History of Entomology at The University of Maryland.

Part II: The Later Years

Floyd P. Harrison*

*Dr. Floyd Harrison, Professor Emeritis, wrote this history after his retirement in 1987.

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In 1859, the first catalogue of courses taught at Maryland Agricultural College listed entomology as one of the subjects. It is evident that entomology at this University had an early beginning. Not only does the University have entomological roots extending far back tn time, but early entomologists here would later be recognized as some of the greats of our profession. Course listings for 1860 include Townend Glover as "Entomologist. for the United States, Professor of Natural History, Botany and Pomology." Correspondence of Mr. Glover indicates he was at Maryland Agricultural College as early as 1859. He was the first federal entomologist and was followed by a long line of entomologists who would be well known for generations. Glover was succeeded in his federal position by Charles Valentine Riley. Other familiar names associated with Maryland Agricultural College were Willis Johnson, the first state entomologist, F.C. Bishop, Dwight Sanderson and A.L. Quaintance, who was the second state entomologist followed in later years by Dr. Thomas B. Symons who would become state entomologist in 1905, and Leonard Peairs. Dwight Sanderson published a text on insect pests in 1912 and later collaborated with Peairs to publish an edition in 1921. The eighth edition is now known as "Insect Pests of Farm, Garden and Orchard" by Ralph Davidson and William Lyons. In 1914, when Thomas Symons was head of the Department of Entomology, the Agricultural Extension Service was created. Symons became the first person to head the Extension Service in Maryland and Ernest Neal Cory assumed the duties of Department Head in 1914. He was to hold this office for 42 years, until 1956. Mr. Harold McConnell joined the Department in 1924.

His major duties included corn and tobacco pest research but his main interest was scale insects. He became internationally famous for scale insect systematics research on mealy bugs and acleridies. In 1927, Dr. Louis Ditman became a member of the faculty of this department. His earlier work was insect physiology, but later he began an active program of vegetable insect research.

In the late 1980s, Maryland saw the San Jose scale and pea aphid become established. During the tenure of Dr. Cory, the Mexican bean beetle, 1924; the Japanese beetle, 1926; European corn borer, 1932; green peach aphid on tobacco, 1946; and alfalfa weevil, 1951 became established. It was in these earlier years that introduction and establishment of these pests in Maryland determined to a large extent what the major activities of the Department would be.

In 1960, Theodore Bissell published a "History of Entomology at the University Maryland." The above is only a brief summary of Bissell's work. In 1956, Dr. Cory retired. Dr. William Bickley was appointed acting Chairman and in 1957 was named Department Chairman. In 1971, Dr. Ernest C. Bay of the University of California, Riverside, became chairman and

served in that capacity until 1975. Dr. Allen Steinhauer was then made Department Chairman and remains in that position today. It is the purpose of this narrative to set down more recent events during the tenure of these three chairmen and to show how, because of the advances in our technology and the changes in demographics, the Department of Entomology has evolved from a simple beginning that faced the problems caused by these pests to a more complex program orientated organization of teaching, extension and research.

The Teaching Program. When Dr. William Bickley became Department Chairman, there were no immediate changes in curriculum or degree requirements; change came, but slowly. In 1958, there was no resident insect physiologist. Insect physiology was taught by Dr. Sam Munson who was on the faculty of George Washington University. Dr. Jack Colvard Jones, who had been at the National Institutes of Health, joined our faculty and began a program of insect physiology including a more extensive course than had been previously taught. In 1981, Dr. Jones retired and Dr. Michael Ma arrived and continues the teaching program in physiology.

In the mid-1960s, the University altered its undergraduate requirements. In order to better serve these requirements, there was an effort within the College to organize a general biology course which never materialized. The Department of Entomology formed a new course to offer the concepts of biology in relation to the lives of insects. This course became popular and in the early 1970s enrollment exceeded 700 students. University requirements were changed once again causing enrollment to drop, but this course is currently taught and has registration as high as any entomology course. For years it was a popular course at University College, the University of Maryland evening educational program for adults. The course is known simply as "Insects.'

In order to improve the selection process for graduate students, a graduate affairs committee was formed in the mid-1960s which had a significant impact on our graduate program. According to Dr. Robert Denno, the present Chairman of the Graduate Affairs Committee, it has afforded a means of upgrading the quality of graduate students.

In the mid-197Os two significant additions were made to our educational program. Because of the extension IPM program, a need was created to educate students in the actual practice of pest management. A non-thesis master's program was proposed and approved by the graduate school and the first students admitted. This program deviates from the traditional research degree period of internship, giving practical experience in the practice of pest management. The second significant addition to the, program is the Maryland Center for Systematic Entomology (MCSE). This consortium program was based in the Department of Entomology and included personnel from the Systematic Entomology Laboratory (SEL), USDA (notable Adjunct Professor Douglas Miller) and Department of Entomology, Smithsonian Institution. Originally directed by Dr. John Davidson, this program has greatly expanded and been enhanced under the leadership of Dr. Charles Mitter who joined the Department in 1981. The objectives of MCSE are to produce students who are very competent in the systematics of some group of arthropods, and to produce quality research. Recently MCSE has added a taxonomic methods position filled by Dr. Mary Mickevich.

The coming of the Consortium for International Crop Protection (CICP) has brought talent into the department rarely found in an academic institution. ClCP is a nonprofit Consortium of university and USDA personnel, which assists developing countries in the area of pest management. Dr. Allen Steinhauer, the Department Chairman, is the Executive Director, so CICP has relocated to the University of Maryland. With this move has come Dr. Dale Bottrell, who is now a member of the faculty. Dr. Bottrell has organized a course, "International Pesticide Problems and Solutions." This course satisfies requirements in the present University Studies Program required of all undergraduates. It has proved to be an unusually popular course.

Dr. Elizabeth Haviland taught introductory entomology until 1964 when Dr. Donald Messersmith joined the faculty. Dr. Messersmith taught the introductory course until the early 1980s when this course was relegated to a team of instructors. This allowed some changes to take place in the core courses in entomology. The course in insect taxonomy as it had been taught for years was abandoned and two new courses, Insect Morphology and Classification and Insect Collection and Identification were formed, and taught by Dr. Messersmtth. Dr. John Davidson joined the faculty in 1966. His major interests included scale insect systematics. An internationally known two-week short course in coccidology was developed with other universities and SEL at USDA.

In 1976, another faculty position was created which is 100% instruction. Dr. Earlene Armstrong, an insect pathologist joined the faculty and teaches the lower level course "Insects." She shares this responsibility with Dr. J. L. (Lee) Hellman. Dr. Armstrong is also responsible for the course in medical and veterinary insects.

Extension and Service Activities. In 1957 when Dr. William Bickley assumed the duties of Department Chairman, the duties now performed by the Maryland Department of Agriculture were carried out by the University of Maryland. This included apiary inspection, mosquito control, nursery inspection and other regulatory duties. Dr. George Langford was the state entomologist and directed these activities. Mr. George Abrams was apiculturist and his duties included apiary inspection, inspecting primarily for American foul brood. Maryland is not a large state with many commercial beekeepers, but does have a large member of beekeepers' associations. Dr. Abrams was a strong supporter of beekeeper organizations. In 1965, Mr. Abrams died and Dr. Al Dietz was appointed to the vacated position. Dr. Dietz not only carried the responsibilities of teaching, research and extension but also was the apiary inspector. Dr. Dietz strongly supported the addition of a person to take over inspection responsibilities, so in 1967, Mr. John V. Linder became Maryland's first full time apiary inspector. Dr. Dietz was in Maryland for only 2 years. Dietz was followed by Dr. Dewey Caron in 1970. Like Dietz, Caron also had some inspection duties.

On January 1, 1973, the Maryland Legislature reorganized the State Board of Agriculture (which up until this time was within the University) into a separate Maryland Department of Agriculture with headquarters in Annapolis. Mr. Linder then reported to Dr. Robert Altman who was the state entomologist at the time of the move to the MDA. Dr. Caron no longer inspected

apiaries, however, the apiary inspector and extension apiculturist have continued to assist each other wherever possible. The apiary inspection office remained at the University until 1978 when it moved to MDA headquarters in Annapolis. In 1981 Dr. Caron resigned and extension apiculture was carried on by Melanie Odlum until 1989, and is now the responsibility of Dr. Gordon Allen-Wardell.

lnterest from various factions in the state, especially the Eastern Shore, eventually caused the legislature to appropriate, generous sums of money for a mosquito control program. Administered from Dr. Langford's office, a mosquito control organization was formed under the direction of Mr. Elwood Lynch. Joining Lynch was Dr. James Foster, Mr. Lester George (formerly with the Department of Agricultural Engineering), Dr. Stan Joseph and Mr. Robert Berry. These people administered a program of adult and larval control from the Department of Entomology until it became part of MDA in 1973.

In 1972 extension activities within the Department of Entomology took on new and broader responsibilities. Dr. Floyd Harrison (not extension) obtained funds from USDA to initiate a pilot integrated pest management program on sweet corn. Administration of this program became the responsibility of the Extension Service, so in 1972 Dr. Galen Direly was hired to head this new program. The program soon expanded to include snap and lima beans. Eventually the program developed and expanded to include a variety of vegetable and field crops. In 6 years the pilot phase of the program was over and it became self-supporting. Dr. Direly was responsible for scout training and dissemination of information, but the agricultural community now hires its own scouts and supports its own activities. Betty Marose, a weed scientist, joined the pest management team in its earlier years. Recently she has become IPM coordinator. In the 15 years of this program, tactics have remained much the same, but compared to initial knowledge there is an abundance of information on which to base present IPM strategies.

As this area of Maryland became more and more urbanized, the next logical direction for IPM was urban. In 1978, Dr. Davidson directed the first landscape plant IPM program for homeowners. This was followed by administration program for an arborist company, and finally, a nursery IPM program. In the early 1980s, Dr. Michael Raupp joined the Department of Entomology, expanding and improving the level of urban IPM research. He developed IPM programs for communities as well as the National Park Service. Dr. Raupp's responsibility was to bring a better understanding of basic fundamental biology and ecology of ornamental pests and use this understanding to develop an applied program of sampling, monitoring and thresholds. He is, at the same time, attempting to develop alternatives to chemical control.

Theodore Bissell retired in 1967 and Dr. Wallace Harding became the extension entomologist. Mr. Lee Hellman, who at the time as a doctoral candidate, became survey entomologist.. In 1981 Dr. Harding retired and Hellman, now Dr. Hellman, became extension entomologist. Dr. Hellman's major extension effort is with agricultural pests. The objective of this extension effort is to develop proper methods for using pesticides; investigate the possibility of using alternatives to pesticides; study the impact of cultural changes on insect populations,

such as no-till culture on crops. He also cooperates with Dr. Raupp in his urban IPM program and with Dr. John Davidson in extension efforts for ornamental plants. These three interact with urban groups to bring this whole IPM thrust to the public.

In 19641 Dr. F. E. Wood (Gene) Joined the extension group in this department. His main interest is household and structural pests. He has, in his earlier years, worked with pine cone worms in pine, and with the 4-H program. His efforts narrowed down in the early 1970s to developing IPM strategies for household pests, mainly cockroaches. Urban areas in Maryland offer a rich opportunity for work in this.

In addition to their research responsibilities, Drs. Castillo Graham and E. R. Krestensen were engaged in extension activities among the fruit growers of Western Maryland. In 1945, Dr. Graham established the fruit lab in Hancock, MD and was joined in 1955 by Dr. Krestensen. In 1968, Dr. Graham retired and the work was carried on by Dr. Krestensen. In the early 1980s the laboratory in Hancock moved to the Western Maryland Research and Education Center near Keedysville, MD. In 1986 Dr. Krestensen retired. Dr. Gerald Jubb, an entomologist who had recently joined this department, was appointed as director of this center.

As any technology becomes more advanced, so does the responsibility of maintaining the system that technology supports. Eventually as the use of synthetic insecticides became more widely used, a need was created for a pesticide coordinator. David Shriver became the first coordinator here. The original concept of pesticide coordinator was to promote safety with regard to pesticide use. The responsibility of this position has now evolved to a broader scope. Shriver was succeeded by, Dr. Wallace Harding who eventually hired Ms. Sherrill Knight to assist in this work. Later, after Dr. Harding's retirement, this responsibility was borne by Ms. Amy Brown. As the coordinator's job now stands, responsibilities are in two areas: (1) as a conduit of information on the risks and benefits of pesticides, impact assessment and current usages and (2) to coordinate training programs for people who must be certified to use restricted pesticides.

The Department of Entomology at Maryland is fortunate to have the opportunity for an extensive foreign outreach through CICP. Under the auspices of CICP, a number of this faculty have had tours of duty in various countries, aiding in the development of pest management systems.

Research Activities. 'Because of the earlier history of pest introductions into Maryland, research in the 1950s and 1960s was largely applied and commodity oriented. For vegetable research, this department utilized the facilities of the Plant Research Farm near Fairland, MD (about 7 miles from College Park). Drs. Louis Ditman and Floyd Harrison were engaged in screening insecticides for control of vegetable pests. If emphasis was on any one crop in this work, it was on sweet corn. In 1958, Dr. Harrison initiated a project to develop control techniques for tobacco pests. This work contributed to the development of the use of systemic insecticides for control of green peach aphid and flea beetles. It also provided a basis for establishing thresholds for treatment of tobacco budworm and tobacco hornworm. Drs. Graham

and Krestensen were responsible for research on tree fruits. Significant accomplishments include studies that led to control of periodical cicada and low volume sprays on fruit trees.

Gradually, field oriented research evolved to more basic and laboratory adapted effort. The complication and problems arising from use of synthetic organic insecticides was largely responsible for this change. Residues, for instance, created health hazards. In 1956, Dr. Louis Ditman perceived the need for a laboratory to conduct residue analysis in order to establish proper guidelines for treatment of crops. With the support of a regional project, NE 36, Mr. Tom Whitlaw was given the responsibility of equipping and initiating this laboratory. In the early 1960s, Dr. Robert E. Menzer assumed responsibility for the operation of this laboratory. As other questions arose regarding the use of synthetic organic chemicals, routine residue analysis gradually shifted to companies producing insecticides and the "residue lab" began to address more basic questions such as metabolites, fate of compounds and development of new techniques for conducting analytical work. This lab is better known now as the Toxicology Laboratory. It is presently funded from regional project NE ll5, grants from NIH and USDA. In 1976, Dr. Menzer acquired additional adminstrative responsibilities and Dr. Judd Nelson assumed the responsibility of the operation of the toxicology laboratory. Dr. Nelson has joint appointment with the Center for Agricultural Biotechnology and the Department of Entomology.

In the mid-1960s it became obvious that a new direction would have to be taken with applied research on vegetable crops. Louis Pitman vas nearing retirement and the Plant Research Farm near Fairland, MD (also near College Park) was being considered for removal. William Bickley, the Chairman, hired Mr. Michael Tysowsky to establish a program of research at the University of Maryland Vegetable Research Farm in Salisbury, MD on the Eastern Shore which is the center of the vegetable industry in the state. Mr. Tysowsky obtained his Ph.D. while there, but completion of the degree meant he would have to fulfill his military obligation. Mr. James Linduska, a graduate student in the latter phases of his Ph.D. work moved to the Vegetable Research Farm to replace Dr. Tysowsky. Upon Dr. Tysowsky's discharge from the Army, he sought employment elsewhere so Mr. Linduska was made permanent entomologist. He soon obtained his Ph.D. and continues to work at that facility today.

Dr. Jack Colvard Jones joined this department in 1958 and established an insect physiology laboratory. Out of this research came a book "Circulation Systems of Insects" published in 1976. He also won a Guggenheim Award. In later years Dr. Jones published another book "Anatomy of the Grasshopper." In 1981, Dr. Jones retired and his place was filled by Dr. Michael Ma. Dr. Ma’s research is centered around 2 areas of physiology: (1) the study of insect egg development and (2) the study of how hormones control metamorphosis. This work involves many cellular and immunochemical techniques. These are marketable skills so this particular area of research attracts a number of graduate and postdoctoral students. This work is funded largely by USDA and NIH grants.

In 1951 the alfalfa weevil was discovered in Maryland. It rapidly became a serious threat to the production of alfalfa, so a position was created to address the problem of alfalfa weevil and other forage crop pests. Dr. Allen Steinhauer filled this position in 1958. Because of the common interests of this department and entomologists at USDA in Beltsville, a close

relationship developed. The research had a multi-pronged approach: (1) development of pesticides for alfalfa weevil; (2) a study of the genetics of alfalfa weevil to determine if it was a new introduction; (3) development of cultural methods of control, (4) release and establishment of control agents (5) development of thresholds and sampling techniques for alfalfa weevil. In time, parasitoids become effective and perhaps for other reasons the weevil became considerably less damaging and the problem decreased.

Other projects in which Dr. Steinhauer was involved were a study of pollination of cucumbers by honeybees and a Mexican bean beetle parasite program. The USDA made available a gregarious parasite of Mexican bean beetle, Pediobious fovicolatus. Dr. Steinhauer and his students developed rearing and release techniques. In the late 1970s this project was adopted by the Maryland Department of Agriculture and continues today.

By the mid 1960s it was obvious that there would have to be a broader base to research on crop pests. Biological control research was expanding in many places so Drs. Bickley and Heimple (USDA Insect Pathology Lab) decided that an insect pathology laboratory was needed. Dr. Charles Reichelderfer came in the late1960s and established this laboratory. The first few year were devoted to the study of nuclear polyhedrosis and granulosis viruses. This study involved such issues as mode of action and how viruses react to insects. This developed into a program of genetics of resistance. More recently this laboratory has turned its attention to the study of Bacillus thuringiensis. A new isolation technique was developed and has facilitated the work on distribution and abundance of B. t. in nature and the fate of B. t. after it is applied to crops. Another question being considered is, does B. t., after it is applied to a crop, exchange genetic information with other soil organisms? Dr. Earlene Armstrong, also an insect pathologist, is currently investigating certain microbes as biological control agents for stored product pests.

One area of research which had not been seriously pursued prior to the mid-1970s was ecology. In 1976 Dr. Robert Denno joined the department and initiated a program of research involving insect-plant relationships. His specific research interests involve host-plant quality and its effect on the population dynamics and dispersal of herbivorous insects. Also studied in Denno's lab are issues concerning host-plant stress, predators and parasites and how these factors influence the distribution and abundance of plant feeding insects. In 1979, Dr. Pedro Barbosa joined the department. He has investigated various aspects of ecology such as the impact of gypsy moth on tree species which do not occur in the northeast. Other areas of research by Dr. Barbosa are behavior and ecology of parasitoids of gypsy moth, an evaluation of the role of plant chemicals on the feeding behavior and nutritional ecology of herbivores and on natural enemies. His investigations also include a study of mutual interactions among organisms at different trophic levels.

Maryland has had epizootics of encephalitis. It is obvious, therefore, that disease causing arboviruses are present in populations of arthropods, even though these arthropods may exist at low levels. In 1983 Dr. Tom Scott established a laboratory for the study of arboviruses. His efforts focus on the effect of virus infection in vertebrate host and the effect this has on mosquito

feeding success and development of techniques for assaying vertebrate hosts to determine if they have been infected with viruses. This work is supported by the National Institutes of Health and the Agricultural Experiment Station.

Dr. William Lamp joined the department in 1985 to teach and contribute to systems, exploring the theoretical side of pest management rather than focusing on a given pest complex. He is looking at a broader concept of pest management that focuses on the integration of crop management practices with pest ecology to minimize the impact of pests. To briefly illustrate, he is examining plant nutrition in alfalfa and how it affects tolerance to potato leafhopper.

A new and significant addition to the University system is the Maryland Biotechnology Institute (MBI). The Institute was formed to direct the use of modern technologies toward significant biological problems, both applied and basic. The Center for Agricultural Biotechnology (CAB) is a part of and located on the College Park Campus. Its broadly defined mission is plant protection. Dr. Jerry Reiger recently joined CAB with a joint appointment in the Department of Entomology. His research program focuses on understanding morphogenesis and phylogenesis of the lepidopteran eggshell and on relating morphological changes in eggshell structure to changes in the expression specific genes. Many Lepidoptera (butterflies and moths) spend an extended period within an eggshell, and these studies may provide a foundation for interrupting the life cycle of diverse pests.

In the near future, Dr. David O'Brochta will also join CAB with a joint appointment in the Department of Entomology. His research program will focus on developing means of introducing foreign genes into a variety of insects, including pest species.

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Mallis, Arnold. 1971. American Entomologists. Rutgers University Press. 549 pp.

Present Department Roster

Armstrong, Earlene. Associate Professor. Insect Pathology and Teaching
Barbosa, Pedro. Professor. Biological Control, Insect Ecology
Bottrell, Dale. Professor. Biological Control and International Crop Protection
Brown, Amy. Faculty Extension Assistant. Pesticide Coordinator
Davidson, John. Professor. Systematic and Urban IPM
Denno, Robert. Professor. Insect Ecology...
Dively, Galen. Associate Professor. Extension IPM Specialist
Hellman, J. L. Associate Professor. Extension Entomologist
Jubb, Gerald. Professor. Director of Western Maryland Extension and Research Center, Fruit Pests

Lamp, William. Assistant Professor. Research in IPM, Teaching
Linduska, James. Associate Professor. Research on Vegetable Pests
Ma, Michael. Associate Professor. Insect Physiology
Marose, Betty. Faculty Extension Assistant. Extension IPM Coordinator
Menzer, Robert. Professor. Toxicology, Director of Maryland Environmental and Estuarine Studies
Messersmith, Donald. Professor. Teaching, Taxonomy of Diptera
Mickevich, Mary. Associate Research Scientist. MCSE
Mitter, Charles. Associate Professor. Systematics. MCSE
Nelson, Judd. Associate Professor. Toxicology
Odlum, Melanie. Faculty Extension Assistant. Apiculture
Raupp, Michael. Associate Professor. Extension Urban IPM Specialist
Regier, Jerry. Associate Professor. Center for Agricultural Biotechnology
Reichelderfer, Charles. Associate Professor. Insect Pathology
Scott, Thomas. Associate Professor. Medical Entomology
Steinhauer, Allen. Professor and Chairman
Wilson, Alvin. Faculty Research Assistant. Christmas Tree Pests. Computer Whiz
Wood, F. E. (Gene). Professor. Urban IPM Extension Specialist, Household Pests

Former Members, Date of Departure

Abrams, 1965, Apiculture
Bay, E.C., 1975, Department Chairman, Medical Entomology
Berry, Robert, 1973, Mosquito Control
Bickley, William, 1973, Department Chairman
Bissell, Theodore, 1967, Extension Entomologist
Caron, Dewey,]981, Apiculture
Dietz, Albert, 1968, Apiculture
Ditman, Louis
Foster, James, 1974, Mosquito Control
Garrett, Wallace T., Administrator of Pesticide Applicator Law
George, Lester, 1973, Mosquito Control
Graham, Castillo, 1968, Fruit Pests
Harding, Wallace, 1981, Extension Entomologist
Harrison, Floyd, 1987, IPM Research and Teaching
Haviland, Elizabeth, 1964, Teaching
Johnson, Warren, 1960, Regulatory
Jones, Jack, 1981, Insect Physiology
Joseph, Stanley, 1973, Mosquito Control
Krestensen, E. R., 1986, Fruit Insects
Langford, George, 1971, State Entomologist
Lynch, Elwood, 1973, Mosquito Control
McComb, Charles, 1973, Regulatory
McConnell, Harold,
Mellors, William, 1983, Research, IPM

Thompson, Patric, 1968, Medical Entomology
Shriver, David, 1973, Pesticide Coordinator
Tysowski, Michael, 1971. Vegetable insects