interactions between nitrogen and water, he came to our lab at the University of Illinois for a sabbatical. Our lab was interested in the interactions but was small and overrun with 10 students and associates. When he walked into the packed lab, John was dismayed. Equipment was shared, used day and night for student deadlines. He felt that he could not interrupt this activity. After struggling with what to do, he conceived and built a simple instrument that he could use without impeding the progress of others in the lab. His construction was from bits that anyone could find, but his measurements of leaf growth and nitrogen supply were profound. The students watched, curious at first. As time progressed, they were amazed! John had come to learn, but we had learned much more from him.

We had been studying the impact of water availability on reproduction in maize, and after returning to Phoenix, John took notice of water's impact on reproduction in cotton. Growers using irrigation had trouble with *cutout,* when flowers and young fruits abscised during the height of the growing season. John found that cutout was associated with water deficiencies occurring between large irrigations. He found that frequent small irrigations could eliminate the problem without additional water. Furthermore, white fly infestations were diminished by the practice. The method was rapidly adopted by western farmers and probably gave John the most satisfaction of his scientific career.

It did not take long for ARS to realize that these successes were combined with a commitment to the welfare of other people. He became a research leader in the Phoenix lab by 1989 and was invited to Washington in 1992 to be part of the national program staff with responsibilities for plant physiology. He arrived just as major concerns were emerging about genetically modified plants, risk assessment in the national food supply, and the outcomes from ARS research. USDA has national responsibility for these areas, and ARS was inevitably called on. John found himself writing position papers for national policy, consulting on the development of risk assessment systems, and organizing new evaluative structures in ARS while carrying out his duties in physiology. The challenges were daunting and sometimes discouraging to scientists affected by the changes. John made a special effort to support and mentor those who were affected. He remained in close contact with scientific societies such as ASPB and occasionally interacted with the U.S. Congress.

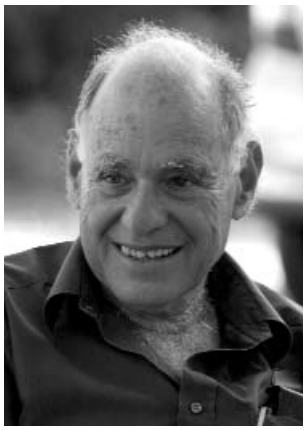
His administrative approach was to identify current problems affecting agriculture; sense emerging problems that would affect the future of agriculture; develop ARS strategies, structures, and skills to ameliorate those problems; and maintain strong communications with those affected by ARS actions, incorporating their feedback. With these four tenets, he felt that agricultural impact would follow. These tenets are fundamental and can be profitably applied to much wider issues.

For his extraordinary leadership, John received the ARS Certificate of Merit for Superior Performance beginning in 1994 and for seven years in a row. He also received the Hoagland Award from ASPP in 1991; was elected a fellow of the American Society of Agronomy and the Crop Science Society of America in 1992; and received the Outstanding Research Award in Cotton Physiology, given at the Beltwide Cotton Production Research Conference in 1998. Long active in ASPB, John was personally responsible for establishing the child care services ASPB has been offering at its annual meeting in recent years. John gave a generous contribution to ASPB to make the child care services available.

Three or four years ago, John was wondering whether it was time to retire. ARS prevailed on him to continue. So he delayed retirement, but leukemia took hold. His sudden absence leaves a large gap in many lives and careers.

John S. Boyer
University of Delaware

Tsvi Sachs



With great sadness we report that Tsvi Sachs passed away on January 9, 2007. Tsvi was professor emeritus at the Hebrew University of Jerusalem and a world-class plant biologist who had a huge impact on our understanding of the origin of cellular patterns in plants. His creative experimentation and thoughtful comments will be missed by many.

Born in 1936, Tsvi grew up in a rural area near Tel Aviv. For his PhD, he moved to Harvard University, where he graduated in 1965 with a thesis on mechanisms of apical dominance under the supervision of Kenneth Thimann. Between 1966 and 1979 he was successively promoted from lecturer to full professor at the Hebrew University in Jerusalem, but he found time for study abroad at Yale University in 1973 and at the Medical Research Council in Cambridge, England, in 1979. In 1986 he became *Otto Warburg Professor of Botany* at the Hebrew University in Jerusalem. Tsvi received numerous awards for his scientific work, such as the Jeanne Siron Pelton award from the Botanical Society of America, but a primary emphasis of his work involved his various activities to promote teaching. A dedicated and much-esteemed teacher himself, he became a member of the National Committee for High School Education in Israel (1985) and was chair of the Botany Department (1991–1995) and Hebrew University (2000–2001) teaching committees.

Tsvi was a unique scientist in both achievement and style. The words that characterize his style best might be *independence of thought.* He was perfectly immune to trends and fashions in science. Instead, he preferred to apply his very abstract way of reasoning to diverse subjects of his personal choice, each of which he then pursued over many years. One such subject was the generation of plant tissue patterns and their relationship to the acquisition of apical–basal cell polarity. What is often briefly tagged the *auxin canalization hypothesis* is part of a larger context of observations, which he published in a detailed paper in *Advances in Botany* in 1981. Here, and in many individual research contributions and later reviews and two books, he expressed his opinion that plant cells are distinguished with regard to the degree of their polarization and that this feature can then feed back on the three-dimensional pattern of certain tissues, most evidently in the pattern of vascular strands. In his studies on vascular patterning in stems and leaves, he was adept at using surgical techniques to alter the pathway of hormone and growth regulator flow through developing tissues. These studies, which provided stunning examples of his ideas, were both elegant and cost efficient, matching his preferred working style with small groups of committed students. His experimental results revealed that polar auxin fluxes were primary determinants of vascular strand initiation and continuity, and also demonstrated how vascular networks formed in developing organs.

In other studies at about the same time, Tsvi examined patterning of stomata on leaf surfaces, again a system that could be readily examined microscopically. In experimental and theoretical analyses, he showed that there was a definite space around each stoma from which new stomata were excluded. These studies on vascular and stomatal patterns carried out in the 1970s and 1980s are still cited extensively in research publications and formed the basis of his book *Pattern Formation in Plant Tissues* (Cambridge, England: Cambridge University Press, 1991).

Tsvi was well aware that the concepts he developed from his early studies on vascular regeneration applied to plant pattern formation in general. For his abstract way of reasoning, the molecular nature of the flowing signal was not at all critical, and he correctly described it as "experimentally not separable from auxin." Molecular geneticists are still in a somewhat similar situation, except that they prefer concrete substances over abstract principles and have finally reached an agreement to talk about auxin as the polarizing substance. In recent years, detailed knowledge about auxin signal transduction and transport has been linked to patterning processes and has convinced many researchers that self-regulated signal flux could underlie patterning in the most diverse locations in plants. Ten years ago or so, many researchers excluded roles of plant hormones in the control of these processes, while there is now an expanding field of mathematical modeling of hormone-based self-regulatory mechanisms. This shift in perception demonstrates the pioneering nature of Tsvi's thoughts. In their mathematical description by Mitchison, Tsvi's postulated feedback mechanisms took the form of an early systems biology description of plant biological patterning.

Flexibility and self-organization are hallmarks of plant development as a whole and are reiterated at all levels of plant organization. Of all these levels, Tsvi became fascinated by the plasticity of plant architecture—for example, the arrangement of branches on the trunk of a tree—which can be correlated to obvious external influences such as weather conditions or human activity. Tsvi applied the same basic principles that explained the variable orientation and reproducible continuity of vascular tissues to better understand the mechanism underlying the inherent plasticity of plant development. A growing branch can be seen as a source of auxin that, through its orienting action on the vascular tissues that connect the branch with the roots, diverts substrates and signals toward itself and away from competing branches, thus inhibiting their development. Further, if increased light conditions enhance auxin supply, competition of different branches for the best environmental space and for limiting nutrient

supply from the roots could be integrated by the same signal. Plant architecture would thus be shaped by a self-organizing process in which branches inhibit or compete with one another.

Just as among individuals in Darwinian selection, this "developmental selection" among plant organs is based on environmentally influenced selection. As in the case of vascular patterning, the final balanced state would still be constrained by species-specific controls, but within this frame, developmental selection could optimize adaptation. An interesting aspect of this model is that the required interactions could be carried out by a single central signal, and auxin would again be the most likely candidate. As a long-range coordinating signal (on top of its role in local patterning), auxin could integrate information from different sources, which in turn could be differentially interpreted by response tissues. Although the idea of auxin as a messenger in many processes did not immediately appear attractive, results from recent studies suggest that the complexity of auxin signaling processes could originate from tissue-specific signal interpretation rather than from a diversity of signal substances.

Although Tsvi was a quiet person, not inclined to dominate any discussion, he influenced many people through the originality of his ideas over the decades. Once approached, he usually offered lots of fresh thoughts and original insights. He was very generous in sharing his time and thoughts on subjects of common interest and was actively engaged in productive exchanges with molecular, cell, and systems biologists as well as ecologists working on plant patterning. Tsvi cared a lot for the people around him and was highly dedicated to his family, students, and colleagues. His wife Laura and some of his former students contributed to many of his manuscripts, and his biography documents a strong commitment to the improvement of teaching at the university.

Tsvi was active beyond retirement; most recently, he worked on a manuscript on leaf venation patterning, a book on morphogenic implications of plant hormone signals, and a popular book on botanical phenomena.

It is regrettable that Tsvi will not be with us to witness the dramatic progress in the analysis of the processes he was so influential in envisioning and unraveling. The currently thriving molecular genetic analyses of plant patterning owe a lot to the guiding influence of his combined experimental and theoretical insights.

Thomas Berleth
University of Toronto

Enrico Scarpella
University of Alberta

Ian Sussex
Yale University

Important Dates in 2007

April 4
Abstract deadline for Plant Biology & Botany 2007 program book

May 18
Officer election closes

June 1–2
Northeast Section Annual Meeting
SUNY
Syracuse, New York

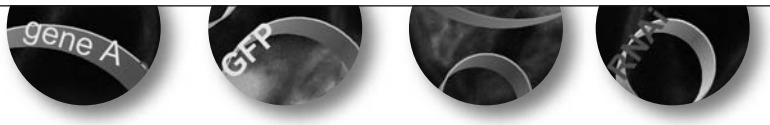
June 15
Pre-registration cutoff for Plant Biology & Botany 2007

July 5–7
Laboratory Leadership Workshop
Chicago, Illinois
http://www.aspb.org/meetings/pb-2007/labmanagement.cfm

July 6 & 10
Executive Committee Meeting
Chicago, Illinois

July 7–11
Plant Biology & Botany 2007 Joint Congress
Chicago, Illinois
http://www.aspb.org/meetings/pb-2007/index.cfm

September (date to be determined)
Mid-Atlantic Section Crab Feast
ASPB Headquarters
Rockville, Maryland
http://www.aspb.org/sections/washington/meetings.cfm



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Plant Physiology is pleased to announce a Focus Issue on Vector Systems for Plant Research and Biotechnology to be published in December 2007. The issue will be edited by Vitaly Citovsky. Submissions in all topics of plant expression vector systems designed for state-of-the-art experimentation are welcome, including novel systems for multiple gene expression, protein tagging, induction and suppression of gene silencing, specialized vectors for monocot transformation, and virus-based vectors. Emphasis should be made on simplicity of use and applicability of the system to a wide range of model plants and crop species.

Authors interested in contributing should indicate this in the cover letter when submitting papers online at http://submit.plantphysiol.org/. Please select "Vector Systems (December, 2007)" from the Focus Issue list in the online submission system. Articles published within 2 years before and after the Focus Issue will be considered for inclusion in an online Focus Collection of articles relevant to the focus topic (http://www.plantphysiol.org/ misc/collections.dtl).

Please contact Vitaly Citovsky (vitaly.citovsky@stonybrook.edu) for additional information.

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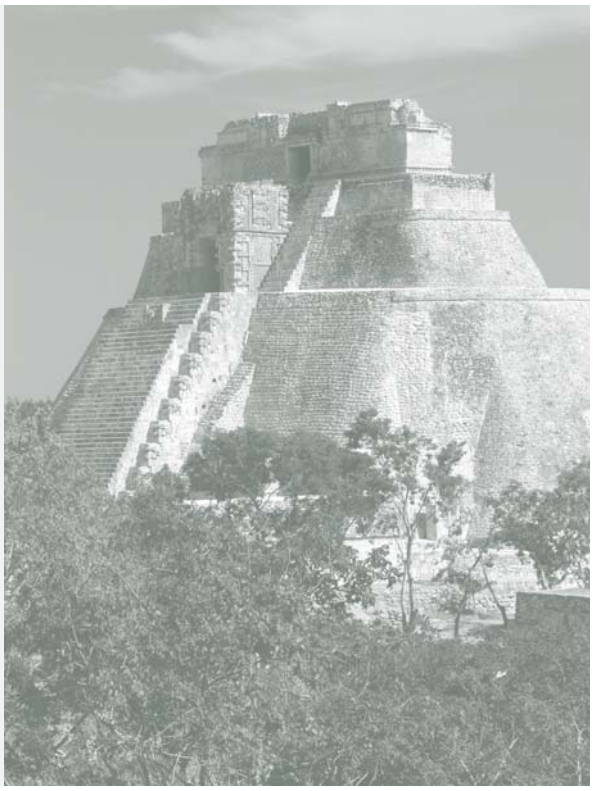

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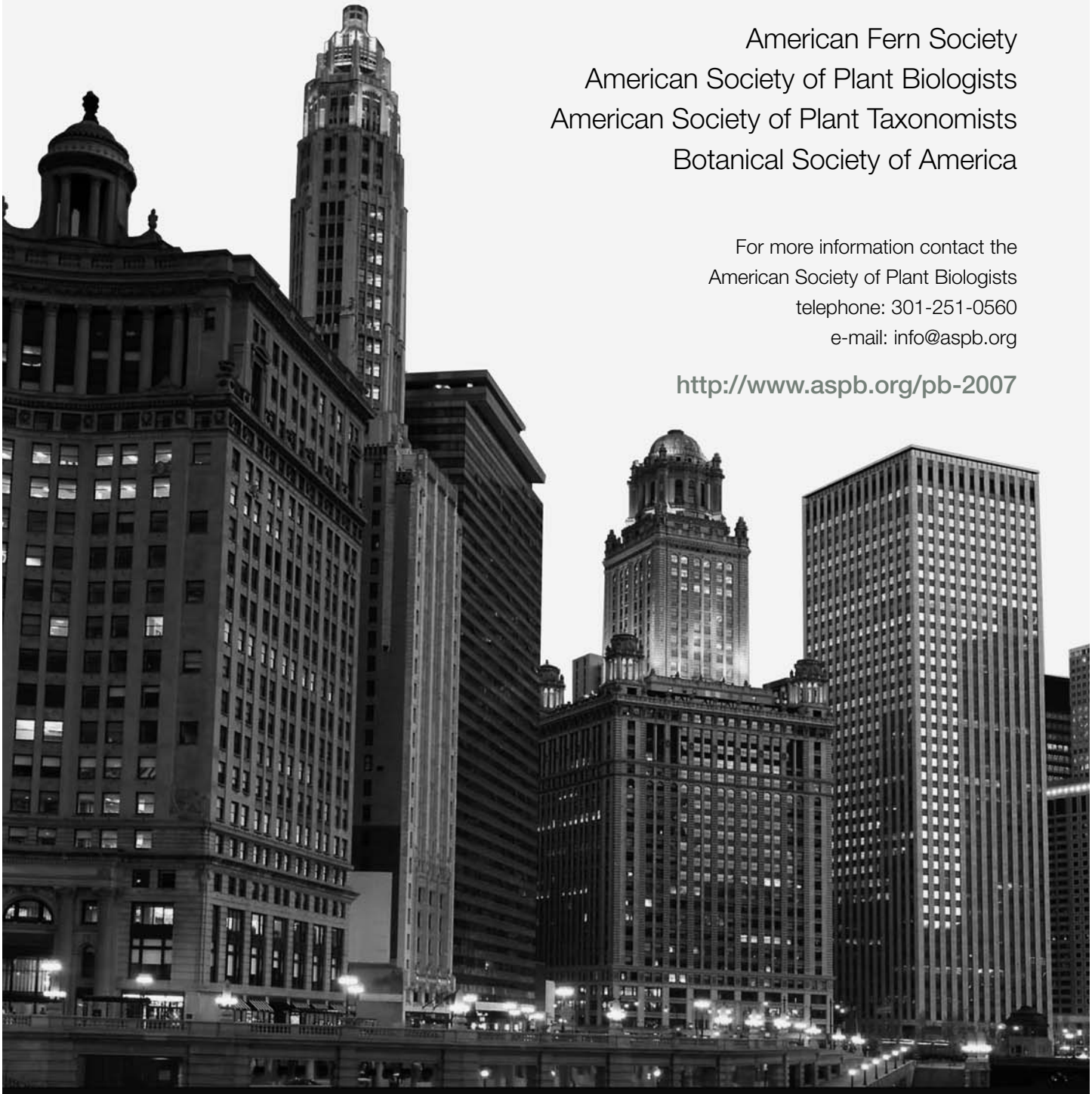

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	Crispin Taylor / ext. 115 ctaylor@aspb.org	Donna Gordon / ext. 131 dgordon@aspb.org	Jean Rosenberg / ext. 110 jean@aspb.org	Kim Kimnach / ext. 140 kkimnach@aspb.org	Jotee Pundu / ext. 144 jotee@aspb.org	Stephanie Liu-Kuan / ext. 143 sliu@aspb.org	Suzanne Cholwek / ext. 141 scholwek@aspb.org	Carolyn Freed / ext. 122 cfreed@aspb.org	Brian Hyps / ext. 114 bhyps@aspb.org	Nancy Winchester / ext. 117 nancyw@aspb.org	John Long / ext. 119 jlong@aspb.org	Annette Kessler / ext. 120 akessler@aspb.org	Leslie (Ash) Csikos / ext. 125 lcsikos@aspb.org	Wendy Sahli / ext. 123 wendys@aspb.org
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