

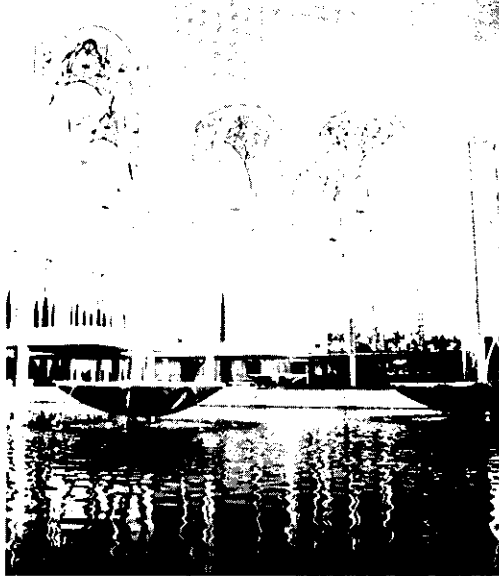
# sip

# newsletter

society for invertebrate pathology

Volume XII, Number 2  
May 1980

XIIIth ANNUAL MEETING  
SOCIETY FOR INVERTEBRATE PATHOLOGY  
University of Washington, Seattle, Washington  
July 27 - August 1, 1980



The arches of the Science Pavilion, Seattle Center.

## Washington Whispers

Looks like the whispers were going to end up in one god-awful bang, if Mt. St. Helens blows its top. I knew Al Sparks could blow his stack, but I certainly didn't think that their vibrations would result in seismic sympathy and cause an eruption. Well, you ain't scaring me off, even if I have to wear my Army

helmet and carry a metal umbrella; and I'll tell you guys something--both Joe Maddox and I are going to have one joyful blast which may startle Mt. St. Helens into activity again. Joe has started his countdown and me, I have big number 1 to go--just one more issue and good bye. (From my son: What do you get if you touch a Martian toad? Star warts)

## HOUSING INFORMATION

We have reproduced for the membership the form copy that they should have or will receive as a consequence of their registration. We have been urged again to impress on the membership of the importance of registering *as soon as possible*. We have been warned that if participants arrive in Seattle with no reservation, they will have great difficulty in procuring rooms for one week in the immediate University area. The registrars for the residence halls have been sending reservation applications promptly and there is an early deadline on the University residence as well as one for the University Tower Hotel. You are asked to *return the card* with the necessary information and to hold the form which was sent out, and to bring this form with you. This will serve as a *reservation confirmation* at the residence hall. The returned card will be kept on file and should you lose your confirmatory form, the central file will be checked to assist the member in obtaining his reservation.

If there is some difficulty or question, you may call the residence hall information at the following number: (206) 543-9233.

Campus housing will stop taking reservations after **June 27, 1980. YOU ARE WARNED.**

## Residence Halls Housing Information, University of Washington

Housing Conference: #34

Check-In Date: July 27, 1980 (12:00 pm - 10:30 pm)

Check-Out Date: July 1, 1980 (12:00 pm)

*Note: The University of Washington is unable to honor any requests for early arrivals or late departures. If travel requires dates other than those indicated, please consult a local hotel or motel.*

Accommodations: All student rooms have twin beds (whether single or double occupancy) and community bath facilities. Linen and towels are provided and beds made for your arrival. Linen and towels are exchanged once a week in the rooms. Coin-operated automatic washers and dryers and a limited number of pay telephones are located in the residence halls. Mail boxes are located on the first floor and open to room keys. Lost keys will be replaced upon the payment of \$5.00 per key at the Conference Center desk. Delegates will be expected to present photo identification to obtain a replacement key to a room.

Other Services: No other service is included.

Room Rates: Double accommodation requests are encouraged as only a few single rooms are available. The daily rate for room only is \$14.00 per person per day single occupancy and \$11.00 per person per day double occupancy. The total charge for five nights lodging is \$70.00 per person single occupancy and \$55.00 per person double occupancy.

Parking: We encourage delegates to use public transportation whenever possible, as parking on campus is extremely limited. Charge for parking is \$4.00 per week and is payable on arrival. There is no credit for a shorter stay.

Reservation Deadline: To secure a residence hall accommodation, the reservation card must be received by this office by Friday, June 27, 1980.

Check-In: Please retain this form and bring it with you when you check in at \_\_\_\_\_ Hall.

Questions About Your Housing: If you have questions regarding your housing arrangements or reservation, you may call us Monday through Friday, 8:00 am to 5:00 pm, or write us at this address:

Summer Conference Office  
Housing and Food Services  
McCarty Hall GR-10  
University of Washington  
Seattle, Washington 98195 USA  
Phone: (206) 543-7636

#### TRAVEL INFORMATION

The following information is offered to assist you in completing your trip in the easiest way possible. Parking on campus is extremely limited and we encourage your use of public transportation whenever possible. Bus transportation around Seattle is excellent (fare is 50¢, exact change, and transfers are free). All rates quoted here are subject to change.

##### - Arriving by plane?

Airporter/Hustlebus to the Airporter Terminal in Downtown Seattle is \$3.25 per person one way. Bus leaves SEA-TAC every 20-30 minutes between 4:30 am and 12:30 am. Best place to purchase ticket and board bus is outside United Airline's baggage claim area. Then you can take a cab from Downtown Seattle (approximately \$5 to UW excluding tip). Or you can walk one block to 3rd & Union and board METRO Bus #7, 71, 72, or 73 (destination "University District").

Cab fare from SEA-TAC direct to the UW is approximately \$25 excluding tip. Ring bell at outside passenger loading zone for cab dispatch.

METRO Bus #174 direct from SEA-TAC to University District is 74¢. Allow a minimum of 1½ hour travel time for the trip by this means.

##### - Arriving by train? bus?

King Street Station: Cab fare to the UW is approximately \$6, excluding tip, or ask directions to board Metro Bus #7 to the University District.

Greyhound Bus Terminal: Cab fare to the UW is approximately \$4, excluding tip, or ask directions to board Metro Bus #71, 72, or 73 on Olive Way to the University District.

##### - Arriving by car?

(We encourage delegates to use public transportation because parking on campus is limited, but if you must drive, we hope this information is helpful to you.)

North on Interstate 5: Take the N.E. 45th Street exit, turn right onto N.E. 45th, and then follow directions below to reach the hall where you are asked to check in.

South on Interstate 5: Take the N.E. 45th Street exit, turn left onto N.E. 45th, and then follow directions below to reach the hall where you are asked to check in.

McCarty Residence Hall: Proceed up the hill on N.E. 45th to the 17th Avenue N.E. entrance onto the University campus. The parking attendant can direct you from there. If you have pre-arranged parking, tell the attendant your name and that of your conference to obtain a temporary parking permit.

Terry Residence Hall: Continue on N.E. 45th for 8 short blocks, turn right onto Brooklyn Avenue N.E. Follow Brooklyn Avenue N.E. for 5 long blocks and turn right onto Lincoln Way (right behind Lander and Terry Residence Halls). Follow this street nearly to the end and turn right into the parking lot behind Terry Hall. (W9 lot)

Mercer Residence Hall: Follow the directions shown for Terry Residence Hall until you are on Lincoln Way. Turn left at the first intersection onto Cowlitz Road, go a short distance and follow Cowlitz around to the right. Go straight another short distance and turn left again at the first intersection onto Adams Lane. You will see Mercer Hall directly in front of you on the right-hand side. Park in the lot across the street until you are able to check-in. (W36 lot)

##### Desk telephone numbers

After June 22, the Conference Desks will be open 7:00 am to 11:00 pm daily.  
McCarty Hall: (206) 543-5527  
Terry/Mercer Halls: (206) 543-0235.



Hotel and Motel Information,  
Seattle, Washington

Space has been blocked out for the participants of this conference in the University Tower Hotel. If you wish to obtain reservations there, please send in the reservation card. If you prefer an alternate accommodation, the list below is provided for your convenience. Reservation deadline is

There is also a new shuttle service from SEA-TAC to the Sherwood Inn, which would put you closer to your destination should you choose to stay in the campus residence halls, the University Tower, or any of the hotels/motels listed below. It is called The Everett Airporter. They depart throughout the day at the following times: 6:45 am, 8:10 am, 10:00 am, 11:20 am, 12:45 pm, 2:05 pm, 3:30 pm, 5:30 pm, 6:50 pm, 8:30 pm, 9:40 pm, and 11:30 pm.

The University Tower Hotel      Single occupancy: \$40-55  
45th & Brooklyn Avenue N.E.      Double occupancy: \$44-60  
Seattle, Washington 98105  
Phone: (206) 634-2000

The College Inn                      Single occupancy: \$15-18  
4000 University Way N.E.              Double occupancy: \$25  
Seattle, Washington 98105              Triple occupancy: \$32  
Phone: (206) 633-4441

Please note that the College Inn provides separate community bathrooms only. They also do not accept credit cards. Rates include a continental breakfast.

University Travel Lodge              Single occupancy: \$34  
4725 - 25th Avenue N.E.              Double occupancy: \$39-40  
Seattle, Washington 98105  
Phone: (206) 525-4612

Sherwood Inn                          Single occupancy: \$35  
400 N.E. 45th                          Double occupancy: \$39-42  
Seattle, Washington 98105  
Phone: (206) 634-0100

University Motel                      Single occupancy: \$20-24  
4731 - 12th Avenue N.E.              Double occupancy: \$23-28  
Seattle, Washington 98105              Kitchenettes available  
Phone: (206) 522-4724

University Motor Inn                  Single occupancy: \$21  
4140 Roosevelt Way N.E.              Double occupancy: \$26  
Seattle, Washington 98105              Kitchenettes available: \$5  
Phone: (206) 632-5055                  additional per night

NOTE FROM THE COMMITTEE ON CONSTITUTIONAL AMENDMENTS

A number of imperative constitutional amendments will be proposed to members attending the business meeting at the XIII Annual Meeting in Seattle. The entire membership will be polled on the amendments at a later date.

Phyllis Johnson  
Vice President and  
Chairperson for the  
Committee

NOTICE

RE: Journal of Invertebrate Pathology

Word has been received that the Journal of Invertebrate Pathology will be listed in the Current Contents for Life Sciences in addition to the Agricultural, Biological, and Environmental Sciences.

REGIONAL NEWS--USA

Report on Regional Research Project, S-135

The Technical Committee of Regional Project S-135 on "Development of Microbial Agents for Use in Integrated Pest Management Systems," met February 25-26, 1980 at the Howard Johnson Motel on Elvis Presley Blvd. in Memphis, Tennessee. Forty-four members were in attendance. Dr. Seth Young called the meeting to order and after initial items of business, Dr. L.O. Warren, Administrative Advisor, gave general comments on the project goals and suggested that the group should be in a position in the near future to develop a regional publication, either through the project as a whole or through one or more of the subcommittees.

Dr. George Allen then provided input relative to policies and actions of USDA-APHIS, EPA, and on the present status of integrated pest management in Washington. Considerable discussion arose over the proposed agricultural Organisms Act relative to restrictions on movement of microbials within the U.S. and into the U.S. A committee consisting of Joe Maddox, Randy Gaugler, Steve Wraight, Bob Granados, Drion Boucias, and Clay McCoy, Chairman, was appointed to draft a document to be taken to Washington to state the position of S-135 relative to the proposed legislation.

Dr. Allen then discussed the development of registration guidelines by EPA for microbials, and stated that progress is on schedule relative to health effects, safety testing, ecological effects, and environmental fate. He then asked that the group develop a list of pathogens which show the greatest promise for being developed rapidly through the objectives of the project.

Discussion of the recently developed, I.O.B.C. related, Southern Working Group on Biological Control resulted in a request that each subcommittee provide a list of pest insects for which specific pathogens might be imported into the U.S. for control purposes. This was done by each subcommittee and the list was compiled by Clay McCoy to be passed on to Dr. Will Whitcomb of the Working Group.

Bill Yendol reported on his efforts to develop a new subsection in Section C of the ESA which would deal with insect pathology. This is now under advisement by the ESA governing board and will probably be voted on by section members in the coming year.

Jim Harper also reported on the development of a division on microbial control within the SIP. Proposed bylaws are nearly complete and will be presented to the Council at Seattle for approval.

The remainder and majority of the two-day meeting was devoted to subcommittee work and involved discussion of 1979 research accomplishments, areas of needed research work, and possibilities for cooperative work in specific areas.

A special plea was made by the applications subcommittee for support by pathologists in this critical area. Federal man-years in this area have been steadily declining, despite an obvious need for development of technology which takes into account the unique application requirements of microorganisms. All agreed that this area is of critical importance to the future of microbial control.

At the final business meeting, Clay McCoy was elected as Member-at-Large for the project. Jim Harper succeeds Seth Young as Chairman, and Wayne Brooks succeeds Jim Harper as Secretary for the next two-year period.

James D. Harper  
Secretary, S-135

## The World Mariculture Society

The World Mariculture Society (WMS), relatively young as scientific societies go, was formed in 1969 and now has 900 members. Formed to promote and encourage marine aquaculture research and development, the Society has a viable mix of government and university scientists, and industry members (production as well as research and development).

Part of the founding concept for WMS was to promote mariculture internationally. This concept has been followed vigorously; one major affiliate society exists--the European Mariculture Society with 350 members--and others are in various stages of organization.

WMS holds annual meetings in principal cities of the United States, often in conjunction with other aquaculture organizations, and every four years it meets in a foreign country (the 1981 meeting, for example, will be in Venice). Meetings usually extend over three days, and consist principally of contributed papers, symposia, and panel discussions. In addition to the annual meetings, the Society also sponsors workshops on a variety of mariculture topics. (A molluscan workshop will be held in Seattle in March 1981, for example.)

WMS publishes an annual proceedings--a hard-cover book of reviewed papers, usually about 500 pages--as well as occasional special publications. Additionally, a quarterly newsletter is distributed to all members.

Membership in WMS is open to all with an active interest in mariculture. Dues are \$20, which includes the Proceedings volume. The business office is located at Louisiana State University, Baton Rouge.

(Of possible interest to SIP members, is that a significant aspect of every annual meeting of WMS has been diseases and disease control in mariculture. Crustacean and molluscan diseases have received justified attention, since research on culture of penaeid shrimps, Malaysian prawn, lobsters, scallops, clams, and oysters has been extensive during the past decade.)

Carl Sinderman

## NEWS NOTE--U.K.

XV Annual Meetings and International Colloquium. The week of September 5, 1982 has been selected for the meetings to be held at the University of Sussex, Brighton, United Kingdom.

D. Burges, Chairman  
Organizing Committee

## MICROSPORIDIAN WORKSHOP

Participants are requested to bring any and all photographic or other material representing Microsporidia in their collection. The characteristics of these species will be discussed informally.

J. Maddox  
Organizer

## EDUCATIONAL MATERIAL

A color film is available from T. Unestam on Aphanomyces astaci; on its mechanism of invasion of the host crayfish and resistance mechanisms of the host. The finished product will be available at a price of ca. \$500. If interested drop a line to Prof. T. Unestam at Institute of Physiological Botany, Box 540, S-751 21 Uppsala, Sweden.

## SIPeople

Betty Davidson and husband off to the land down-under, Australia, to do a bit of combined operations with T. Sweeney at the Australian Army Malarial Research Unit near Sydney and also to continue studies on pathogenesis of Bacillus sphaericus in mosquito larvae at the Department of Zoology, Monash University. Betty is also editor of a book on "Pathogenesis of Invertebrate Microbial Diseases."

Received an interesting note from a member located in Petit-Bourg, Guadeloupe, M. Kerijanec. He is working on parasitic diseases, particularly mycoses caused by fungi such as Moniliales. The XII OTAN (Organization of Tropical American Nematologists) meeting is scheduled for the 17-21 August 1980 in Guadeloupe.

Received a phone call from John Henry during Christmas break--guess he was back in the country for a while; had a call from M. Laird before Christmas who is also back for a short while. Wish I could find someone to look after my zygotes so I could go off skiing or sumpn'.

We are getting a new address-computer print out system from ALBS, and this may lead to a few losses, until our indefatigable secretary, Joe Maddox, gets the kinks worked out. We ask you to bear with us on this matter.

Note from L.M. Sutton who lives close by to me in Greensboro, North Carolina. His interests are effects of ecdysone, juvenile hormone and structurally related compounds on Nomuraea rileyi. Also has interests in Beauraria bassiana.

T.R. Shieh informs us that he has submitted some new microbials for registration in 1979. Those interested should contact him. He is also developing some new research lines, notably use of Nosema sp. spores for grasshopper control.

One of our new members and my collaborator, Richard Axtell, has been elected vice president of the American Mosquito Control Association. I am given to understand that this is the Social Register for mosquito people. Guess he owes us a few drinks.

Our indefatigable Program Committee Chairman, Aaron Rosenfield, is off to Europe for a series of Fishery Station visits, mostly in Wales. Wow, what a job, wish I could go as assistant. Doesn't even send me a card.

W. Brooks off to participate in the Boyce Thompson Symposium being sponsored by Don Roberts at Ithaca.

Hank Thompson, Project Leader, Corvallis, retired recently after 20 years with PNW. He came to Corvallis in 1960 after working for the USDA in Maryland for 7 years. Thompson received a Superior Service Award in 1977 "for scientific research resulting in the development of a nuclear polyhedrosis virus for control of the Douglas-fir tussock moth. Due to the efforts of this team, there is now a highly effective microbial insecticide that is completely safe environmentally for use when the next outbreak of this defoliating insect occurs. Thompson plans to work as a Forest Service volunteer, writing and assisting in studies which may include field tests in Arizona this summer. Dr. Thompson is a Founding Member of the Society for Invertebrate Pathology.

Student Members

F.K. Olle Hammarstedt  
Karl XII G. 16B V  
S-22220 Lund  
SWEDEN

Research Interest: Nuclear polyhderosis viruses on  
Triphaena spp. (Lep.) and Helicosporidium sp. on  
odonata larvae

Jo Ellen Hose  
4968 Ferro Street  
Long Beach, California 90815 USA  
Research Interest: Crustacean pathology

Karl K. Huebner  
Department of Entomology  
North Carolina State University  
Raleigh, North Carolina 27607 USA  
Research Interest: Entomogenous nematodes of the  
Japanese beetle

Louise Anne Malone  
Imperial College Field Station  
Ashurst Lodge, Sunninghill  
Berks SL5 7DE, ENGLAND  
Research Interest: Microsporidia of insects

Thomas L. Merriam  
Department of Entomology  
North Carolina State University  
Raleigh, North Carolina 27650  
Research Interest: Control of mosquitoes with  
Lagenidium giganteum

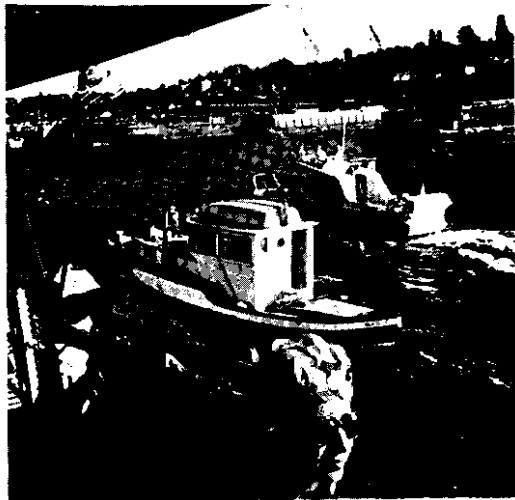
Mohamed Bin Mohd-Salleh  
Department of Entomology  
Insectary Building  
Iowa State University  
Ames, Iowa 50011 USA  
Research Interest: Effect of different bacterial  
media on the production of exotoxins by different  
varieties of Bacillus thuringiensis



Romoska, Anthony, Kramer



Jaronski



Bayne



EAS AND HIS CONCEPT OF INVERTEBRATE PATHOLOGY--  
A COHESIVE FORCE

"Synthesis: the combining of often diverse conceptions into a coherent whole" (Webster's Collegiate Dictionary).

Ed Steinhaus was a synthesist. Written proof is abundant in his book "Disease in a Minor Chord." Perhaps it was inevitable that his synthesis would progressively enlarge, to recognize the wholeness of invertebrate pathology. He had to have had a great sense of the rightness of his endeavors--first in establishing a discipline of insect pathology at U.C. Berkeley and later in causing recognition that insect pathology is logically part of a larger field--invertebrate pathology. How was the final amalgam reached? Steinhaus' successful methods may have been the result of perceptive direction and of having the right ideas in the right places at the right times. One would imagine that SIP never would have been formed if many people had not, by 1967, recognized invertebrate pathology as the coherent field EAS said it was. Or did they?

Without supposing absolute prescience on the part of EAS, it appears to me that he set the stage by writing "Insect Microbiology" (1946) and "Principles of Insect Pathology" (1949), and in establishing a course in insect pathology at a major university. His next major move was to provide a means of communication for the emerging discipline by his establishment of "Journal of Insect Pathology." (From the beginning he wanted to name it "Journal of Invertebrate Pathology," but the publishers felt that was a phrase whose time had not yet come.) Finally, a forum for invertebrate pathologists was provided by the organization of The Society for Invertebrate Pathology. Ed's thoughts on this, as expressed in "Disease in a Minor Chord" were: "Just as through the Journal of Invertebrate Pathology I had hoped to bring together the common interests of those concerned with disease in insects with those concerned with disease in oysters, snails, annelids, and all other invertebrates, so I thought it would be well to bring insect pathologists, already well integrated with entomologists, into closer association with other types of invertebrate pathologists."

There is a question as to whether all the members of the newly formed Society for Invertebrate Pathology regarded the field as being a coherent one. I think there is still a question in some minds. The practical advantages of banding together of the largest groups of invertebrate pathologists--those working on insects and those working on oysters--was a large consideration when SIP was born. Now, though, whatever our present and personal attitudes may be; even if we may not read all the papers in JIP; and even though we may not attend all sessions at the annual meetings that are far apart from our specialities, SIP and JIP have done what Ed had hoped. We are aware of other fields within invertebrate pathology. We often learn from them. We are no longer provincials.

One appreciates that disciplines do not grow from the efforts of a single person. Others have been instrumental in furthering the concept and practice of invertebrate pathology. But would the evolution have been so sure, and would it have reached its present level without Ed Steinhaus? Singlehandedly, he provided texts, a course of university study, and a journal of invertebrate pathology. His efforts were the major ones that culminated in establishment of SIP. It is my premise that, because he put his evolving concepts of invertebrate pathology into action in those ways and in that order, we now have a discipline as cohesive and with parts as relevant as any in biology.

Phyllis T. Johnson  
Vice President

SIP New Members

Regular Members

Dr. Richard C. Axtell  
Department of Entomology  
North Carolina State University  
Raleigh, North Carolina 27650 USA  
Research Interest: Mosquito pathogens, especially fungi, medical and veterinary entomology

Helci Ana de Carvalho  
Instituto de Biologia da UFBA  
Rua Barao de Geremoabo s/n - Ondina  
40.000 Salvador, Bahia, BRASIL  
Research Interest: Crustaceae--biology, physiology, histology, and culture

Maria da Gloria Sampaio Gomes  
Instituto de Biologia  
Universidade Federal da Bahia  
Barao de Geremoabo, s/n - Ondina  
40.000 Salvador, Bahia, BRASIL  
Research Interest: Crustacean reproduction, histochemistry, and biochemistry

Jaques Hamon  
4 Rue Du Coteau  
74240 Gaillard  
FRANCE  
Research Interest: Epidemiology and control of vector borne diseases, World Health Organization

Dennis J. Joslyn  
Department of Biology  
Camden College of Arts and Sciences  
Rutgers University  
Camden, New Jersey 08102 USA  
Research Interest: Genetics of pathogens and their hosts

Dr. Goodwin P. Kaaya  
Department of Zoology  
University College of Swansea  
Singleton Park, Swansea  
SA2 8PP Wales, U.K.  
Research Interest: Insect hemocyte types and insect cellular defense reactions

IN MEMORIAM--KENNETH M. HUGHES

It is with considerable regret that we have learned of the very recent death of K. Hughes who just recently retired.

He was born June 18, 1917, to Guy and Ina Detling Hughes in Halfway. His family moved to Harrisburg when he was 10 years old.

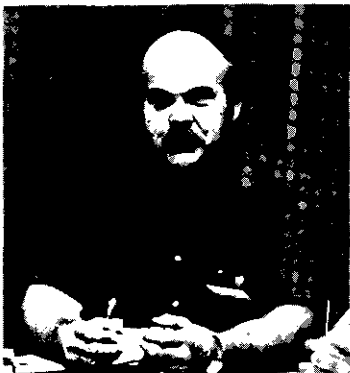
Mr. Hughes graduated from Willamette University in 1941. He and Ruth Luree Norris were married on June 1, 1942, in Salem. He served in the Army Air Force from 1943 until 1946. After his military service, Mr. Hughes was on the research staff at the University of California in Berkeley where he became Professor Edward Steinhaus' first assistant and the first electron microscopist at the newly established Laboratory of Insect Pathology of the University of California, Berkeley. Among Hughes' major contributions during his Berkeley years were a thorough study of the granulosis virus of the variegated cutworm (*Peridroma saucia*), the first such disease studied in the Western Hemisphere, and a pioneering investigation of the development of the nucleopolyhedrosis virus of the alfalfa caterpillar (*Colias eurytheme*) within the host cells. More on these early, exciting years in the Laboratory of Edward Steinhaus can be found in a delightful article by Hughes (Bull. Entomol. Soc. Am. 24:25-28, 1978). In 1964, after an eight-year interlude in Alaska, Hughes joined the Forestry Sciences Laboratory, where a great deal of his work concerned the two nucleopolyhedrosis viruses of the Douglas-fir tussock moth (*Orgyia pseudotsugata*). During the last decade, several papers on his work on the ultrastructure of *Baculovirus* appeared in the Journal of Invertebrate Pathology.

K. Hughes retired because of ill health in October 1979. On March 1 the family moved to Brookings, where Mr. Hughes died Friday at the family home.

Position Available

Postdoctoral research associated. Research and training in genetics, replication and efficacy of insect viruses. Experience in contemporary biochemical and molecular techniques preferred. Application deadline and position available August 1980. Send curriculum vitae and names of three references to: Dr. H. Alan Wood, Insect Pathology Reference Center, Boyce Thompson Institute at Cornell University, Tower Road, Ithaca, New York 14853. An affirmative action and equal opportunity employer.

More gleanings from Gainesville.



Allen



Cheng



Mix



Avery



Angus (Canada)

Frederick G. Kern  
National Marine Fisheries Service  
Biological Laboratory  
Oxford, Maryland 21654 USA

Research Interest: Parasites and pathogens of marine mollusks

Milos Kucera  
Institute of Entomology  
Flemingovo N. 2  
166 09 Prague 6  
CZECHOSLOVAKIA

Research Interest: Enzyme changes of the host during microsporidian infections--high-molecular toxins and microorganisms

Joel Margalit  
Department of Biology  
Ben Gurion University  
Beer Sheva, ISRAEL

Research Interest: Mosquito biology and control, pathogens of mosquitoes

Catherine M. Moreau  
Vector Biology and Control Division  
World Health Organization  
1211 Geneva 27, SWITZERLAND

Research Interest: Bibliographic researches on entomopathogenic agents for biological control of insect vectors of human diseases

Iracema Andrade Nascimento  
Instituto de Biologia - UFBA  
Barao de Geremoabo s/n - Ondina  
40.000 Salvador, Bahia, BRASIL

Research Interest: Molluscan biology, histology, and pathology

Joseph B. Perrone  
Department of Pathobiology  
School of Hygiene and Public Health  
Johns Hopkins University  
615 N. Wolfe Street  
Baltimore, Maryland 21205 USA

Research Interest: Mosquito reproductive physiology

Juarez Jorge Santos  
Instituto de Biologia  
Universidade Federal da Bahia  
Barao de Geremoabo s/n - Ondina  
40.000 Salvador, Bahia, BRASIL

Research Interest: Biology and ecology of molluscs and oyster cultivation

SIP Newsletter Editor  
A. J. Domnas  
c/o Department of Botany  
University of North Carolina  
Coker Hall, 010-A  
Chapel Hill, North Carolina 27514  
U.S.A.









