

# ISCE NEWSLETTER

Vol. 2, No. 2, Fall 1985

International Society of Chemical Ecology

## From the Editor

The Second Annual ISCE Meeting held in Madison was a great success and we are very grateful to Dale Norris and his staff for their splendid job. Next year's meeting to be held June 21-24, 1986 at University of California, Berkeley and hosted by David Wood, promises to be an exciting one, and we are looking forward to a large turnout.

We would also like to extend our thanks to John Romeo for the fine work he did on the directory. We anticipate that many of our members will change addresses, so please send any changes, along with the telephone number to the editor as soon as possible.

The Society also wishes to thank Lincoln Brower for his outstanding leadership as past president and welcome Gunnar Bergström as the new president for 1985-86. From the President's Message we can look forward to increasing not only membership rolls but the treasury as well! Bon voyage to Gerald Rosenthal who is in France on a Fulbright. Under his directorship, the Life Membership roster has grown to 47 members. As of September 14, I have become the new treasurer.

Having just returned from an invited lectureship in the People's Republic of China, I found that there was a great interest in chemical ecology. We hope to recruit new members from China, Japan and other Asian countries.

Lastly, a reminder concerning dues. The deadline for 1985-86 dues is January 31, 1986. Please send in your dues, and encourage your colleagues to join. An envelope is enclosed for mailing in your membership dues.

Eloy Rodriguez



ISCE member Dr. Wendell Roelofs receiving the National Medal of Science from President Ronald Reagan.

## President's Message

ISCE is now firmly established as an inter-national, inter-disciplinary forum for all those interested in the field of chemical communication and interaction. More specifically, the purpose of the Society, as laid down in Article II of the Bylaws is to "promote the understanding of the origin, function and significance of natural chemicals that mediate interactions within and among organisms". This forum has been put into practice at the first two very successful meetings of the Society, organized by Larry Gilbert in Austin and Dale Norris in Madison, respectively. For some time, the center of chemical ecology has been chemical communication among insects. The first meeting saw a wealth of reports on chemical communication and interaction in plants. The second meeting dealt with chemicals of physiological, ethological and ecological significance from marine organisms. All these presentations served to widen the scope of chemical ecology, a policy which will be a guiding principle in our coming meetings.

The ISCE Executive Committee has had very productive meetings, during which various facets of the operation of the Society have been discussed and planned. The Student's Affairs Committee has also been very active and has generated many suggestions for future meetings, such as the form of presentations, the financial aspects of attending the meetings, and the job possibilities for chemical ecologists. Members of the Advisory Council have been helpful in producing ideas for continued activities. Other facts that add to the firm establishment of the Society are: the JOURNAL OF CHEMICAL ECOLOGY now the official organ for ISCE; the newsletter appears regularly under the inspired editorship of Eloy Rodriguez; the first membership directory has been compiled by John Romeo; meetings are scheduled until 1989 (Berkeley, California 1986; Hull, England 1987; Quebec, Canada 1988; Sweden 1989) and times and places for further meetings have been discussed; many people have chosen to become life members, forming an important core of the membership; and affiliations with biological and chemical international organizations, like IUBS and IUPAC, have been discussed.

So, on one hand we can say that ISCE has achieved recognition from international biologists, and chemists, as well as those outside the field of chemical ecology. On the other hand, there are now important questions concerning the future of the Society. I wish to address the following:

**FINANCES:** Membership fees alone will

be far from enough to enable us to realize the ambitions of the Society. A subcommittee consisting of Jerrold Meinwald, Lincoln Brower, Eloy Rodriguez and myself are currently trying to attack this question by approaching companies both in and outside of the U.S., thereby building up a fund from which money can be drawn for ISCE expenses such as scholarships for students, grants, travel support, etc. We have met with some companies and are hopeful that contributions will eventually come in. If members have any ideas on how to raise money, please let us know!

**JOBS:** Linked to the question of raising funds for the Society, is what we can offer industry. In connection with fund-raising efforts, we plan to invite companies to come up with suggestions on what to include in chemical ecology curriculum. We would like industry to start asking the question: "Why should we hire a chemical ecologist"? We believe that working with small amounts of biologically active material, chemical microtechniques, behavioral experiments, and interdisciplinary approaches to problems are good scientific arguments. It is important that the field of chemical ecology and industry have a dialogue going on these matters. Industry will also be invited to send people to meetings.

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## Overview of ISCE Second Annual Meeting

The 2nd Annual Meeting held in Madison, Wisconsin, continued the tradition established at the inaugural meeting by featuring four outstanding symposia, covering a diverse range of topics. The symposium on the opening day centered around the "Chemical Aspects of Symbiosis". Jerome Kukor discussed the potential contribution of microbes to the nutrition of wood-boring insects; William Starmer probed another microbe-insect interaction with a thorough review of the cactus-yeast-*Drosophila* system, including some very recent results. Clarence Ryan similarly provided a concise picture of the mechanism of phytoalexin production in tomato plants: damaged tissue releases cell-wall fragments which act as hormones to promote a systemic response throughout the plant. Biotechnology was brought to the symposium by Winston Brill, who discussed genetic manipulation of nitrogen-fixing bacteria, and their ability to form symbiotic relationships with flowering plants.

The second symposium was entitled, "Behavioral Adaptations to Chemical Cues". Ron Prokopy presented some results from his elegant study of the apple maggot fly and the search for underlying stimuli which lead to host acceptance. Bob Metcalf ably demonstrated how strongly cucumber beetles are attracted to cucurbatacins, bitter constituents of their host plants, but also went on to discuss how these natural products are sequestered by the beetles for defense against predators. The morphology and physiology of pheromone reception, and resulting behaviors of ticks, an often ignored taxon amongst the arthropods, was presented in depth by Daniel Sonenshine. Philip Matsumura discussed motility of bacteria in response to the chemical signals, an area of study with which many of the attendants were unfamiliar.

The symposium on the third day exposed "Marine Chemical Ecology" to many society members for the first time. Gerald Bakus and Nancy Targett catalogued a bewildering array of natural products from marine organisms and discussed the impact of some of the more notable marine toxins. Valerie Paul discussed chemical aspects of herbivore-plant interactions in the marine environment, while William Carr presented some interesting perspectives on feeding stimulants for crustaceans. In both cases, technical hurdles to bioassays, lacking in terrestrial systems but central to the marine milieu, were overcome by ingenious means. Dan Rittschof discussed surface-active compounds which arrest free-swimming barnacle larvae, including a clever bioassay which separates out "swimmers, sliders and stickers".

Outgoing ISCE president Lincoln Brower opened the symposium on "The Evolutionary Ecology of Chemical Defense in Insects", with an informative overview of the migration of monarch butterflies, and some recent chemical data from which a new hypothesis on host utilization has emerged. The audience was treated to many magnificent slides of monarch butterflies overwintering *en masse* in central Mexico. Lynn Moore and I summarized some unique morphological and physiological adap-

tations for the sequestration and storage of cardenolides in the large milkweed bug, indicating that this insect is even more efficient at this task than the better known monarch butterfly. Martine Rowell-Rahier presented her survey of chemical defensive compounds in some leaf-feeding beetles, including species which sequester defensive agents from their host plants and those which synthesize defensive chemicals *de novo*. Most interesting was the finding that beetles sequestering salicylaldehyde from willows, can profit metabolically from this practice by obtaining the glucose moiety from the salicin glucoside provided by the plant. Owing to a prior commitment, Gerry Rosenthal spoke on the first evening, rather than on the final morning. His paper on the role of L-canavanine in insect-plant interactions was delivered with his usual infectious enthusiasm, and he again provided a review with recent results from his laboratory.

Almost without exception, the symposia papers were well received, and most generated colorful, and often illuminating discussion, usually running through the coffee breaks and well into the lunch hour. Meeting participants, and those unable to attend, should be very happy to hear that the symposia papers will appear in a special issue of the Journal of Chemical Ecology, currently slated for May 1986.

Murray Isman

## ISCE Member Profiles



Dr. Peter George Waterman is a Professor and Reader in Phytochemistry, Department of Pharmacy, University of Strathclyde, Glasgow, Scotland. Dr. Waterman's research interests can

be divided into three basic areas: 1) The identification of novel secondary metabolites, with particular emphasis being placed on the use of high-field nmr in structure elucidation. This work is closely linked with pharmaceutical firms in the UK who test all novel compounds to come out of the laboratory. 2) Chemical systematics of the family Rutaceae and more recently in the Guttiferae, Ebenaceae and Papilionaceae. At present Dr. Waterman is screening resins from Old World Burseraceae in order to assess their potential value as taxonomic markers. 3) Chemical ecology of rain forest ecosystems in West Africa, Malaysia and Costa Rica since 1977; with particular interest in phytochemical factors influencing food selection by colobine monkeys. Dr. Waterman is concerned with the development of methods based on chemical analysis of foliage for the assessment of carrying capacity of different forests for mammalian arboreal folivores. He is also investigating the biochemistry of the tannin/protein interaction as it relates to mammalian herbivores, with emphasis on factors influencing proteolysis by trypsin in the presence of tannins. In addition, Dr. Waterman is developing studies on chemical defense of Papilionaceae seeds and the interaction between plant chemistry and caterpillars of saturniid moths in Costa Rican deciduous forests (with D.H. Janzen) and on the "survival value" of gum-resin production among the Burseraceae of East Africa.



Dr. Murray B. Isman is currently in the Department of Plant Science, Entomology/Toxicology, Faculty of Agricultural Sciences, University of British Columbia, Canada. Dr.

Isman's recent research interests involves the deterrent and toxic effects of plant natural products (allelochemicals) in pestiferous insects. He is investigating the structure-activity relationships amongst putatively toxic plant compounds to determine what structural characteristics (toxicophores) are requisite for biological activity in insects. Concomitant to understanding toxicity is the investigation of pharmacodynamics and pharmacokinetics of toxic compounds in the insects, i.e. how are the compounds metabolized in the insect and what is the ultimate fate of the parent toxicant and its metabolites. The ultimate goal of this line of investigation is to elucidate "chinks in the metabolic armor" of the insect, or rephrased, what particular chemical structures or functional groups are insects unable to deal with in a metabolic sense? This type of information could be very useful in the design of future chemical materials used for pest management.

In addition, Dr. Isman is investigating the effects of terpenoid compounds from desert plants of Baja California on pest insects. These include sesquiterpene lactones from species of *Parthenium* and chromenes (benzopyrans) from species of *Encelia*, two dominant desert genera of the Asteraceae (sunflower family). His principle test insects are the migratory grasshopper, *Melanoplus sanquinipes*, and the variegated cutworm, *Peridroma saucia*, both of which are maintained on a year-round basis in his laboratory. Other pest insects occasionally used are the alfalfa looper, *Autographa californica*, the green peach aphid, *Myzus persicae* and the sunflower beetle, *Zygogramma exclamatoris*.

## ISCE Annual Meeting for 1986

The Third Annual Meeting of the International Society of Chemical Ecology will be held at the University of California, Berkeley, California, from June 21-24, 1986. Arrangements are being made to provide the best in accommodations and food services at modest prices. Registration forms for contributed papers and poster sessions, as well as details on topics, invited speakers, lodging, and transportation, will be provided in the March 1986 issue of the ISCE Newsletter. Members requesting information should contact Dr. David Wood, Entomology and Parasitology, 201 Wellman Hall, Berkeley California 94720. Members are encouraged to write to Professor Wood to suggest possible topics to be covered at the upcoming meeting.

David L. Wood



Dr. Wendell E. Roelofs is the Liberty Hyde Bailey Professor in Insect Biochemistry at Cornell University, Ithaca, New York, and a member of the National Academy of Science. Considered a

leading authority on insect-chemical communication and its application to control insect pests, Dr. Roelofs has made fundamental contributions to basic and applied biology in the field of insect pheromones, their chemical composition and blends, their biosynthesis, how insects perceive and respond to them, and their use in insect pest management. He has published over 210 articles and his research has brought him numerous awards in recent years.

Dr. Roelofs research interests include the development and use of the electroantennogram as a monitor for biologically active compounds in pheromone extracts. This discovery and the technique of using a series of synthetic compounds, greatly facilitated the identifications and reduced the number of female insects to hundreds or less, rather than thousands. Using his novel technique, Dr. Roelofs and colleagues have identified the pheromones of numerous pest species and have optimized the performance of synthetic attractants in the field.

In determining the pheromone blends, he has cooperated with industry in designing insect traps and pheromone dispensers in practical kits. Within the last several years this method of pest monitoring has become a vital part of orchard pest-management programs.

In addition to monitoring, Dr. Roelofs has been using pheromones for direct insect control. From 1969 to 1972 he and his colleagues investigated the possibility of controlling the red banded leafroller by mass trapping with pheromone traps and demonstrated that populations can be suppressed in apple orchards with one trap per tree.

Dr. Roelofs and his colleagues also have been conducting research on disrupting the sexual communication of insect pests by broadcasting the pheromones in the field. Using microencapsulated formulations of the pheromones of various Tortricidae, Dr. Roelofs demonstrated that these insects could be controlled in orchards and vineyards by this method.

In recognition of his numerous contributions, Dr. Roelofs has received the Entomological Society of America, J.E. Bussart Award in 1973 and the 1980 Founders Memorial Lecture Award, and along with H.H. Shorey, the Alexander von Humboldt Award in 1977. Further, he was a member of the U.S. Insect Control Delegation to the People's Republic of China in 1975, and has had an active exchange program with USSR. In 1982, he was awarded the prestigious Wolf Prize in Agriculture by the Wolf Foundation. Most recently he was awarded the National Medal of Science by President Reagan.

## New Life Members

ISCE would like to extend special thanks to the New Life Members as of June 3, 1985. Francke, W., Germany; Girolami, Vincenzo, Italy; Stabell, Ole B., Norway; Adams, Robert P., U.S.A.; Fenical, William, U.S.A.; Nakanishi, Koji, U.S.A.; Quay, W.B., U.S.A.; Scheuer, Paul, U.S.A.; Visscher, Saralee N., U.S.A.

## Upcoming Symposia Events

Gordon Research Conference on the Chemistry of Plant-Herbivore Interactions, January 20-24, 1986, Casa Sirena Marina Hotel, Oxnard, California. Chairman: David Seigler; Vice Chairman: Guy Bush. For details of Program and Application form, members should refer to *Science*, Vol. 230, Pgs 189-196, Oct. 11, 1985.

The IV International Congress of Ecology, August 10-16, 1985, State University of New York, Syracuse. For information write: IV International Congress of Ecology, SUNY College of Environmental Science and Forestry, Syracuse, NY 13210.

"Biology of the Leguminosae" Second International Legume Conference, June 23-27, 1986, Missouri Botanical Garden, St. Louis, Missouri. Write to Dr. James L. Zarucchi, Legume Conference Coordinator, Missouri Botanical Garden, P.O. Box 299, St. Louis, MO 63166.

"Symposium of Natural Toxins" Rocky Mountain Regional Meeting, American Chemical Society, June 8-12, 1986, Abstract deadline: 01/06/86. Contact Professor Anthony T. Tu, Department of Biochemistry, Colorado State University, Fort Collins, CO. 80523.

2nd American Symposium, Animal, Plant & Microbial Toxins, May 21-23, 1986, Arizona State University. Write to Professor Allan L. Bieber, Dept. of Chemistry, Arizona State University, Tempe, AZ 85287.

## Publications of Interest

Members are encouraged to send reprints, titles of books and other materials that they wish to have included in the ISCE Newsletter.

The following Symposium issues are planned for the Journal of Chemical Ecology, 1986; Issue No. 2 (February) Bio-organic Chemistry of Communication Systems. NERM Meeting, ACS, New Paltz, 1985; Issue No. 4 (April) Insects and Photoactive Substances in Plants. ESA Annual Meeting, San Antonio, 1985; Issue No. 5 (May) ISCE Annual Meeting, Madison, 1985; Issue No. 8 (August) Chemical Communication and Regulation of Reproduction, Growth and Maturation in Schistosomes and Related Helminths. Conference held at the John Hopkins University, Baltimore, 1985. Subscribers who wish to purchase a copy should write to the editors as soon as possible. R.M. Silverstein & J.B. Simeone, Journal of Chemical Ecology, SUNY College of Environmental Science and Forestry, Syracuse, NY 13210-2778.

*Plant Species Reportedly Possessing Pest Control Properties - A Database.* S. Ahmed, W.C. Mitchell, and R. Saxena, eds. Publication Orders, Publications Office, East-West Center Rd., Honolulu, HI 96848.

*Thin-Layer Chromatography: Techniques and Applications.* B. Fried and J. Sherma. Marcel Dekker, New York, (1982).

*Plants For Arid Lands.* G.E. Wickens, J.R. Goodin, and D. Field eds. George Allen & Unwin, England, 1985.

*Physiological Ecology of North American Plant Communities.* Brian Chabot and Harold Mooney, eds. Chapman and Hall. Available from Methuen, Inc, 29 W. 35th St., New York, NY 10001, 1985.

## Student Funding Sources

American Museum of Natural History  
Central Park West at 79th St., New York, NY 10024

Chapman Memorial Fund (Ornithology)  
Deadline: Sept. 15, Feb. 15-Max. Award \$1000

Roosevelt Memorial Fund (N. Amer. Fauna)  
Deadline: Feb. 15-Max. Award \$1000

Fulbright Grants for Graduate Study Abroad  
Institute of International Education  
809 United Nations Plaza, New York, NY 10017  
Deadline: Oct. 1-Max. Award Varies  
(In the 1986-7 competition 752 grants will be available for more than 70 countries)

Fred C. Gloeckner Foundation  
15 East 25th St., New York, NY 10010  
Deadline: May 1, Nov. 1-Max. Award \$10,000  
(Plant physiology and entomology, average award - \$5000, 1984 total awards - \$181,000, checks mailed only in August)

National Science Foundation  
Grants for Improving Doctoral Dissertation Research, Directorate of Biological, Behavioral, and Social Sciences  
Washington, D.C. 20550  
Max. Award: Research expenses

NSF Predoctoral Fellowships  
Fellowship Office, National Research Council  
2101 Constitution Ave., Washington, DC 20418  
Deadline: Nov. 23 - Max. Award Three year stipend (first year grad students only, highly competitive)

Sigma Xi, The Scientific Research Society  
Grants-in-Aid of Research  
345 Whitney Ave., New Haven, Conn. 06511  
Deadline: Nov. 1, Feb. 1, May 1  
Max Award: \$600 (Large number of grants available, don't miss the deadline)

Dissertation Fellowship  
American Association of University Women  
2401 Virginia Ave. N.W., Washington, DC. 20037  
Deadline: Dec. 15 - Max. Award: Stipend of \$3500-8000 (Women Only)

Predocctoral Award  
Association for Women in Science  
Educational Foundation  
1345 Connecticut Ave., N.W., Suite 1122  
Washington, D.C. 20036  
Deadline: Jan. 15 - Max Award: \$500 (Women Only)

## Letters

On behalf of all those who attended our Madison Meetings this past June, we would like to extend a very special thanks to Dale Norris. Dale planned every possible detail and arranged elegant amenities which help to facilitate a creative atmosphere for our formal interactions. The meeting was well attended by an enthusiastic group of chemical ecologists representing a fine international diversity. The success of our past two meetings have now established a tradition, and I trust that as many members as possible will attend what promises to be another outstanding ISCE Meeting next summer in Berkeley.

Lincoln Brower

The Fourth Annual Meeting of the International Society of Chemical Ecology will be held at the University of Hull, England from July 14-17, 1987. We will have self contained conference facilities at the Lawns Centre, using student accommodations in Lawns Hall. The fee, including all meals, will be approximately £100. Members requesting further information should contact Professor David A. Jones, Department of Plant Biology and Genetics, University of Hull, Hull HU6 7RX, England.

David A. Jones

## Student Affairs Committee Opinion Poll Results

As of July 10, 1985, 57 questionnaires were returned to the Student Affairs Committee with only 7 returned from outside North America. We encourage more student members to contribute their opinions so that SAC can accurately represent the interests of the international student membership.

The proposed SAC structure was unanimously approved by the poll respondents. The proposed SAC functions were rated by importance:

1. Job Placement Services - all respondents indicated they would use the service in job searches. Only one potential employee stated the service would not be used in hiring.
2. Student Monetary Awards
  - a) Student Travel Grants to attend Annual Meeting were considered most important of Monetary Awards. With the exception of one, all respondents expressed a willingness to attend ISCE Meetings outside North America if partial funding is available. Students residing outside North America also expressed the same willingness to attend meetings in North America under similar conditions.
  - b) Research Grants
  - c) Presentation Awards
3. Funding Opportunities/Research Techniques Library. Two/Thirds of the respondents would contribute to a Techniques Library.
4. SAC functions related to ISCE Meetings (program, symposia, student/faculty breakfasts) were given slightly lower priority. However, 39% expressed an interest in serving on Student Program Work Committees for ISCE Meetings.

I would like to thank those members who responded to the Opinion Poll and thus helped define the objectives of the Student Affairs Committee. Students who did not return questionnaires are encouraged to contact SAC or Executive Committee with any suggestions or comments concerning student issues.

Kenneth Grace

## President's Message *(Continued from Page 1)*

**MEMBERSHIP:** Following the initial rapid increase in membership, it is now important to preserve momentum: to keep members, to get new ones and to continue to make the membership truly international. One highly relevant question that I have often met is: "What do I get if I join ISCE?". As a member you receive a discount at the annual meetings; you receive the bi-annual newsletter; reduced subscription rate to the JOURNAL OF CHEMICAL ECOLOGY; possibility of research and travel grants. Just as important, the Society provides an inter-national, interdisciplinary forum for our field of research. Creating such a forum is most instrumental for the development, both scientifically and from a practical point of view of job possibilities and obtaining grants. Inviting representatives from industry and from grant-giving agencies to meetings could facilitate this.

There are many questions associated with recruiting members to the Society. One is the fees, currently \$200 for life members, \$20 for annual membership and \$10 for students. We are aware that in many countries these sums are considerable and perhaps even a hindrance in becoming a member. Also, the ways of payment, fluctuating exchange rates and whom to pay, present problems. We must try to find ways of solving this. We are currently looking into using credit cards or the like. The fiscal year for ISCE is now September 1 to August 31. Will switching to the calendar year simplify the paying of the dues?

The Society already has members from a great number of countries. Even so, we have to spread the message to even more places. Hopefully with meetings in Europe arranged for 1987, 1989, ISCE will become even more internationalized. Maybe, when we get our finances organized, scientists in this field from countries not yet on the ISCE-map could be invited to meetings.

It is a happy fact that the membership is widespread in many countries and - more troublesome - that we can meet only now and then. It is important that we find ways of

catalysing the work of the Society given these conditions. The Society meetings, the Journal, the Newsletter and the Committee meetings serve as communication between members. The dedication of one issue a year of JCE to seminars held at the Society meetings also serves this purpose. As times go, perhaps the program for the meetings, including abstracts and lists of participants, can be given a more definitive form, which could also enhance communication. Other communicative tools could be check-lists for officers of the Society, which could be handed over like a baton.

**ANNUAL MEETING:** The first five meetings have been planned to occur annually and in the summertime of the northern hemisphere. I would like to invite points of view on this from the members! Some people who have their major field season during the months May - September may want a winter time for the meeting. One compromise would be to have a 1.5 year cycle between meetings and thereby alternate between summer and winter meetings. Regional meetings can also be arranged. One does not want to split the international idea, but we may have to consider small, regional meetings that extend over maximally two days, or maybe alternating between international and regional meetings in the future.

Finally, please spread the word about ISCE and particularly about the meetings! We have received several letters from members with ideas and comments on the Society, which will be incorporated in the continued work. This correspondence is vital to our common goal! And please plan to attend our 3rd annual meeting in Berkeley, California in June 1986. There is every indication that the program under the leadership of David Wood will be a great one!

Gunnar Bergström

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