

RISK *newsletter*

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On Merging Our Two Risk Cultures

"Let this be our challenge: to insist on the practice of risk assessment being a true example of genuine interdisciplinary problem solving. We can do this only with a reasonably balanced representation from all the sciences, including engineering, as well as from the legal, economic, and management communities. By making this the signature of SRA, we will serve all of society in the best possible way."—B. John Garrick

As the most recent recipient of SRA's Distinguished Achievement Award, a dedicated member of the Society, and a long-time practitioner of risk analysis for engineered systems, former SRA president B. John Garrick was uniquely qualified to both criticize and advise the Society during his address at the 1994 Annual Meeting.

Pointing out that the Society had thus far failed in its goal to "get this multicultural risk community to work as a team," he said that risk analysts had coalesced around two basic groups—engineers and non-engineers—who had little appreciation for each other and too often worked against each other, thereby confusing real decision makers, namely, the public.

Garrick believes the reason for this extends beyond the inherent philosophical differences of the two groups on problem solving and is primarily due to their different beginnings. Although earlier work had been done, the engineers had their big boost into the risk assessment field with the 1975 reactor safety study directed by SRA's 1990 awardee, Norman C. Rasmussen. The non-engineers (whom Garrick also broadly classified as environmentalists) had their start in the field with the cancer risk assessment guidelines issued by the U.S. Environmental Protection Agency in the mid-1970s and later with the paradigm on risk assessment issued by the National Academy of Sciences in 1983.

Although a reasonable merging of the two cultures occurred for early risk assessments of nuclear plants, Garrick said the same level of comprehensiveness has not been applied to other systems, and that needs to be changed. "We engineers greatly need to embrace the ideas of risk communication, [and] we need the help of the health scientists to improve and update our health effects models." At the same time, "the environmentalists need to catch up in the areas of information processing, the quantification of uncertainty, and a more liberal consideration of different performance measures beyond cancer."

Turning to specific issues, Garrick addressed the continuing debate about thresholds for radiation and chemical carcinogens. By assuming that no-damage thresholds do not exist, he said, risk assessors are predicting statistical deaths that give decision makers only the most conservative and costly choices—this in spite of the fact that risk assessments were begun as a means of offering decision makers realistic appraisals.

Risk analysts must quantify their uncertainties, which, if nothing else, will provide guidance for research and corrective actions, Garrick said. "It shouldn't be a question of whether or not there is a no-damage threshold, but rather a question of how likely there is and how likely there isn't, and that should be the basis of our calculations." That is, the challenge is for risk analysts to translate

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1995 Meeting at Sheraton Waikiki

The Sheraton Waikiki Hotel in Hawaii, the site of the 1995 Society for Risk Analysis Annual Meeting on December 3-6, is in a central location within walking distance of nearly 500 restaurants and shops. For Sue Burk of the SRA Secretariat, that was a deciding factor in its selection.

"The Sheraton Waikiki is in the thick of things," she said. "When you walk out the door, every type and price range of restaurant is available, including affordable fast food, as well as shops and a small beach." Also in making the choice, Burk kept affordability in mind for annual meeting participants on a tight budget.

The hotel is located on Oahu, one of Hawaii's eight main islands, which features well-known landmarks such as the state's capital city Honolulu, the beaches of Waikiki and the North Shore, the extinct volcano Diamond Head, and Pearl Harbor. Other attractions are historic Chinatown; Foster Botanical Garden, founded in 1853; Iolani Palace, the home of Hawaiian royalty; Hawaii Maritime Center, displaying Hawaii's nautical history; Waikiki Aquarium, with 300 species of regional marine life; and the 43-acre Honolulu Zoo.

Oahu's schedule of events in early December includes the Lite Ice Triple Crown of Surfing's 13th Annual Pipe Masters, which is part of the Association of Surfing Professionals World Tour, at the North Shore's Ehukai Beach Park (December 1-9); the Pacific Handcrafters Guild Christmas Fair exhibit at Thomas Square (December 2-3); Bishop Square's annual Christmas lighting in Honolulu's Tamarind Park (5:30 p.m. on December 7); and the Honolulu Marathon, one of the largest

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Merging Risk Cultures

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their knowledge into the language of uncertainty, which is the language of probability. While the two cultures have not worked well together in this area, the only possible way to quantify uncertainties with any kind of credibility is for the two groups to combine their talents and commit to a common goal.

Garrick also believes that the performance measures calculated shouldn't be limited to those required by law. Citing the nuclear waste repository as an example, he said that risk analysts shouldn't be in their current position of waiting to be told what to calculate, but instead should be calculating all performance measures: doses to humans, releases to the biosphere, etc. "Not only would it be cheaper, but we would do a better job of characterizing the risk."

Another of Garrick's concerns is the issue of "acceptability and decision." Since risk is a continuous and not a discontinuous function, he said, decision-theoretic approaches to risk problems should be adopted. Again citing the repository as an example, he said that the dose delivered to the biosphere can be made as small as desired. But what will the cost be? "The real questions and the real decisions that have to be made are all concerned with the allocation of societal resources."

Garrick also talked about how the Society can better serve the risk management activities of the nation. One way, he said, is to meet the challenge of the distortion of risk information by the media, congressmen, and other institutional representatives by being willing to bridge the gap between *popular risk* and *scholarly risk*. "We owe it to our Society and the public to get involved, and from the media's perspective, we just haven't been doing so."

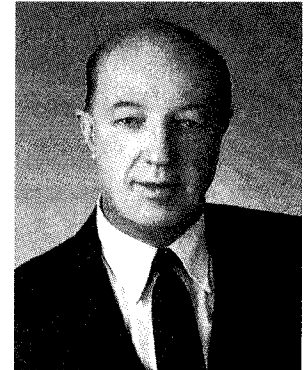
In another area, the Society can help ensure a workable process for involving the public in risk assessment and management. For example, the U.S. Department of Energy has recently adopted the recommendations of a National Academy of Sciences committee report written in response to a DOE inquiry on "whether a risk-based approach to evaluating the consequences of alternative

Garrick Receives SRA's Highest Award

B. John Garrick, the president and chief executive officer of PLG Inc., Newport Beach, California, was presented SRA's Distinguished Achievement Award at the Society's 1994 Annual Meeting held in Baltimore in December.

In 1968 while a graduate student in engineering and applied science at the University of California-Los Angeles, Garrick wrote a Ph.D. thesis on the topic *Unified Systems Safety Analysis for Nuclear Power Plants*, which first advocated what is now known as probabilistic risk assessment. Initially focusing only on nuclear systems, most of his career has been dedicated to building a comprehensive consulting practice in quantitative risk assessment in many fields, including space and defense, chemical and petroleum, and transportation. His PLG teams were the first to present risk results that included the quantification of uncertainties in the logic models and also included the treatment of external phenomena in the basic risk models.

Garrick was president of SRA in 1989-90 and was elected a Fellow in 1991. He is also a Fellow of the American Nuclear Society and the Institute for the Advancement of Engineering and was elected to the National Academy of Engineering in 1993. He recently directed a NATO advanced research workshop in Budapest, Hungary, on the use of risk-based technologies for evaluating and applying disarmament strategies.



B. John Garrick

actions (regarding their environmental-remediation program) is feasible and desirable." Having served on the NAS committee, Garrick says that the DOE public-participation policy, which addresses many more issues than risk, is to be handled on a site-specific basis. Unless risk experts get involved in articulating clearly and concisely the questions that need answers, he fears that the same mistakes that created the almost impossible licensing process for nuclear facilities will preclude a rational approach to remediating nuclear facility and nuclear weapons sites.

"I think we can make a difference because the core values of the DOE policy include such qualities as accuracy, communication, consistency, honesty, innovation, openness, and scientific credibility. All of these and more are the very foundation of quantitative risk assessment, and to deal with the honesty value we must be quantitative. By which I mean we must quantify our uncertainties. By which I mean we must deal with probabilities, which is the language of uncertainty. To those who say that this is a risk communication prob-

lem, I say that unless you have something with substance to communicate, you will not succeed in the public arena."

Garrick said that even though risk assessment is more of a thought process than a genuine science or engineering discipline, it can greatly improve science and engineering by facilitating better decisions on alternative solutions to societal problems. "We always need to be thinking about solving problems, about how to wrap up the science and get on with closure of projects. [In so doing], we will provide a knowledge base that will give greater assurance that the standards and regulations that follow will indeed provide protection."

Returning to the issue of merging the two cultures, Garrick said, "A competent risk assessment and risk management program is not just multidisciplinary but more importantly interdisciplinary, as has been discussed by two former recipients of this honor, Chauncey Starr in 1984 and Sheila Jasanoff in 1992."

Garrick concluded by issuing the challenge to the Society printed at the beginning of this article.

1995 Annual Meeting Site

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marathons in the world with over 30,000 competitors (December 10).

To request other information on Oahu, contact the Waikiki/Oahu Visitors Association, Suite 477, Pauahi Tower, 1001 Bishop Street, Honolulu, HI 96813, telephone (808) 524-0722. For information on Hawaii, contact the Hawaii Visitors Bureau, Waikiki Business Plaza, 2270 Kalakaua Avenue, Honolulu, HI 96815, telephone (808) 923-1811, or their other offices in New York, (212) 947-0717, and Tokyo, (81) 03-3201-0430. For information on the headquarters hotel on the World Wide Web, go to <http://www.aloha.com/~june/sheraton>. For Hawaii sightseeing, go to <http://www.visit.hawaii.org>.

Congressional Briefing Update

The SRA-sponsored series of breakfast briefings on risk assessment for U.S. congressional staff continued with two more briefings in March. The first three briefings were held in January and February (see *RISK newsletter*, First Quarter 1995).

On March 17, SRA member John F. Ahearn of Sigma Xi, the Scientific Research Society, and former Society president James D. Wilson of Monsanto Company (who is now with Resources for the Future; see page 12) addressed regulatory peer review.

On March 31, SRA Councilor Caron Chess of Rutgers University's Center for Environmental Communication and Lawrence E. Susskind of the Massachusetts Institute of Technology's Department of Urban Studies and Policy and of Consensus Building Institute Inc. spoke on risk communication, focusing on priority-setting and public participation.

SRA President M. Elisabeth Paté-Cornell, who chaired the series' Management Committee, says there are no plans to schedule additional briefings in this series, but that the Society will assess its impact and will consider similar activities for the future.

1995 Annual Meeting Sessions Planned

The Society's 1995 Annual Meeting Committee, chaired by President-elect John D. Graham, will meet on July 7 with the SRA Secretariat in McLean, Virginia, to plan the program for SRA's upcoming annual meeting, which will be sponsored both by the parent SRA and the Japan Section of SRA.

Committee members include SRA Councilors David E. Burmaster of Alceon Corporation, Gail Charnley of the National Commission on Risk Assessment and Risk Management, Yacov Y. Haimes of University of Virginia, and Tohru Morioka of Osaka University. Other members are Scott Baker of EA Engineering, Science, and Technology Inc.; Ann Bostrom of Georgia Institute of Technology; Kenny S. Crump of the K. S. Crump Group of ICF Kaiser International; Michael Dourson of Toxicology Excellence for Risk Assessment; John S. Evans of Harvard School of Public Health; Robert Fares of Versar Inc.; John G. Keller of Apex Environmental Inc.; Lester B. Lave of Carnegie Mellon University; Stanley Levinson of B & W Nuclear Technologies; SRA Treasurer Paul S. Price of ChemRisk, a division of McLaren/Hart; Resha Putzrath of Georgetown Risk Group; and Larisa Rudenko of Environ Corporation.

The committee will arrange the papers, symposia, and posters into sessions and schedule workshops. Authors will receive notification concerning their papers by early fall. Preliminary programs will be mailed in September, and the deadline for registration will be in mid-November.

Included in the program will be five sessions organized by the SRA Japan Section under the leadership of its Executive Committee for the Joint Meeting in Hawaii, chaired by Eiji Yokoyama, former dean of the National Institute of Public Health. The committee members are the Japan Section's vice president Hirotsada Hirose of Tokyo Women's Christian University, its president Saburo Ikeda of Tsukuba University, SRA Councilor Tohru Morioka of Osaka University, Taketoshi Taniguchi of Central Research Institute of Electric Power Industry, and Iwao Uchiyama of the National Institute of Public Health Japan.

The Society will consider proposals for workshops to be held December 3 after the June 16 deadline. It also is accepting entries for an exhibition of risk-related products and services and a book exhibit at the meeting. For more information, contact Lori Strong, SRA Secretariat, telephone (703) 790-1745.

SRA and ISEA To Hold Joint 1996 Annual Meetings

The Society for Risk Analysis and the International Society for Exposure Analysis (ISEA) will hold joint annual meetings in 1996 at the Fairmont Hotel at University Place in the New Orleans financial district, near the French Quarter. The event, to be held December 8-11, will be the first annual meeting SRA has held with another society.

Thomas E. McKone of the Lawrence Livermore National Laboratory and the University of California at Davis, who is a councilor of both societies, is the ISEA technical program chair for 1996 and is organizing ISEA's technical program committee, which will include both ISEA and SRA members from academia, government, and industry. He is also an SRA Meetings Committee member and will serve as a liaison between the societies as they plan the joint meetings. In addition, he chairs the SRA Exposure Assessment Specialty Group, which is planning to take an active part in the meetings.

McKone requests anyone with ideas or suggestions for SRA/ISEA sessions at the 1996 Annual Meeting to contact him at e-mail tmck@llnl.gov, telephone (916) 754-8757, or fax (916) 752-3394.

Abbott, Boykin Receive SRA's Outstanding Service Award

Lorraine S. Abbott, editor of RISK newsletter, and Raymond F. Boykin, who served as the Society's treasurer for five years, were co-recipients of SRA's Outstanding Service Award at the 1994 Annual Meeting.

Abbott became the editor-writer of the SRA newsletter with the publication of its second issue in 1981. At the time, she was a technical writer and editor at Oak Ridge National Laboratory, where she had been employed since receiving her degree in chemistry from Maryville College in Tennessee in 1948. Her publications include reviews of radiation shielding design methods for fast reactors and nuclear weapons and, as co-editor, the shielding volume of the *Reactor Handbook* published in 1962 by the U.S. Atomic Energy Commission. From 1979 to 1989, she was also the editor-writer of the newsletter of the American Nuclear Society's Oak Ridge/Knoxville chapter.

Retiring from the Laboratory in 1986, Abbott formed her own technical communications company, Tec-Com Inc., and assembled a five-person staff to produce RISK newsletter and several other publications. Through the efforts of the staff, which include regular contacts with chapters, sections, and specialty groups, SRA's newsletter has grown from a four-page biannual publication to the present quarterly newsletter that fully informs the membership of current events and provides a historical record of the Society's major activities.

Boykin was elected to a two-year term as the Society's treasurer in 1989 and was re-elected in 1991. His second term was extended to three years by action of the SRA Council so that the secretary and treasurer would be elected in alternate years. During his tenure, he instituted several financial review procedures, was instrumental in obtaining a new journal publishing contract more favorable to the Society, and took the lead in modifying the budgeting process to require more financial responsibility in all SRA activities. He is a charter member of SRA and served as general program chairman and general co-chairman of the 1984 and 1989 annual meetings, respectively.

Boykin is currently at California State University, Chico, where he is a professor of operations management, the director of the Center for Risk Management, and the technical director of the Center for Manufacturing Excellence. He is also a senior associate consultant with PLG Inc.

With a Ph.D. in management science from St. Louis University, Boykin spent over 15 years as a management scientist and senior research scientist in industry, mostly in the chemical and nuclear industries. His work included early applications of probabilistic risk assessment in chemical plant operations, methodology development for hazardous material transportation, and numerous other risk projects that included high-level radioactive waste disposal, ammonia and chlorine storage, plutonium transportation, and glove box operations. He has served on several industry and government risk assessment and risk management committees at both the national and state levels and has published numerous papers on risk analysis topics.



Abbott and Boykin at SRA Meeting

Cumming Is Society Historian

The Society for Risk Analysis Council appointed the Society's first president, Robert "Bob" Cumming, as its historian at the 1994 SRA Annual Meeting.

Cumming is writing a history of SRA and requests anyone with recollections, documentation, or photographs associated with the Society, particularly in its early years, to contact him at 111 Netherlands Road, Oak Ridge, Tennessee 37830, telephone (615) 483-0837 or e-mail rbcumming@aol.com.

SRA President Elected to Academy

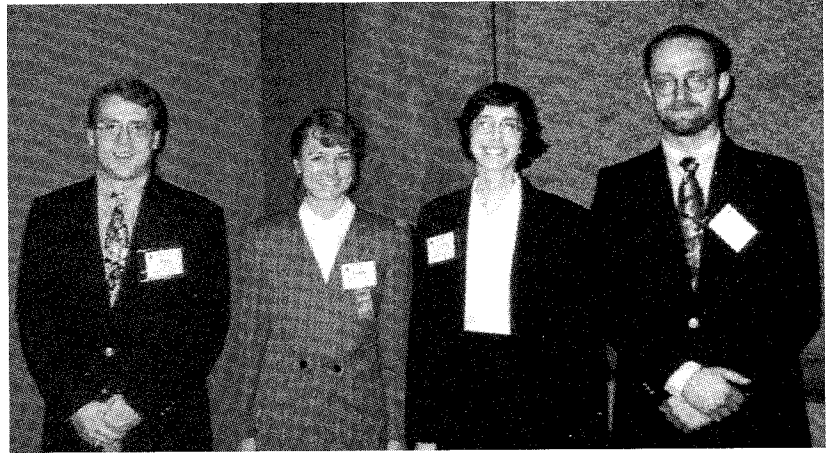
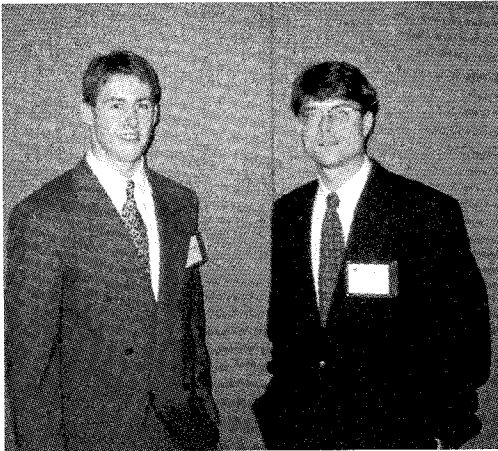
SRA President M. Elisabeth Paté-Cornell was among 77 engineers who were recently elected to membership in the National Academy of Engineering. The academy's president Robert M. White announced the election of the new members and eight foreign associates on February 9, which brings the total U.S. membership to 1,790 and the number of foreign associates to 151.



Paté-Cornell

The academy elected Paté-Cornell "for contributions to the field of engineering risk management, enabling effective inclusion of technical, economic, and organizational factors in safety policies and regulations." She is a professor in the department of industrial engineering and engineering management at Stanford University in Stanford, California.

Academy membership is one of the highest professional distinctions accorded to an engineer and honors those who have made "important contributions to engineering theory and practice, including significant contributions to the literature of engineering theory and practice," and those who have demonstrated "unusual accomplishment in the pioneering of new and developing fields of technology."



Christopher S. Crockett and David L. MacIntosh William J. Wheeler, Sharon Sigethy, Laura Painton, and Charles D. Linville

Students Receive Best Paper Awards

Six student papers submitted for the 1994 SRA Annual Meeting were judged to be of high quality based on scientific rigor, creativity, and the advancement of risk assessment. Each student received a \$500 travel award and the opportunity to make a platform presentation. The awardees, their paper titles, and supporting authors, if any, are listed below:

Christopher S. Crockett, Drexel University, Philadelphia, Pennsylvania, "Prevalence of Shigellosis in the U.S.: Consistency with Dose-Response Information," with C.N. Haas.

Charles D. Linville, Carnegie Mellon University, Pittsburgh, Pennsylvania, "Information Value Theory: Informing Global Change Research Priorities."

David L. MacIntosh, Harvard University, Boston, Massachusetts, "Uses of Probabilistic Exposure and Dose Models

in Environmental Health Management and Risk Assessments," with J. Xue and H. Ozkaynak.

Laura Painton, Carnegie Mellon University, Pittsburgh, Pennsylvania, "Optimization Under Uncertainty: A Case Study in System Reliability," with P. Fischbeck.

Sharon Sigethy, Duke University, Durham, and U.S. EPA Health Effects Research Laboratory, Research Triangle Park, North Carolina, "Comparing Three Approaches for Deriving Potency Estimates for Acute Noncancer Health Effects: Phosgene—A Case Study," with I.L. Cote, D. Costa, M.J. Selgrade, and J.J. Vandenberg.

William J. Wheeler, Pennsylvania State University, University Park, "Perceptions of Global Warming: Causes and Effects."

DRMS Program Sees Upsurge in Proposals

The Decision, Risk, and Management Science Program (DRMS) of the National Science Foundation (NSF) has received more than 270 proposals for fiscal year 1995, says Program Director Robin Cantor. The special funding emphasis for fiscal year 1995 has been in policy sciences.

"Last year we reviewed 146 regular proposals," Cantor said. "We've had a huge surge in our proposal submissions. We attribute that, in part, to various special competitions that we're running."

One special competition is providing \$2.5 million in grants for research in valuation and environmental policy. The DRMS program is supporting the competition in partnership with the U.S. Environmental Protection Agency. Can-

tor hopes this funding will continue in 1996 but has no guarantees.

The program also awards grants under the Joint NSF/Private Sector Research Initiative, which promotes partnerships between university and private sector researchers by encouraging theory building through applied studies in operational and managerial processes, risk management, and organizational decision making. The NSF matches private sector funds up to \$75,000 per year. From 1991 through 1994, the DRMS program made 17 awards under this initiative, with SRA members receiving five of them.

The NSF created the DRMS program in the 1980s to build an interdisciplinary science base for decision making and management by providing grants

for research that explores fundamental issues in management science, risk analysis, public policy and societal decision making, behavioral decision making and judgment, and organizational effectiveness. In fiscal year 1994 with nearly \$4 million in total resources, the program made 35 new awards out of 146 proposal submissions—a 24 percent success rate—and supported a total of 70 new and continuing awards.

The next target date for proposal submissions is August 15, 1995, which will be the first competition for fiscal year 1996 funds. For more information on the DRMS program, contact Cantor by e-mail rcantor@nsf.gov or Program Director Hal R. Arkes by e-mail harkes@nsf.gov, or call the program office at telephone (703) 306-1757.

Risk Assessment As a Major Tool for EPA Policy Decisions

(Lynn R. Goldman, M.D., Assistant Administrator for the Office of Prevention, Pesticides and Toxic Substances at the U.S. Environmental Protection Agency, was the speaker at the plenary session of the Society for Risk Analysis' 1994 Annual Meeting in Baltimore, Maryland. Given below is RISK newsletter's summary of her address.)

Using "Risks Along the Regulatory Superhighway" as the topic of her address at the 1994 SRA Annual Meeting, Dr. Lynn R. Goldman, pediatrician, environmental epidemiologist, and, since 1993, assistant EPA administrator, summarized how risk assessment has evolved as a major tool in shaping policy decisions at the EPA.

Dr. Goldman pointed out that risk has always had a role in EPA's regulatory decision making, but initially no formal methods existed for assessing risk. Instead, EPA's earliest set of "cancer principles" was developed from the proceedings of adjudicatory hearings on the carcinogenicity of the persistent chlorinated pesticides, during which scientists from opposite sides presented their findings.

The result, she said, was that "the cited findings included that any chemical producing cancer in animals should be considered a human carcinogen, and there is no method for establishing a no-effect level for a carcinogen." With no way to model or extrapolate low-level cancer risks for chemicals, the EPA administrator at that time had only two options: ban the chemical (protecting everyone) or retain it (possibly putting some people at risk).

By the mid-1970s, however, the EPA had issued its interim cancer risk assessment guidelines, becoming the first agency to attempt to quantify cancer risks. "Precedents were set by using consistent risk assessment practices, both in regards to our handling of scientific uncertainties as well as in the courts where the relative merits of our assessment practices were debated and usually settled in favor of the agency."

But the process remained adversarial, Dr. Goldman said, and the EPA sought advice from the National Research Council, which responded in 1983 by publishing the well-known Red Book (the report *Risk Assessment in the Federal Government: Managing the Process*). It recommended keeping risk assessment and risk management separate, to be linked together later by risk characterizations as summations for policy makers.

In 1986, the EPA revised and added to its guidelines, making them consistent with the NRC recommendations. Even so, concern and criticism of EPA's practices persisted—and still do. "Many in the regulated community view EPA's risk assessments as too conservative," Dr. Goldman said.

In 1989, a report by the American Industrial Health Council recommended an even-handed exposition of data and their evaluations. The EPA subsequently developed guidance for the conduct of risk characterization, which was later updated by the agency's Science Policy Council. In addition, EPA joined in sponsoring a study on risk characterization by the National Research Council.

In 1990, the U.S. Congress asked the NRC to recommend how EPA could best develop new risk assessments. The result was the 1993 report *Science and Judgment in Risk Assess-*

ment. In addition, Congress, through the Clean Air Act Amendments, required the U.S. president to establish a Risk Assessment and Management Commission, which is examining the implications of the NRC report and will give recommendations on the assessment of residual risks under the Clean Air Act.

Meanwhile, the agency is revising its 1986 cancer risk assessment guidelines to reflect significant changes in the science and understanding of carcinogenic processes. With the explosion of information in basic biology and toxicology, major emphases of the revised guidelines will be (1) the use of all available cancer mode-of-action information and (2) modification of hazard classification guidelines to give narrative descriptions of hazards, together with three descriptors of conclusions (known/likely, unlikely, and cannot say).

Dr. Goldman added that the agency will continue to fill in the gaps with default assumptions, including the assumption that a linear dose-response assessment is appropriate when the mechanism is not known for certain.

At the same time, EPA is performing or sponsoring ongoing projects to further improve the science base for decision making. For example, in keeping with recommendations in the 1993 NRC report on *Pesticides in the Diets of Infants and Children*, the agency recently published in the *Federal Register* a proposal to examine combined exposures from various routes (food, water, etc.) and sources (initially the triazines, a major group of herbicides that all produce mammary tumors in female rats).

In future research directions, the EPA will focus on ecology, for which research, testing, and risk assessment methodology have lagged behind. The agency also is planning to study non-cancer effects, such as the effect of endocrine disruptors both in the environment and on human health.

To streamline its operations, the agency's Office of Research and Development is reorganizing along the lines of the NRC's decision-making paradigm. It will include a National Health and Environmental Effects Research Laboratory, a National Exposure Research Laboratory, a National Risk Management Research Laboratory, an Office of Research and Science Integration, a National Center for Environmental Research and Quality Assurance, a National Center for Environmental Assessment, and an Office of Resources Management and Administration.



Lynn R. Goldman

In addition, EPA Administrator Carol Browner has directed all offices to develop standard operating plans to ensure appropriate peer review for all agency science efforts.

In conclusion, Dr. Goldman said, "As we make improvements in the scientific processes, it is important to keep in mind that the legislative basis for environmental policy decisions is multifaceted. Generally, risk is only one component in decision making."

Also, she noted that risk assessment is used in many different ways in the various agency programs to support regulatory decisions. "Sometimes, a bounding estimate on risk is used to set priorities for more in-depth review. In others, it forms the basis for determining that more testing information is needed on the chemical. Some assessment information is used to classify chemicals and appropriately label substances as to toxic or safety hazards. In the new industrial chemicals program at EPA, some 2,000 chemical evaluations are made per year based on minimal or no test data. Other assessments are major, like those for the setting of air and water standards, where there is a considerable body of data spanning an array of health and ecological effects."

Dr. Goldman said the Clinton administration is committed to the appropriate use of risk assessment and other analytic tools in developing policies and regulations. And Congress is developing several bills which prescribe certain types of risk assessments as a part of regulatory decision making.

Final Call for PSAM-III Papers

The technical program committee has issued the final call for papers for the International Conference on Probabilistic Safety Assessment and Management—PSAM-III—to be held June 24-28, 1996, in Crete, Greece. The Society for Risk Analysis is a cosponsor of the conference.

To submit a paper, send four copies of a 400 to 600-word summary in English by **July 1, 1995**, to the technical program committee chair P. Carlo Cacciabue, European Commission, Joint Research Centre, Institute for Systems Engineering and Informatics, I-21020 Ispra (VA), Italy, telephone (39) 332 789869, fax (39) 332 785813. *(The committee will consider submissions which arrive past the deadline.)* Authors will receive acceptance or rejection notice by October 10, 1995. Full papers will be due by January 1, 1996.

"Let us work together to create the best assessment tools we can," Dr. Goldman admonished. "The challenges that face us today demand no less of us than making government work for the people of this country, and that entails using the best science."

Editor's Note: Not included in the above summary are Dr. Goldman's additional remarks on EPA's participation in efforts to harmonize international risk assessment activities.

RISKANAL and Other Internet Resources for Risk Assessment

The RISKANAL Internet mailing list operated by the Pacific Northwest Laboratory and SRA's Columbia-Cascades Chapter has resolved some problems with mailing list software and is now in full operation. As of mid-May, it had 267 subscribers, including 101 international subscribers from 16 countries, and had posted 241 messages. Anyone with an Internet account/address may subscribe to RISKANAL by sending the message **subscribe riskanal first-name last-name** to the following address: listserv@listserv.pnl.gov.

New RISKANAL subscriber Erik G. Still of Golder Associates Inc., Redmond, Washington, recently forwarded to RISK newsletter the addresses of risk assessment home pages on the World Wide Web that he had collected from other RISKANAL subscribers. To inform the SRA membership of the availability of these home pages, selected addresses are reprinted below:

Agency for Toxic Substances and Disease Registry (see Datasets/Resources) – <http://atsdr1.atsdr.cdc.gov:8080>

Center for Exposure Assessment Modeling (U.S. EPA software) – ftp://ftp.epa.gov/epa_ceam/wwwhtml/ceam_home.html

Centers for Disease Control and Prevention – <http://www.cdc.gov>

Council on Environmental Quality (NEPA information) – <http://129.229.1.100/ceq/ceq.html>

The Environmental Organization Directory – <http://www.rain.org/~eis>

Environmental Sciences Division, Oak Ridge National Laboratory – <http://www.esd.ornl.gov>

Health and Ecological Assessment Division, Lawrence Livermore National Laboratory – <http://www-ep.es.lnl.gov/www-ep/hea.html>

International Agency for Research on Cancer – <http://www.iarc.fr>

Links to **Material Safety Data Sheets, Occupational Safety and Health Administration**, and other sites –

<gopher://gopher.igc.apc.org:70/11/environment/toxics/internet>

National Institute for Occupational Safety and Health – <http://www.cdc.gov/diseases/niosh.html>

National Institute of Environmental Health Sciences – <http://gopher.niehs.nih.gov>

National Institute of Public Health and Environmental Protection (RIVM) – <http://deimos.rivm.nl/about.html>

Office of Environmental Management, U.S. Department of Energy (includes links to DOE laboratory servers) – <http://www.em.doe.gov/roadmap.html>

Risk-Related Research at Lawrence Berkeley Laboratory – <http://www.lbl.gov/LBL-Programs/Risk-Research.html>

The World Health Organization – <http://www.who.ch>

SRA Specialty Groups

Editor's Note: Reports on all of the specialty groups' plans for the 1995 SRA Annual Meeting will be included in the next issue of the newsletter.

Exposure Assessment Specialty Group sees the 1996 joint meeting of the Society for Risk Analysis and the International Society of Exposure Analysis (ISEA) in New Orleans as a great opportunity for the group's participation (see page 3). The SRA Council approved the joint meeting when it met in March. The group encourages its members to begin thinking about session topics for the meeting that highlight the role of exposure assessment in risk assessment.

Specialty group members who did not previously respond to calls for participants in the Residential Exposure Assessment Project (REAP) but would like to contribute expertise or suggest potential sources of additional funds should contact the SRA Secretariat. The project is a cooperative agreement among SRA, ISEA, the U.S. Environmental Protection Agency, and several industrial sponsors to produce a source book on multiple aspects of residential exposure. The final product is due in 1996.

For more information about the group's activities, contact its chair, Thomas E. McKone of Lawrence Livermore National Laboratory and the University of California at Davis, telephone (916) 754-8757, fax (916) 752-3394, or e-mail tmck@llnl.gov; or its secretary/chair-elect, John C. Kissel of

the University of Washington's Department of Environmental Health, telephone (206) 543-5111, fax (206) 543-8123, or e-mail jkissel@dehpost.sphcm.washington.edu.

For information about the other SRA specialty groups, contact the following:

Ecological Risk Assessment Specialty Group, Chair William Alsop of Harding Lawson Associates, Novato, California, telephone (415) 884-3136, fax (415) 883-3300.

Engineering Specialty Group, Chair Robert J. Mulvihill of PRC Inc., El Segundo, California, telephone (310) 640-1050, ext. 117, or (619) 721-2540, fax (310) 640-2207, e-mail mulvihill@aol.com.

Dose-Response Specialty Group, Secretary-Treasurer Scott Baker of EA Engineering, Science, and Technology Inc., Silver Spring, Maryland, telephone (301) 565-4216, fax (301) 587-4752, e-mail sb@eaeng.mhs.compuserve.com.

Risk Communication Specialty Group, Chair Branden Johnson of the New Jersey Department of Environmental Protection, Trenton, telephone (609) 633-2324, fax (609) 292-7340, e-mail brandenj@eohsi.rutgers.edu.

Member News

Richard B. Belzer of the Office of Information and Regulatory Affairs at the Office of Management and Budget in the Executive Office of the U.S. President, **Adam M. Finkel**, formerly of Resources for the Future's Center for Risk Management, Washington, D.C., and **Steven Lewis** of Exxon Biomedical Sciences Inc., East Millstone, New Jersey, are among five resident fellows who examined "The Identification, Assessment and Management of Environmental Risks" this spring at the Cecil and Ida Green Center for the Study of Science and Society on the University of Texas' Dallas campus. The summer 1995 issue of *Issues in Science and Technology* will include a roundtable discussion on their work. To purchase a copy for \$10.95 (U.S.), contact Sonja Nelson, P.O. Box 830688, Mail Stop AD13, Richardson, Texas 75083, telephone (214) 883-6325. (The group's photograph was published in *Bon Appétit*, July 1995.)

Michael Dourson, formerly with the U.S. Environmental Protection Agency, Cincinnati, Ohio, has founded the non-profit corporation Toxicology Excellence for Risk Assessment in Cincinnati, telephone (513) 542-7475, fax (513) 542-7487, e-mail mdourson@aol.com.

Adam M. Finkel and **Dominic Golding**, both formerly of the Center for Risk Management, Resources for the Future, are the editors of *Worst Things First? The Debate over Risk-Based National Environmental Priorities* (Resources for the Future, December 1994). **Golding** is with Clark University's

George Perkins Marsh Institute, and **Finkel** is director of the Occupational Safety and Health Administration's Directorate of Health Standards Programs, Washington, D.C., telephone (202) 219-7075, fax (202) 219-7125, e-mail afinkel@dol.gov.

Jacques Ganoulis of Aristotle University of Thessaloniki in Greece has published *Engineering Risk Analysis of Water Pollution* (VCH, Weinheim, New York, 1994).

Ronald L. Joiner recently became the director of toxicology and risk assessment for the consulting engineering firm Golder Associates Inc., Atlanta, Georgia, telephone (404) 496-1893, fax (404) 934-9476.

Peter LaGoy of OHM Corporation, Hopkinton, Massachusetts, has published *Risk Assessment: Principles and Applications for Hazardous Waste and Related Sites* (Noyes Publications, Park Ridge, New Jersey, 1994).

Yvette Wieder Lowney, president of SRA's Rocky Mountain Chapter, recently joined PTI Environmental Services as a senior toxicologist in the company's Boulder, Colorado, office, telephone (303) 444-7270, fax (303) 444-7528.

Steven Milloy of Regulatory Impact Analysis Project Inc., Washington, D.C., telephone (202) 739-0186, is the primary author of *Choices in Risk Assessment: The Role of Science Policy in the Environmental Risk Management Process* (1994), sponsored by the U.S. Department of Energy.

(Continued on page 12.)

SRA International Reports

News from SRA-Europe

Following its successful 1995 Annual Meeting held in Stuttgart, Germany, May 21-25, the European Section of the Society for Risk Analysis is making plans for its 1996 meeting to be held June 3-5 at the University of Surrey in Guildford, England. The meeting will include four parallel sessions on the topics of risk communication, biotechnology and risk, industrial risk and insurance, and new trends in risk analysis.

The meeting's plenary speakers will include Ortwin Renn of the Center of Technology Assessment in Baden-Württemberg in Stuttgart, Germany, and David Slater of Her Majesty's Inspectorate of Pollution in London, England.

To receive more information on the 1996 meeting or the call for papers, contact the conference administrator Jean Libaert at the University of Surrey, telephone (44) 1483 259047, fax (44) 1483 259394.

News from SRA-Japan

In addition to planning five sessions for the 1995 SRA Annual Meeting to be held in Hawaii (see page 3), the Society's Japan Section has undertaken several other activities.

Response to "Hanshin" Earthquake. Officers of the section who were living in the Kansai area when the earthquake occurred last January 17 suggested that the section make a proposal on how to deal with a wide range of risk issues from comprehensive and interdisciplinary viewpoints. In response, the Japan Section is setting up a communication forum titled "Risk Discussion Forum on 'Hanshin' Earthquake Disaster" and is requesting its members to send in their opinions and ideas, which the section will report in its newsletter and journal.

The section will also address the earthquake disaster at a September 8 symposium in Osaka with the support of the Japan Society of Liability Insurance's Osaka Section. SRA member Atsushi Takao of Kobe University's Department of Business Administration is helping to organize this event.

Several SRA-Japan Section members have been involved with the many scientific societies in the field of disaster prevention which did initial research and data collection after the earthquake. The section itself has taken up natural or urban disaster risk issues as essential research themes, such as risks in rescue activities; emergency risk control; pre-risk evaluation and philosophy of control, including earthquake insurance and investment in disaster prevention; and ways to influence restoration projects with risk philosophy.

Product Liability Symposium. The section's spring symposium on "Risk Communication in Product Liability" will be held June 23 at Tokyo University to discuss problems which exist in product liability and to identify possible solutions.

Japan enacted a product liability law in June 1994 which will be in force this August and has attracted the attention of the country's industries, consumers, lawyers, insurance companies, and government. The new law responds to recent consumer requests for product safety and the right to know risk information on product quality, safety, and liability, says SRA-Japan Section President Saburo Ikeda of Tsukuba University. The law introduces Japanese society to the concept of "the strict liability of the producer," which is in accordance with European and United States systems. However, Japan's industrial sector fears being in a conflict-oriented society where consumers are apt to seek resolution in court rather than in mutual communication. (Contact: Saburo Ikeda, Tsukuba, telephone (81) 2 98 53 5380, fax (81) 2 98 55 3849, e-mail ikeda@shako.sk.tsukuba.ac.jp.)

Reports from Eastern Europe

Several attendees of the 1994 SRA Annual Meeting from Eastern Europe reported on SRA activities in their countries.

Karel Blaha of the **Czech Republic** said approximately 15 persons have adapted the SRA bylaws to their own chapter and have developed a cooperative program with a Czech group of environmental scientists, which will include a national meeting in September 1995. The main topics will be a post-graduate risk assessment curriculum and research programs, the latter in response to a request from the Ministry of Environment for assistance in the peer review of grants. (Contact: Karel Blaha, Prague, telephone (42) 2 67311 467, e-mail blaha@earn.cvut.cz, fax (42) 2 67311 236.)

Naoum I. Borodianskii said the **Ukraine** Kiev Chapter, which has 112 members from eight cities, conducts monthly workshops at Solomon University or the Institute of Cybernetics. The chapter will have a national conference in Kiev in November 1995 with a focus on the influence of environmental factors on health risks. The chapter officers are Vladimir Michalevich, president; Andrei Serdyuk, vice-president;

Borodianskii, secretary-treasurer; and Boris Prister, councilor. Serdyuk chairs the 1995 program committee, which also includes Alexando Rozenfeld and Borodianskii. (Contact: Naoum Borodianskii, Kiev, telephone (7) 044 228 7212, fax (7) 044 224 3026.)

Vitaly Eremenko of **Russia**, organizing chairman of SRA of the Russian Federation, gave an overview of risk analysis work in Russia. Others reporting on activities of some of the country's 10 SRA chapters, most of which focus on specific geographic risks, included Victor G. Krymsky, Sergei G. Mironyok, Anatoli Merzliakov, and Oksana Shilova. (Contact: Vitaly Eremenko, Moscow, telephones (7) 095 275 34 89 and (7) 095 196 95 79 (office), e-mail vitaly@glas.apc.org.)

Branimir Molak of **Croatia** said that further development of an SRA chapter in his country has been interrupted by the region's continuing wars. He presented a paper on the use of risk analysis in developing a rational approach to rebuilding the nation. (Contact: Branimir Molak, Zagreb, telephone (38) 51 579 834, e-mail molak@rujan.srce.hr.)

U.S. Chapter News

Metropolitan Chapter (CT-NJ-NY) President Wayne Tusa of Environmental Risk and Loss Control Inc. says the chapter plans to sponsor evening seminars on electric and magnetic fields and multiple chemical sensitivity. Members have also expressed interest in other topics, including residential risk, indoor air quality, life-cycle analysis, drinking water quality, and treatment-resistant infectious diseases, for which speakers are being sought. The chapter is also seeking ways to better support local risk assessors and risk managers.

At the end of 1994 the chapter had approximately 30 members.

New England Chapter and the Boston Risk Assessment Group have continued their seminar series in 1995 with the following speakers and topics: Katherine von Stackleberg of Menzie-Cura and Associates Inc., on fish food chain models for predicting body burdens of PCBs; Cynthia Jennings, a consultant, on public involvement and environmental justice; Sharon McCarthy of Gradient Corporation, on modeling multimedia exposure to municipal waste incinerators; Brian Toal of the Connecticut Department of Public Health and Addiction Services, on public health implications of mercury usage in some Hispanic communities; Laura Greene of Cambridge Environmental, on dioxin risk assessment; SRA Councilor Gail Charnley of the National Commission on Risk Assessment and Risk Management, on the 104th U.S. Congress' impact on health risk assessment; SRA Past President Robert Tardiff of EA Engineering, Science, and Technology Inc., on comparative risk; Lebel Hicks of the Maine Department of Agriculture, on the state's perspective on fish advisories; Bernard Goldstein of Environmental and Occupational Health Sciences Institute, on new risk characterization approaches; and Brian Leaderer of Yale University's Pierce Laboratory, on sick building syndrome studies.

Northern California Chapter held its winter meeting in March at the University of California at Berkeley.

More than 30 members heard the chapter's new president-elect William Pease of the university's School of Public Health speak on "Orphan Risk Assessments: Why CalEPA [California Environmental Protection Agency] Abandoned Its Comparative Risk Project." The chapter's new president is Kenneth Bogen of Lawrence Livermore National Laboratory.

A new chapter project offers members' expertise to local nonprofit organizations as a pro bono service.

Philadelphia Chapter had three 1994-95 dinner meetings. Deborah Weil of Bailey Research Associates Inc., New York City, addressed "The EMF [electric and magnetic fields] Health Issue: The Role of the Science." Clay Frederick of the Rohm and Haas Toxicology Laboratories, Spring House, Pennsylvania, presented "The EPA's New Carcinogen Assessment Guidelines." Reginald Baldini of the New Jersey Department of Environmental Protection, Trenton, spoke on "What's Needed for Risk As-

essment on Acutely Toxic Substances?"

Research Triangle Chapter offered new memberships at a reduced fee with registration at its symposium on environmental risk equity last October. The symposium drew more than 70 registrants. The chapter now has approximately 100 members.

At the chapter's January meeting, Linda Birnbaum of the U.S. Environmental Protection Agency's Health Effects Research Laboratory spoke on "Dioxin Reassessment: Where We've Been, Where We Are, and Where We're Going." In March, Karla Thrall of Battelle Pacific Northwest Laboratory spoke on "Real-Time Breath-Analysis Instrumentation: Applications in Risk Assessment."

Southern California Chapter co-sponsored its eighth annual workshop on May 18 with the University of Southern California's Institute of Safety and Systems Management. The day-long

SRA Chapter Is Organizing in Chicago Area

A new SRA chapter, the Chicago Regional Chapter, received official recognition at the SRA Council meeting on March 26, 1995. It is the first SRA chapter to organize since 1991, bringing the total number to 15.

The new chapter's petition for recognition contained around 30 signatures, primarily from SRA members who work at Argonne National Laboratory. A number of risk analysis professionals in the Chicago area, including staff at the U.S. Environmental Protection Agency, Region V, have expressed interest in the chapter. The chapter's leading organizers, SRA charter members Thomas D. Wolsko and Loren J. Habegger, both of Argonne, are serving as the interim chapter president and secretary, respectively.

The chapter petitioners anticipate that the local chapter will provide a professional focus for risk activities in the Chicago area. "A large number of people are engaged in risk activities in the Chicago area," said Wolsko. "Therefore, we expect there is an interest in a professional forum now because it is directly related to their work." Pending risk legislation should provide an additional incentive for risk professionals from both the government and private sectors to join a professional forum that discusses risk issues.

The chapter's initial interests are broadly based, ranging from highly technical subjects such as probabilistic risk assessment to policy/risk management issues such as perceived risk and risk communication, Wolsko said.

For more information about the chapter, contact Wolsko at Argonne National Laboratory, Decision and Information Sciences Division, 9700 S. Cass Avenue, Argonne, IL 60439, telephone (708) 252-3733, fax (708) 252-6073, e-mail tdwolsko@anl.gov.

event included a plenary session panel addressing the communication gap on risk between the "pundits" and the "polls," 16 invited papers in two parallel tracks on human health risk assessment and technological risk assessment and management, and a panel discussion on the use of risk analysis in litigation support. Approximately 80 people attended. A few copies of the abstract booklets are available from Douglas Orvis of Accident Prevention Group at telephone (619) 592-0189 or e-mail 74166.1455@compuserve.com.

The chapter officers and councilors are rotating the tasks of editing and producing the chapter's newsletter *Risk Resources*. The newsletter is utilizing FAXBAK—a form provided in the newsletter for readers to "fax back" reservations for dinner meetings, responses to membership surveys, etc.

The new chapter officers include President Larry Froebe of IT Corporation and President-elect Krishna Nand of Parsons Engineering Science Inc.

U.S. Chapter Contacts

Columbia-Cascades: Jim Dukelow, president, (509) 372-4074, e-mail js_dukelow@pnl.gov

East Tennessee: Joe Minarick, president, (615) 481-2117, e-mail minarickj@orvb.saic.com

Greater Pittsburgh: Gregg Claycamp, president, (412) 967-6524, e-mail hgc2@vms.cis.pitt.edu

Lone Star: Tom Connor, president, (713) 792-4300

Metropolitan (CT-NJ-NY): Wayne Tusa, president, (212) 369-5400

Michigan: John Nelson, president, (313) 845-4588, e-mail usfmcmmv@ibmmail.com

National Capital Area: Rebecca Klemm, president, (202) 667-5244

New England: Wendy Koch, president, (203) 289-8631

Northern California: Garrett Keating, secretary, (510) 422-0921, e-mail keating2@llnl.gov

Ohio: Jeff Fisher, president, (513) 255-5740

Philadelphia: Tom Ledoux, president, (609) 633-1311, e-mail tledoux@eohsi.rutgers.edu

Research Triangle: David Kramer, president, (919) 558-1359, e-mail kramer@ciit.org

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Member News

(Continued from page 8.)

Drew Rak, formerly at Duke University's School of the Environment, is now a consultant specializing in risk assessment issues at Booz Allen & Hamilton Inc., San Antonio, Texas, telephone (210) 244-4200, fax (210) 244-4206, e-mail arak@vax.clarku.edu.

Harlee Strauss is co-founder, president, and executive director of a new, non-profit organization dedicated to scientific research involving links between the environment and women's health, especially breast cancer. Silent Spring Institute Inc. is located in Newton, Massachusetts, telephone (617) 332-4288, fax (617) 332-4284, e-mail hstrauss@aol.com.

Ruth Thompson, formerly of DuPont Environmental Remediation Services, Houston, Texas, is now with the environmental consulting firm URF Consultants, Seattle, Washington, telephone (206) 623-1800, ext. 4588, fax (206) 233-9570.

Former SRA president **Chris Whipple** (1982-83) of the Environment and Energy Group of ICF Kaiser International, Oakland, California, was elected to membership in the National Council on Radiation Protection and Measurements at its annual meeting in April. **Lynn R. Anspaugh** of Lawrence Livermore National Laboratory, Livermore, California, and **Roger O. McClellan** of Chemical Industry Institute of Toxicology, Research Triangle Park, North Carolina, were re-elected to the council.

Former SRA president **James D. Wilson** (1992-93) has been appointed senior fellow in the Center for Risk Management, Resources for the Future, Washington, D.C., telephone (202) 328-5099, fax (202) 939-3460, e-mail wilson@rff.org. He was formerly with the Monsanto Company, St. Louis, Missouri.

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