Fellows

Thirteen members of The American Phytopathological Society are honored as Fellows of the Society at the 1992 Annual Meeting in Portland, Oregon. Election as a Fellow is a reflection of the high esteem in which a member is held by his or her colleagues. The award is given in recognition of outstanding contributions in extension, research, teaching, or other activity related to the science of plant pathology, to the profession, or to the Society.

Herb S. Aldwinckle

Herb S. Aldwinckle was born in Stamford, England, in 1942. He was brought up on a 600-acre farm in the small village of Barnack, known for its nature reserve in an old Roman quarry and as the place of origin of the Barnack Beauty apple.

Dr. Aldwinckle obtained his education in physical and biological sciences at Cambridge University in England; he specialized in botany and graduated with a B.A. degree in 1963. He received a Ph.D. degree in plant virology from the University of London, where he studied the effects of cytokinins on virus infection. He did postdoctoral work in plant virology and in resistance of safflower to *Phytophthora* species at the Davis and Berkeley campuses of the University of California.

Dr. Aldwinckle was appointed assistant professor of plant pathology at Cornell University's New York State Agricultural Experiment Station, Geneva, in 1970. He has been at Geneva since then; he was promoted to associate professor in 1976 and to professor in 1984. He has served as department chairman since 1982. Since 1970, he has carried out a major program in cooperation with plant breeders to develop multiple disease-resistant cultivars of apple and apple rootstocks. This program is characterized by its integration of rigorous plant pathology with plant breeding, by use of innovative techniques, and by long-term commitment. The products of this program, some of which have already appeared (Liberty and Freedom), promise significant improvements in disease control on apples in the future. A fire blight and vole-resistant rootstock, Novole, and a crown rot and fire blight rootstock, Geneva 65, have been introduced, and a new series of rootstocks with multiple pest resistance are being tested in several countries. Although in the early years of Dr. Aldwinckle's program conventional breeding methods were, and still are, emphasized, the program has adapted biotechnology techniques, including tissue culture, genetic engineering, and the particle gun for apple improvement. He has obtained regenerated apple plants transformed with marker genes and recently with a gene from the giant silk moth; this gene codes for a protein that inhibits phytopathogenic bacteria. The results of his research indicate that transformation of apple will be a source of valuable new cultivars in the future.

Aldwinckle's work on genetics of resistance in apple and on virulence in several pathogens has put breeding for resistance in this system on a much firmer scientific basis. The practical cooperation with breeders has resulted in tangible benefits for apple growers. This research is particularly timely in an era of increasing concern about the level of chemical use on horticultural crops.

In his research program, Dr. Aldwinckle has cooperated with scientists in France, Brazil, India, Switzerland, and elsewhere. He has been called on to provide advice in India, China, Colombia, and Brazil. Aldwinckle's interest in apple germ plasm led to his involvement in the exploration and acquisition activities of the National Repository for Apple at Geneva. It was primarily through these activities that he went to China in 1988, where he visited native apple sites in Sichuan Province and established continuing cooperation with Chinese apple taxonomists and breeders. He collected more than 11,000 apple seeds from wild trees in Tajikistan, Uzbekistan, and Kazaahstan in 1989. His work in establishing productive contacts with Chinese, Russian, Kazakh, and other foreign scientists working on apple diseases and germ plasm will be of great benefit to apple improvement in the future.

Aldwinckle has provided significant service to The American Phytopathological Society and to plant pathology in general. He served as a senior editor of *Plant Disease* for two years. With Alan Jones, he co-edited the *Compendium of Apple and Pear Diseases*, one of the most successful books in the series. He was one of the founding members of the Apple and Pear Disease Workers Group; he served as its first secretary, then chairman. For several years, he edited an annual newsletter, *The Bad Apple*, which helped to consolidate the group and further its organization and planning.

As chairman of the Plant Pathology Department, Cornell University, New York State Agricultural Experiment Station, Geneva, since 1982, he has fostered the growth of the department in several ways. He was instrumental in adding two professorial positions. He has encouraged the graduate program at Geneva, which has increased from six to 20 graduate students during his chairmanship. In addition, he helped obtain substantial new laboratory and office space for the department and significant new equipment. He is recognized for leadership and for encouraging colleagues and students in many ways.

José M. Amador

José M. Amador was born in Matanzas, Cuba, on March 3, 1938. He graduated from La Salle High School in Havana in 1955 and obtained a B.S. degree in agronomy with a minor in soil chemistry at Louisiana State University in 1960. In 1962, he received an M.S. degree in plant pathology from the same university, and in 1965 he was awarded a Ph.D. degree for work done under the direction of Dr. H. Wheeler. In 1965, he became extension plant pathologist with the Texas A&M Extension Service at the Research and Extension Center in Weslaco, where in 1991 he was named center director. He has served plant pathology professionally for 26 years. His service has spanned direct knowledge application to administration. He has served each activity with distinction, and his accomplishments are well documented.

During his tenure as an extension plant pathologist at Weslaco, he became one of the most revered and respected specialists in the lower Rio Grande Valley of Texas. Growers were careful to check any new ideas or information with Amador before they considered application. Because of his production experience with

sugarcane in his native Cuba and his professional training at Louisiana State University, Dr. Amador was uniquely equipped to assist producers in this subtropical area of Texas. He developed the sugarcane industry in the lower Rio Grande Valley, and his insistence on the use of disease-free planting stock has served the industry well. Teaching through the extension process has been a strong point of Amador's career. He is most proud of his accomplishments in teaching Hispanic farm workers. Creating grower awareness about plant disease occurrence has been a forte of Amador's educational programs. He strategically placed leaf wetness meters throughout the lower Rio Grande Valley to get daily reports of atmospheric conditions that could be used to advise growers about when to spray for foliar pathogens. He followed that activity with daily radio programs for advising growers about appropriate control action. His impact in extension is perhaps best summarized with the words of U.S. Congressman E. de la Garza: "Men like Dr. Amador are few and far between. They are one of a kind. In his two and a half decades of work with Texas A&M, Dr. Amador has acted as a catalyst between the scientific community and the public, performing an array of tasks and demonstrating amazing ability to analyze the most complicated subject and express that topic in understandable terms to the public."

Dr. Amador has served on the APS Council for five years as a councilor for the Caribbean Division. He has participated in the annual divisional meetings by interpreting the activities of the Society to members of the division and obtaining the collective wishes of members for interpretation to the council. It is in this capacity that he has made one of his major contributions to APS by providing valuable contacts with colleagues in Central and South America. This interaction was instrumental in permitting other members of APS to develop appropriate working relationships with plant pathologists in Latin America.

Dr. Amador is regularly asked to present seminars at various universities in Mexico. His reputation as a distinguished scientist is widely known throughout that country. In addition, he and his colleagues at the Weslaco Center have received sizable grants for the past two years from Mexican sugarcane companies to improve cane production through improved disease control techniques.

Dr. Amador is highly respected in many other areas of the world as an outstanding plant pathologist. He traveled to Guatemala at the request of USDA-AID to study disease problems on cotton; he served as an agricultural consultant on sugarcane production in El Salvador, where he also evaluated grain sorghum disease problems. He has traveled to Panama and Honduras at the request of USDA-AID to make recommendations on sugarcane and citrus production systems. He provided valuable assistance in the development of agricultural programs of the Caribbean Basin Initiative of former President Ronald Reagan.

Dr. Amador has a somewhat unique view of APS. He believes that members should support their professional society in tangible ways. Although some may view the Society for what they can get from it, he thinks that professionals should determine what they can give to it. He has served APS not only as councilor for the Caribbean Division but also as APS representative to the International Society of Plant Pathology, as a member of the Advisory Board, Office of International Programs of the Society, and the Extension Committee. He was chairman of the committees on Tropical Plant Pathology and on International Cooperation. In addition to these contributions to APS, Dr. Amador is very much involved with local and state professional organizations and in horticultural societies.

He is a member of Gamma Sigma Delta (Honor Society for Agriculture) and Epsilon Sigma Phi (Honor Society for Extension). He was the recipient of the 1980 Award for Superior Service from the Texas Agricultural Extension Service, and in 1985 he received the Faculty Distinguished Achievement Award for Extension from the Association of Former Students of Texas A&M. In 1990, he was awarded the APS Excellence in Extension Award and the Citation of Excellence from the County Agricultural Agents of South Texas.

He has also been involved in conducting applied research on powdery mildew of carrots; downy mildew on corn, grain sorghum, and melons; decline on St. Augustine grass; and lethal yellowing of ornamental date palms. In recent years, he has worked with his professional colleagues in a cooperative effort to define the cause of vine decline of melons in the lower Rio Grande Valley of Texas. This multimillion dollar crop was in severe jeopardy from this disease complex. Through their efforts, it was found that *Monosporascus cannonballus*, a previously undescribed pathogen from Texas, was one of the main causal agents.

Gustaaf A. De Zoeten

Gustaaf A. de Zoeten was born in Tjepoe, Java (Indonesia), on July 5, 1934. His education was interrupted by the Second World War and recommenced when he was 13, upon his family's return to Netherlands. In 1952, he entered the State Agricultural University at Wageningen, where he competed in crew and earned his candidacy in horticulture and entomology (B.S.) in 1957. The next year was spent on an internship working on physiological diseases of fruit trees at the Western Province Fruit Research Institute in South Africa. He returned to Wageningen in 1958 and earned an engineer degree (M.S.) in horticulture, plant pathology, and organic chemistry in 1960. After two years in the Dutch navy, he emigrated to the United States, where he earned a Ph.D. degree in plant pathology at the University of California, Davis, in 1965, under the guidance of Dr. T. A. Shalla. After his doctoral studies, he held a postdoctoral appointment with Dr. David Schlegel at the University of California, Berkeley. He joined the faculty of the Department of Plant Pathology at the University of Wisconsin in 1967. In 1970, he was promoted to associate professor and in 1974 to professor at the University of Wisconsin. He became chairperson of the Department of Botany and Plant Pathology at Michigan State University in 1989.

Dr. de Zoeten has achieved national and international recognition for research dealing with the elucidation of the virus infection process in plants. Over the past 25 years, working primarily with pea enation mosaic virus (PeMV) but with certain other single-stranded RNA plant viruses as well, he and colleagues have investigated quantitative and qualitative aspects of infection from a structure and function standpoint. In particular, studies have been on the entry of the infectious entity (ectosdesmata) into the plant, localization and characterization of intermediary products of virus synthesis, and the spread of virus infection by membrane-bound replicase and template RNA over short and long distances in the plant host. Early work with intracellular translocation of icosahedral viruses showed that particles could be found in nuclear pores and plasmodesmata, indicating possible routes for systemic invasion.

The site of replication and the replicative strategy of PeMV was investigated by de Zoeten and co-workers. They demonstrated that PeMV dsRNA was primarily associated with nuclei of infected pea cells. Further studies provided evidence that the surface of the nuclei did not offer a suitable environment for virions to uncoat. Research on the systemic spread of PeMV in inoculated pea plants showed that, four days post-inoculation, a rise in dsRNA concentration occurred and was accompanied by the appearance of membrane-covered vesicular cytopathological structures in the phloem above and below the point of inoculation. These structures were shown to originate in nucleate cells and then move into enucleate phloem elements. This supported an earlier hypothesis by de Zoeten and colleagues that PeMV uncoats outside the cell's plasmalemma and that the RNA

is the entity that is transported to initiate secondary infection in other parts of the host by transport of the replicative complex. These results stimulated investigations by de Zoeten and colleagues to determine if potato virus X (PVX) enters tobacco leaf cells through ectodesmata. They showed that, although PVX attaches to the cuticle above ectodesmata, virions were not visualized in ectodesmata. This gave credence to de Zoeten's hypothesis that plant virus uncoats on the plant surface. In addition, the first ever electron microscopical images of surface and cross-sectional views of ectodesmata were obtained.

In 1975, de Zoeten and Fulton wrote a "letter to the editor" of APS that provided part of the impetus for more recent work involving insertion of the viral coat protein (CP) gene into the genome of the host plant, thereby giving the now well known genetically engineered cross-protection. Their hypothesis was that the protein coat subunits of the mild protecting strain previously inoculated will trap the RNA of the in-coming challenging strain. Research done by de Zoeten and co-workers subsequent to the letter tested this hypothesis. They observed that tobacco rattle virus (TRV) infiltrated tobacco leaves attached end-on to cell walls and even to partially detached cuticles. Their work clearly showed that destabilization of TRV occurs on the cell wall. In a subsequent study, it was demonstrated that tobacco mosaic virus (TMV) particles attach to and destabilize on cell walls of tobacco. The length of the TMV rod decreased with time after infiltration, again showing the phenomenon of surface or near-surface destabilization. The significance of this research was the demonstration that TMV-CP of a mild protecting strain could seemingly act within the cell wall to protect against the incoming RNA of the challenge strain. They suggested genetic engineering experiments to test the efficacy of viral coat protein in cross-protection.

When the emphasis in virology changed, de Zoeten's laboratory changed to more molecular approaches to structure and function questions. This culminated in the determination of the in vitro translation strategy of PeMV, the elucidation of the satellite nature of PeMV-RNA3, and recently the determination of the complete sequence of PeMV-RNA1. It has become clear that the monotypic PeMV group should probably be classified in the luteovirus group.

Interest in mechanisms of aphid transmission culminated in elegant research on nonpersistent transmission of virus by aphids showing the location of pea seedborne mosaic virus on the tips of stylets of the aphid vector *Macrosiphum euphorbiae* Thomas. A polystyrene antibody labeling technique for scanning microscopy was developed for this research.

While on sabbatical leave in 1988 at the Friedrich Miescher Institute in Basel in the laboratory of Dr. T. Hohn, de Zoeten did some novel genetic engineering experiments with human interferon to determine if it could be biologicaliy active in plants and prevent viral infection. This research showed unequivocally that human interferon was not able to prevent establishment and multiplication of a turnip yellow mosaic virus.

Interest in the more practical side of plant virology resulted in, among other things, the publication of a description of a nucleoprotein associated with the maize whiteline mosaic disease of sweetcorn in the eastern and north central United States. A CMI-AAB "Description of Plant Virus No. 238" was coauthored by de Zoeten and Reddick.

de Zoeten has taught laboratories in the introductory plant pathology class and co-taught an outstanding graduate level virology class at the University of Wisconsin for many years. He has trained 18 graduate students to date. He has served as associate editor for *Phytopathology* and *Virology*. He was a member of the APS Virology Committee from 1969 to 1972 and from 1978 to 1981. He was chairperson of that committee in 1981–1982. de Zoeten has served regularly on a committee, and chaired it once, for reviewing the disposition of funds by the New York Foundation of Science and Technology (Cornell Biotechnology Program). He also acted as a liaison with the Biotechnology Center of the University of Wisconsin at Madison. In addition, he has been active internationally; he was chairperson of the committee that reviewed the Virology Program of the International Potato Institute (CIP) in 1977. He was also a US-AID consultant in Brazil at the University of Porte Alegre in 1978.

John H. Hill

John H. Hill was born in Evanston, Illinois, in 1941. He was influenced to pursue plant pathology by Dr. William H. Muir at Carleton College, Northfield, MN, where he graduated in 1963 with a B.A. degree in biology. He earned an M.S. degree in plant pathology from the University of Minnesota in 1966. His Ph.D. degree in plant virology was obtained at the University of California, Davis, under the guidance of R. J. Shepherd in 1971. In the same year, he accepted a position as a research associate at Iowa State University. In 1972, Dr. Hill became an assistant professor in the Department of Botany and Plant Pathology at Iowa State. He was promoted to associate professor in 1978 and to professor in 1981.

Hill's innovative research program has taken serology beyond routine diagnosis and made it a precise tool for basic research in plant virology. One of the first to use monoclonal antibodies for detection of plant viruses, he and his colleagues pioneered the use of signature analysis in plant pathogen diagnosis. Signature analysis, by which the shape of antigen-antibody binding curves for a suite of antibodies is used to identify viral antigens, greatly enhances the efficacy of viral strain identification by sharply reducing the number of different antibodies needed for screening. This form of "fingerprinting" has paved the way for simpler, less expensive, and more practical screening procedures. His approach to quantifying serological reactions has made it feasible to track distinct viral strains in the progression of disease epidemics. This fundamental work also provides the basis for rapid detection of amino acid changes in a virulence determinant when they also influence the way antibodies bind with the protein. His work with generation of anti-idiotype hybridoma antibodies to monoclonal antibodies is a classic in plant virology. His laboratory also reported the first use of ELFA (enzyme-linked fluorescent assay) to detect viruses in seed and was among the first to employ double antibody sandwich radioimmunoassay and biotin-avidin systems for plant-pathogen diagnosis.

Early in his career, Hill worked on several important viruses, including bean pod mottle, maize dwarf mosaic virus, cowpea severe mosaic virus, soybean mosaic virus, and hydrangea ringspot virus. In his laboratory, bean pod mottle virus was discovered to be seed-transmitted in soybeans. Through his extensive work on soybean viruses, Hill became internationally recognized as the authority on soybean mosaic virus (SMV), and his studies of this important pathogen have resulted in numerous significant contributions to the practical needs of Iowa agriculture. His research over two decades has significantly advanced an understanding of SMV epidemiology, aphid transmission, and mechanisms of disease resistance. He was instrumental in detecting, identifying, and characterizing strains of SMV that contribute to seedborne disease epidemics in midwestern soybean varieties. He developed an ELISA test for seedborne SMV that has become widely used by commercial seed companies. Most recently, Hill's laboratory has succeeded in the molecular characterization of SMV, including full-length nucleotide sequences of two strains.

Hill's research on barley yellow dwarf virus (BYDV), one of North Africa's most devastating crop diseases, has broken new ground in international plant pathology. His studies in Morocco with the Midwest International Agricultural Consortium (MIAC) of the Agency for International Development (AID) on host range,

strain assessment, yield loss assessment, screening for resistant varieties of small grains, and identification of aphid vectors of BYDV are the first published works on the ecology of this virus in the lower Mediterranean Basin. His advice and leadership were critical in setting up a virology laboratory in Settat, Morocco, for INRA, the Moroccan equivalent of USDA. Hill, along with Richard Van Deusen of Iowa State University's Department of Plant Pathology, provided planning and training services for creation of a hybridoma laboratory in Rabat, Morocco, under a joint agreement between Iowa State University and the Kingdom of Morocco.

Hill has served The American Phytopathological Society (APS) and the American Type Culture Collection (ATCC) in acquisition, preservation, authentication, and distribution of microbial germ plasm resources by ATCC. For the last decade, Hill was chair of the ATCC Plant Virus Collection Advisory Committee. Hill's leadership has made ATCC's Plant Virus Collection much more effective in service to APS. In 1992, Hill was asked to represent APS on the ATCC Board of Directors.

Recently, Hill has taken a leading role in collaborating with APS, American Society for Virology (ASV), and USDA-APHIS-PPQ (Plant Protection and Quarantine) in reforming USDA regulations for interstate transportation of plant viruses. As chair of a subcommittee of the APS Virology Committee, Hill spearheaded a two-year effort to devise a modification of the permit process for allowing entry of plant viruses common to a state without an importation permit.

An outstanding and challenging teacher of plant virology for two decades, Hill has served as major adviser to 10 M.S. degree and seven Ph.D. degree graduates. Two postdoctoral researchers and five visiting scientists have worked in his laboratory. Hill has been an excellent mentor and collaborator, as evidenced by his extensive list of multiauthored papers.

Throughout his career, Hill has applied his insightful, intellectual approach and basic scientific principles to his plant virus work. He has started with fundamental theories and developed new approaches to solving problems. No subtopic of plant virology, immunology, or nucleic acid chemistry was ever too complex for him to tackle, if applicable to his research; in fact, the more intricate the topic, the more stimulating it is for Dr. Hill.

Harry A. J. Hoitink

Harry A. J. Hoitink was born in one of the Zuiderzee polders in The Netherlands in 1938. As a teenager, he became familiar with various procedures for control of plant disease while on his parents' potato seed production farm. He graduated from the Higher Agricultural College in Roermond in 1960. He was a National Research Council Fellow at MacDonald College of McGill University in Montreal and received B.Sc. and M.Sc. degrees in plant pathology from there in 1963 and 1964, respectively. In 1967, he received a Ph.D. degree in plant pathology with emphasis on phytobacteriology from the University of Wisconsin, Madison. Dr. Hoitink became assistant professor of plant pathology at the Ohio Agricultural Research and Development Center, The Ohio State University, Wooster, in June 1967. He was promoted to associate professor in 1971 and to professor in 1977 and continues to serve in that capacity.

During the past two decades, Dr. Hoitink has become internationally recognized for his research on biological control of soilborne plant pathogens in compost-amended substrates. The production of nursery crops in such substrates has been adopted in most parts of the world, because they suppress Phytophthora root rot. With his students and postdoctoral fellows, he isolated and characterized natural antifungal products released from composted oak bark. These naturally occurring fungicides kill zoospores and sporangia of *Phytophthora cinnamomi*. This approach to biological control replaced steam sterilization and soil fumigation and reduced fungicide applications in nurseries.

Since the late 1970s, Dr. Hoitink has focused his research on mechanisms of biological control in disease-suppressive potting mixes and made several important discoveries. He determined the significance of organic matter decomposition level in biological control of Rhizoctonia and Pythium damping off. He and his students demonstrated that hyperparasitic activity of *Trichoderma hamatum* against the pathogen *Rhizoctonia solani* was repressed in fresh compost. In mature composts, hyperparasitism was induced, and biological control prevailed. Synergistic interactions between *Trichoderma* strains and bacterial biocontrol agents were discovered. In a comprehensive series of studies, they determined the impact of the composting process and environment on the diversity and activity of beneficial microorganisms. This resulted in the development of optimum procedures for production of composts naturally suppressive to disease caused by *Pythium ultimum* and other pathogens. These studies are now well recognized landmarks in the growing field of biological control of plant disease. Dr. Hoitink was awarded two U.S. patents (1987,1990) for controlled inoculation of composts with specific biocontrol agents that induce suppression to *Rhizoctonia*, *Fusarium*, and *Pythium* diseases.

To better define microbiostasis, the "general suppression" phenomenon, Dr. Hoitink's group more recently has explored fundamental relationships among biocontrol agents and the fungal pathogen *Pythiun ultimum* in substrates differing in decomposition levels. With his students, he established that *Pythium* populations and severity of root rot only increased after microbial activity in a substrate declined below a threshold level. Above this level, in sphagnum peat as well as compost-amended mixes, suppression of both the pathogen and the disease was sustained. This procedure is now used commercially to monitor natural suppressiveness of such potting mixes to Pythium root rots. In cooperative studies with soil organic matter chemists and by utilizing NMR spectroscopy, Hoitink's group has developed novel procedures for determining the decline in microbial-carrying capacity of potting mixes and how this relates to the potential for biological control of Pythium root rot.

Dr. Hoitink's research has been widely recognized. He has presented more than 40 invited lectures at national and international meetings. Some aspects of his research program not widely known among his plant pathologist peers are his contributions to the development of composting processes for treatment of solid wastes. He has developed a computer-controlled system for the composting of municipal sludges; it has been adopted widely in the United States and, also, more recently in Europe. He has been invited to speak at symposia organized by several national societies outside the field of plant pathology, including The American Society of Microbiology, The American Society of Agronomists, The American Society of Horticultural Science, and The Water Pollution Control Federation. Accounts of his work have appeared in several U.S. and foreign newspapers, including *The Christian Science Monitor* (1986) and *The New York Times* (1991).

In 1988, Dr. Hoitink received the first National Award for Research on Composting from the U.S. Environmental Protection Agency (EPA). In 1983, he was awarded a Fulbright lecturer grant by the University of Barcelona, Spain. In 1990, he was a visiting scientist in Australia with the New South Wales Department of Agriculture and the Sydney Water Board. Dr. Hoitink has been very active in graduate education at The Ohio State University (OSU) and has been a lecturer on biological control in plant pathology graduate courses for two decades.

Since 1990, he has served as program leader for OSU's newly developed Composting Research and Education Center. Activities of this group span several disciplines and two OSU colleges. He has represented OSU's efforts in this area at several workshops

and public hearings. He is the principal organizer of the First International Composting Research Symposium held in Columbus, Ohio, in May 1992.

Dr. Hoitink has contributed to progress in science at a national level in various capacities. He has served APS as a member and chair of both the Bacteriology and Biological Control committees and as associate editor for *Plant Disease*. He has served on EPA and National Research Council panels that set priorities for competitive grant programs.

Donald E. Mathre

Donald E. Mathre was born in Frankfort, Kansas, on January 5, 1938. He received a B.S. degree in botany from Iowa State University in 1960. Later that same year, he began graduate work in plant pathology at the University of California, Davis, where he earned a Ph.D. degree in plant pathology in 1964.

Immediately upon graduation, Dr. Mathre was appointed assistant professor of plant pathology at the University of California, Davis. His research was on the soilborne diseases of cotton. Dr. Mathre joined the Department of Botany and Microbiology at Montana State University, Bozeman, as assistant professor of plant pathology in 1967. He was promoted to associate professor in 1969 and full professor in 1972.

Early in his career at Bozeman, Dr. Mathre conducted research on the mode of action of oxathiin systemic fungicides on basidiomycete fungi. He determined that they affected the electron transport system of mitochondria. During that same period, Dr. Mathre studied the biology and control of ergot on male sterile barley and wheat. Results of this research expanded the knowledge of how host, pathogen, and environmental factors influence ergot development.

Undoubtedly, Dr. Mathre is best known for his insightful research on the soilborne pathogens of field crops. He is considered a world authority on the Cephalosporium stripe disease of wheat. His work has encompassed most aspects of the disease and its causal fungus, *Cephalosporium gramineum*. He has investigated the infection processes and virulence of the pathogen, the physiological and chemical factors affecting sporulation of the fungus, host response and sources of resistance, and the physiological effects of the disease on growth and yield of wheat. The culmination of his outstanding research resulted in the development of CEPHLOSS, a computer program for determining the economic benefit of crop rotation as a control measure for Cephalosporium stripe disease of winter wheat. The program was made available in 1985, and many Montana growers have benefited from its use in the management of the disease. Dr. Mathre also developed and released three winter wheat germ plasm lines with resistance to Cephalosporium stripe disease.

Dr. Mathre is recognized internationally for his creative research on other soilborne diseases. He assessed the incidence and severity of dryland root rot of wheat and barley and the take-all disease of wheat in Montana. On the basis of these findings and subsequent disease control studies, he devised biological and chemical control strategies for these diseases. Dr. Mathre has distinguished himself as a cereal smut pathologist. He is recognized throughout the world as an expert on loose smut of barley and dwarf smut (TCK) of wheat.

From 1987 to the present, Dr. Mathre has broadened the scope of his research on soilborne diseases to include studies involving not only pathogens but also other soil organisms, some of which may interact with pathogens and influence the development of diseases. He has looked at the relationship between bacterial seed inoculum density and rhizosphere colonization of wheat. More recently, he has worked on a bio-priming seed treatment for the biological control of *Pythium ultimum* preemergence damping off in super sweet garden corn. He is the author of 75 scientific articles in refereed journals, two book chapters, and one book. Moreover, several important disease problems have been solved because of his keen mind, intellectual curiosity, impeccable experimental methodology, and concern for crop agriculture. In 1973, Dr. Mathre was honored for his work by being elected a Fellow of the American Association for the Advancement of Science.

Dr. Mathre excels as a teacher. His formal teaching assignments have included "Introduction to Plant Pathology" and "Mycology" at the undergraduate level, and "Soilborne Diseases" at the graduate level. He received an Outstanding Educator of America Award and an Anna K. Fridley Outstanding Teacher Award in 1975 and 1983, respectively, in recognition of his teaching ability.

In addition to his research and teaching accomplishments, Dr. Mathre has made significant administrative contributions. The Department of Plant Pathology at Montana State University, formed in 1972, prospered twice under his leadership. He was acting head of the department from 1975 to 1976 and head from 1987 to 1990. In 1990, he was appointed acting associate dean of research for the Montana Agricultural Experiment Station. Personnel in the experiment station have lauded Dr. Mathre for his positive attitude and his open and honest administrative style as associate dean.

Dr. Mathre has served APS well in many capacities. He has been a member of the editorial boards of *Phytopathology*, *Plant Disease Reporter*, and *Plant Disease*. He was senior editor of *Plant Disease* from 1980 to 1983. He served as a member or chair of several standing committees and as councilor-at-large. Dr. Mathre was secretary treasurer, president, and councilor of the Pacific Division. In 1989, he served as president of APS. He presided over the 81st annual meeting in Richmond, Virginia, where in his presidential address he challenged members of the Society to "look at ourselves and to our future."

Gaylord I. Mink

Gaylord I. Mink was born in Lafayette, Indiana, September 23, 1931. He grew up working on his grandfather's farm nearby. He served in the U.S. Army from 1951 to 1954; he had combat duty in Korea. Dr. Mink earned B.Sc. and M.Sc. degrees in 1956 and 1959, and a Ph.D. in plant pathology at Purdue University in 1962. He was appointed assistant professor in the Department of Plant Pathology at Purdue, but moved to a research post at the Irrigated Agriculture Research and Extension Center, Washington State University (WSU) in Prosser in August 1962. He was appointed professor of plant pathology and plant pathologist at WSU in 1973. He and his wife Barbara reside in Prosser and have four children, Terrie, Dennis, Gayla, and Dana.

Dr. Mink is nationally and internationally known for his extensive studies on the characterization, epidemiology, diagnosis, and control of a wide range of viruses, and especially for his work on tree fruit viruses. As a graduate student, he isolated and described apple chlorotic leafspot virus and pioneered research on apple chlorotic leafspot, apple stem pitting, and apple stem grooving viruses. This work led to the recognition that one or more of these three viruses occurred in nearly all commercial apple trees worldwide. He developed woody plant indicators to differentiate these latent viruses, which are still used in virus certification programs throughout the world. In the 1970s, he collaborated with Japanese scientists in defining the complex of

latent viruses that cause apple top working disease, an economically important disease of apple in Japan. This work led to modification of cultural practices, which has virtually eliminated apple top working disease.

Dr. Mink has worked extensively on various strains of prunus necrotic ringspot virus (PNRSV). He demonstrated that a winter assay of dormant flower buds was superior to a summer assay of leaf tissues by ELISA and could identify rugose mosaic infected trees for winter removal before the virus could be disseminated on pollen during bloom. More recently, he and his colleagues noted that natural infection with a symptomless biotype of PNRSV was associated with decreased field spread of rugose mosaic disease. He then demonstrated that cross-protection can provide effective control against strains of PNRSV that cause the rugose mosaic disease. Dr. Mink and his colleagues studied the dissemination of PNRSV and prune dwarf virus (PDV) by honey bees and found that bees emerging from hives transported from southern California to Washington contain viable, virus-contaminated pollen on their bodies. The viruses were degraded in the hive after seven to eight weeks by a factor(s), probably an enzyme, that was isolated from bee-collected pollen but not from pollen collected by hand. Dr. Mink established a self-supporting ELISA laboratory at Prosser for providing the large-scale service testing needed as rapid, reliable methods were developed to detect viruses in dormant Prunus buds and in bean and pea seed stocks. More than 10,000 registered Prunus seed and scion source trees maintained by certified fruit tree nurseries in Washington, Idaho, Montana, and California are tested annually.

Dr. Mink is responsible for the purification, characterization, and serology of a wide range of plant viruses, including Tulare apple mosaic, apple chlorotic leafspot, peanut stunt, pea seedborne mosaic, beet curly top, carrot thin leaf, beet necrotic yellow vein, asparagus viruses 1 and 2, and prunus necrotic ringspot. The method used to purify Tulare apple mosaic, published in *Nature* in 1962, was among the first to combine differential and density gradient techniques to purify a plant virus and to use droplet assays from density gradient tubes to locate viruses by the combination of optical density, biological activity, and serology. That work and a subsequent study with tobacco streak virus demonstrated that not all virus particles were equally infectious. Dr. Mink also investigated sap components that cause virus inactivation or inhibit mechanical transmission.

Dr. Mink recognized the occurrence of pea seedborne mosaic virus in Washington, purified and partially characterized the virus, developed polyclonal antisera, and developed serological methods for rapid detection of the virus in both plants and seeds. Dr. Mink described and characterized the western strain of peanut stunt virus and determined its serological relationships with cucumber mosaic and tomato aspermy viruses. Dr. Mink showed that the inoculum source for epidemics of carrot motley dwarf virus disease in central Washington was steckling carrots imported into the area from western Washington and southern Idaho where the viruses are endemic. He also identified the role of weeds and volunteer hosts and of cropping carrots in overlapping seasons in sustaining epidemics of this virus disease. Dr. Mink provided the first record in North America of beet necrotic yellow vein virus, the causal agent of sugarbeet rhizomania.

Dr. Mink developed monoclonal antibodies that distinguish the serotype A and B isolates of bean common mosaic virus (BCMV), which cause black root disease of cultivars, with dominant I gene resistance. He developed large-scale indexing procedures to detect BCMV in commercial bean seed lots. He associated the occurrence of serotype A of BCMV with bean seed production areas in East Africa and identified its probable spread from Africa to Idaho and Washington seed production fields. Dr. Mink conducted the first systematic surveys of virus diseases in Jordan and established the economic significance of the whitefly-transmitted tomato yellow leaf curl virus in the vegetable production areas of Jordan.

The results of Dr. Mink's productive research career are documented in more than 140 research publications. He has also served plant pathology in numerous national and international capacities. He was president of the Pacific Division of APS in 1984–1985 and served as senior editor of *Plant Disease* from 1983 to 1985. He served on the APS Virology Committee and on international working groups associated with grapevine, vegetable, and legume viruses and has been active in chairing and organizing symposia for international congresses of plant pathology. Dr. Mink has served the American Type Culture Collection in a range of advisory and committee assignments. He has been active in national and international study and advisory groups that determine virus testing criteria for safe international movement of germ plasm and has served the tree fruit industry extensively in a range of technical committee and advisory council assignments. Dr. Mink has been the leader of the Interregional Research Project 2 (IR-2) since 1985. He has also been active in the Department of Plant Pathology activities in WSU, where he has organized and taught a plant virus methods course. He has supervised five M.S. degree students and eight Ph.D. degree students and was host to 18 postdoctoral scientists in his laboratory.

Dr. Mink was honored with the Lee M. Hutchins Award in 1989 for his research on the etiology, epidemiology, and control of cherry rugose mosaic disease.

Lowell R. Nault

Lowell R. ("Skip") Nault was born in San Francisco, California, on April 4, 1940. He attended the College of Marin and later the University of California, Davis, where he received a B.S. degree in entomology in 1962. At Davis, he first became acquainted with what would become his life-long specialty, the study of insect vectors of plant pathogens. He later attended Cornell University, where he completed M.S. and Ph.D. degrees in 1964 and 1966, respectively. Although his degrees are in entomology, the person who had the greatest influence on Nault's graduate education at Cornell was plant virologist, William Rochow. Under Rochow's guidance, Nault's interests in insect behavior and virus transmission merged in a study of the relationship of aphid feeding to transmission of pea enation mosaic virus.

Nault joined the Department of Entomology at the Ohio Agricultural Research and Development Center and The Ohio State University (OSU), Wooster, as assistant professor in 1966. He was promoted to associate professor in 1970 and professor in 1975. He was appointed associate chairman of entomology in 1991. Since 1970, he has held a joint appointment in the Department of Plant Pathology. He was recruited to OSU in the early 1960s to help solve problems associated with outbreaks of corn virus diseases in Ohio and other states on the southern edge of the Corn Belt. Nault questioned the prevailing view that wheat streak mosaic virus (WSMV) was the cause of kernel red streak disease of corn. He demonstrated that it was not the virus but feeding injury by the WSMV vector, the wheat curl mite, that caused discoloration of corn kernels. This information led to a change in the grading system for streaked corn, saving several million dollars in losses to growers in Ohio, Indiana, Michigan, and Ontario. His were the first comprehensive studies on dispersal of the wheat curl mite and other eriophyids, the smallest of the arthropod virus vectors.

Nault's early work on the aphid vectors of maize viruses took an unexpected turn. Following up on a report that cornicle droplets from the green peach aphid have repellent properties, Nault soon demonstrated that the phenomenon was widespread. He showed that aphids secrete droplets when attacked by predators and parasites and that volatile chemicals, alarm phero-

mones, are present in cornicle secretions. Nault collaborated with Cornell entomologist, William Bowers, to isolate and identify two pheromones, including E-B-farnesene, the most broadly interspecific pheromone discovered to date. Nault studied the alarm response of various stages and morphs of aphid vectors; he was looking for ways to interfere with aphid settling and feeding. While conducting this work, he was puzzled that some aphid species responded poorly to pheromone. Subsequently, he showed that for these aphid species, alarm pheromone does not trigger an escape response, rather pheromone alerts attending ants that protect aphids from attacking predators. On the basis of work from his studies, alarm pheromone is being tested by commercial companies for potential in protecting crops from invading aphids and virus spread.

In his career at OSU, Nault helped to characterize the etiology and vector transmission of most of the major maize virus and mollicute diseases in the United States and Latin America. In particular, he has studied machloviruses, tenuiviruses, potyviruses, marafiviruses, and rhabdoviruses. His work was influential in the recognition of machloviruses and tenuiviruses as distinct groups. He has studied a wide array of vectors, including eriophyids, aphids, beetles, planthoppers, and leafhoppers. Of special note is his work with maize chlorotic dwarf virus (MCDV). Rapid progress on etiological studies was not possible until he demonstrated that MCDV was obligately and semipersistently transmitted by leafhoppers. This was only the second report of such an unusual relationship between a leafhopper vector and a plant virus. Recently, with colleagues, he has shown that MCDV vectors are related phylogenetically, that a helper factor is required for transmission, that virus attaches to the lining of specific regions of the foregut of vector and some nonvector species, and that vector, but not nonvector, species exhibit complex feeding behaviors when they feed in the phloem.

Nault perhaps is best known for his pioneering work on the corn leafhopper, the vector of corn stunt spiroplasma, maize bushy stunt mycoplasma, and maize rayado fino virus. While on a collecting expedition in Mexico, he discovered a primitive relative of the corn leafhopper living on gamagrass, a wild plant closely related to maize. This finding stimulated what has been an intensive, 12-year collaborative study of the evolutionary biology of the leafhopper genus *Dalbulus*. His studies and that of collaborators strongly suggest that southwestern Mexico is the center of origin of the genus and that gamagrasses are the ancestral hosts. Later evolving leafhoppers radiated to the teosintes and maize. Corn stunting mollicutes played a role in leafhopper evolution by selectively killing gamagrass but not maize-specializing leafhopper species. The corn leafhopper, a mollicute-tolerant, highly fecund, and mobile species, is the only member of the genus to expand its distribution throughout Latin America, where it has become a serious pest of maize. This and other findings have made *Dalbulus* a model system for understanding how a pest and vector species may evolve and have made it the best understood leafhopper genus in the world.

Nault has published more than 90 journal articles and a dozen book chapters. He is coeditor of the book, *The Leafhoppers and Planthoppers*, and two proceedings of colloquia on maize and virus diseases. He has given numerous invited talks on vector biology and insect transmission of plant pathogens in the United States and Latin America and Europe. He has served as advisor of several doctoral and masters degree students and postdoctoral associates and often hosts visiting scientists in entomology and plant pathology. In 1989, he was honored with the Distinguished Research Award for senior faculty at the Ohio Agricultural Research and Development Center. In 1982, he was program manager for the USDA Competitive Grants Office for Entomology, Nematology, Plant Pathology, and Weed Science. In 1985, he again managed the Entomology and Nematology Program as well as the first Insect Pest Science Program. He was an associate editor for *Phytopathology*, served on the editorial board of the *Journal of Economic Entomology*, and three times was chair of the Publications Council of the Entomological Society of America (ESA). In 1991, he served as president of the ESA and as the president's forum speaker at the annual meeting of APS. A longtime member of ESA and APS, he has been active in fostering better relations between the two societies. He is a Fellow of the Royal Entomological Society of London and Fellow of the American Association for the Advancement of Science. Nault has had a unique, productive, and significant career working in the interface between entomology and plant pathology.

Dan E. Purcifull

Dan E. Purcifull was born in Woodland, California, on July 1, 1935. He attended the University of California, Davis, received a B.S. degree in agricultural education in 1957, an M.S. degree in agronomy in 1959, and a Ph.D. degree in plant pathology in 1964. His doctoral research, supervised by Dr. Robert J. Shepherd, involved adaptation of the double immunodiffusion technique for use with filamentous viruses. In 1964, Dr. Purcifull accepted a position as a plant virologist in the Plant Pathology Department at the University of Florida, Gainesville, and began his productive research career on virus diseases affecting Florida crops. He was promoted to associate professor in 1969 and to professor in 1975.

Purcifull has gained world recognition for his thorough and meticulous research on the serological properties of numerous plant viruses. His research has contributed to the basic understanding of plant viruses and their relationships and to the development of practical diagnostic methods. He has also made important contributions to the research programs of other scientists through cooperative interaction.

Dr. Purcifull has been involved in the antigenic, biological, and cytological characterization of potyviruses that affect squash, watermelon, and other cucurbits. One contribution was development of serodiagnostic methods for watermelon mosaic virus-1 and watermelon mosaic virus-2. These viruses were shown to be serologically distinct, and their serological differences were correlated with differences in host range. The findings clarified the relationship between these two viruses, provided a basis for their identification, and facilitated the evaluation of disease resistance. In 1981, zucchini yellow mosaic virus was detected in Florida and was shown to cause severe mosaic in cucurbits. This was one of the first reports of this virus in the United States. More recently, Dr. Purcifull and colleagues have produced monoclonal antibodies to capsid and nonstructural proteins of cucurbit potyviruses and used these to reveal variation among viruses in the potyvirus group.

In addition to his work on potyviruses of cucurbits, Dr. Purcifull has worked on the diagnosis and characterization of viruses affecting pepper, cowpea, turnip, peanut, beans, forage legumes, citrus, and papaya. In the early 1970s, the lettuce industry in Florida was threatened by heavy losses from mosaic diseases. Dr. Purcifull showed that two distinct viruses, lettuce mosaic (LMV) and bidens mottle, were involved. He helped develop serodiagnostic methods to control spread of lettuce mosaic virus via infected seed. Dr. Purcifull has produced antisera to numerous other viruses, including blackeye cowpea mosaic, citrus tristeza, cucumber mosaic, squash mosaic, tobacco etch, potato Y, celery mosaic, and pepper mottle, and these have been widely used for disease diagnosis.

Dr. Purcifull also continued his research on immunodiffusion techniques for filamentous viruses and became a world authority on sodium dodecyl sulfate (SDS) immunodiffusion procedures for detection of plant viruses. He adapted the SDS immunodiffusion method for use with inclusion body proteins and applied it to the study of their nature and relationships. Procedures for

immunodiffusional analysis and detection of virus and inclusion body proteins treated with SDS were summarized in a technical bulletin and more recently in the APS laboratory manual on serological methods for detection and identification of viral and bacterial plant pathogens. He demonstrated that freeze-dried extracts from virus-infected plants served as convenient reference antigens for serodiagnosis, and he produced a large collection of freeze-dried viral antigens to complement the antisera collection.

Dr. Purcifull's expertise on the serology of potyviruses and SDS immunodiffusion techniques was a key component in collaborative studies on the identification and characterization of inclusion bodies of potyviruses with Richard Christie, John Edwardson, Ernest Hiebert, and others. They showed that inclusions were not virus aggregates and were antigenically distinct from virion structural proteins. In one early study, the cylindrical inclusions of five potyviruses were antigenically different, and their specificities were not affected by the propagative host. This provided the initial evidence that these inclusion bodies were encoded by the virus genome. Dr. Purcifull proposed that the antigenic properties of the proteins of cylindrical inclusion bodies had taxonomic and diagnostic potential for the potyvirus group.

Dr. Purcifull's research has been documented in more than 80 publications. He is the author or coauthor of seven CMI-AAB Descriptions of Plant Viruses.

Through his efforts and leadership, a library of more than 200 antisera to plant viruses and their components has been constructed. This large collection of polyclonal and monoclonal antisera and freeze-dried viral antigens is a valuable resource he has shared with numerous plant pathologists in the United States and 45 other countries for research, diagnostic, and teaching purposes.

Dr. Purcifull's activities have included serving as chairman of seven Ph.D. degree supervisory committees, three M.S. degree committees, and as departmental graduate student coordinator. He cooperates extensively with extension personnel in identifying disease problems and developing useful practical diagnostic procedures and also participates in the teaching of several courses. He has been an associate editor of *Phytopathology* (1971–1973) and *Plant Disease* (1987–1989) and was a member of the Plant Virus Subcommittee for the International Committee on Taxonomy of Viruses (1973–1975). In 1981, he shared the Lee M. Hutchins Award for his participation in the development of serodiagnostic techniques for citrus tristeza virus, and this year he is a co-recipient of the Ruth Allen Award in recognition of his contributions to the characterization of potyviruses and their inclusions.

Earl G. Ruppel

Earl G. Ruppel was born in Milwaukee, Wisconsin, in 1932. He earned a B.S. degree with senior L&S honors and departmental honors in botany at the University of Wisconsin-Milwaukee in 1958 and a Ph.D. degree in plant pathology at the University of Wisconsin-Madison in 1962 under the direction of Dr. D. J. Hagedorn. After a brief period as a research associate in the Department of Plant Pathology in Madison, Dr. Ruppel joined the Agricultural Research Service of the U.S. Department of Agriculture in 1963. For two years, he conducted research on tropical and subtropical crops at the USDA-ARS Federal Experiment Station in Mayaguez, Puerto Rico. In 1965, Dr. Ruppel filled the need for research on sugarbeet virus diseases in Mesa, Arizona, where the sugarbeet industry had established a new production area. Anticipating the retirement of plant pathologist John O. Gaskill in Colorado, the department transferred Dr. Ruppel to Fort Collins, CO, in 1969, where he currently serves as a research plant pathologist on a team of sugarbeet scientists.

Dr. Ruppel epitomizes the role of a "complete plant pathologist"; he has conducted research and published more than 120 papers on abiotic, bacterial, fungal, and viral problems affecting beans, black pepper, cacao, corn, *Dioscorea* spp., peas, sugarbeet, and *Tephrosia vogelii*. His research mainly has concerned etiology, epidemiology, and control of plant diseases through host resistance.

In Puerto Rico, Dr. Ruppel identified several pathogens affecting the production of *T. vogelii*, an important potential source of rotenoids, and developed chemical and crop management practices to control diseases in this crop. Because of a production-limiting Phytophthora collar rot of black pepper, Dr. Ruppel tested the susceptibility of several native species of *Piper*, identifying one highly resistant species. Use of this species as a rootstock for commercial black pepper was recommended as a means of disease escape.

Dr. Ruppel's main research thrust in Arizona involved sugarbeet virus diseases. He demonstrated that the ubiquitous beet western yellows virus predominated and that severe beet yellows virus only occurred late in the growing season, indicating that a beet-free period as practiced in California was necessary to prevent a carryover of BYV to succeeding sugarbeet crops. This work also led to the first published electron micrographs of the beet western yellows virus in aphid tissues, suggesting that the virus may multiply within the vector.

When powdery mildew of sugarbeets first became epidemic in 1974, Dr. Ruppel coordinated a team of industry and university plant pathologists in an epidemiological survey of the disease and a collaborative multi-state test of chemicals for its control at the request of the Sugarbeet Development Foundation. Further epidemiological studies showed that susceptibility increased with plant age, negating the practice of some growers of applying fungicides before the disease was evident.

Much of Dr. Ruppel's research in Colorado has involved epidemiological studies of Cercospora leaf spot and Rhizoctonia root rot of sugarbeet. Information gleaned from these investigations led to the establishment of suitable epiphytotics in germ plasm nurseries where, in cooperation with geneticists Drs. Richard I. Hecker and Garry A. Smith, 29 germ plasms having high levels of resistance to *Rhizoctonia solani* or *Cercospora beticola* have been developed and released to breeders in the sugarbeet industry. The resistant germ plasms developed in Fort Collins are the only proven source of sugarbeet resistance to *R. solani* in the world. Dr. Ruppel also showed that there were no isolate × cultivar interactions for either disease, which indicates that resistance probably was multigenic and quantitative. This was confirmed by inheritance studies conducted in collaboration with his geneticist colleagues. Additionally, these studies also led to cultural controls of Rhizoctonia root rot of sugarbeet in western states. During the course of this work, Dr. Ruppel was the first to identify and report benzimidazole-resistant strains of *C. beticola* in the United States, and he showed that these strains were as competitive and persistent as sensitive strains in the field. In collaboration with plant pathologists at Colorado State University, he also studied the feasibility of biological control of *R. solani* with *Trichoderma* in the field. Although negative results were obtained, this research demonstrated the need for more efficacious biocontrol agents and means for their delivery and establishment in the field.

Dr. Ruppel, as an integral member of a team composed of a plant physiologist-biochemist and geneticist, is involved in basic studies on the mechanisms of pathogenesis and host resistance in the *Cercospora*-sugarbeet system. In an earlier study, which also included a cytologist, the team demonstrated that ultrastructural effects of pathotoxins produced by the fungus were similar to those induced by the pathogen. Contrary to the literature, this study showed that *C. beticola* was inter- and not intracellular, providing evidence that the nonspecific pathotoxins

were involved in pathogenesis.

As an affiliate member of the Department of Plant Pathology and Weed Science and a full member of the Graduate Faculty at Colorado State University, Dr. Ruppel has served on 20 M.S. and Ph.D. degree graduate student committees; he was the major professor for one Ph.D. degree candidate. These have not been passive commitments; he constantly is sought by the students for consultation in research methodologies, experimental designs, and statistical approaches in the disciplines of agronomy, plant breeding, virology, mycology, and plant pathology. He also is well known for his expertise in graphic and photographic illustrations of research data and materials.

Dr. Ruppel also has earned a distinguished national and international reputation through his research accomplishments. In 1965, only two years after earning a Ph.D., he was named to the "Gallery of Contemporary, Noted Mycologists" for *Mycopathologia et Mycologia*. He also presented an invitational symposium paper at the Ninth International Congress of Plant Protection and chaired a colloquium at the Second International Congress of Plant Pathology. In 1978, he taught the mycology section in a short course on "Pests and Diseases of Sugar Beet" at the International Agricultural Institute in Zaragoza, Spain. He has presented more than 90 invitational lectures and seminars at universities, conferences, and sugarbeet industry grower meetings. He has served on review panels for many granting institutions, including NSF and BARD, as well as on research review panels for several universities and USDA-ARS. He has been nominated for outstanding alumnus of the University of Wisconsin-Milwaukee.

Dr. Ruppel has been a member and a two-term chairman of the By-Laws Committee of the American Society of Sugar Beet Technologists (ASSBT) and served as agricultural program chairman for the ASSBT 1989 biennial meeting. He served as general program chairman for the 1991 meeting of ASSBT. In 1987, for "untiring labor and . . . outstanding contributions to the [ASSBT]," Dr. Ruppel was presented the ASSBT's prestigious Meritorious Service Award.

Dr. Ruppel has served APS as a member of the Committee on International Relations, as a member and chairman of the Sugar Beet Virus Working Group for the American Type Culture Collection and the Virology Committee of APS, and as associate and senior editor of *Phytopathology*.

Howard A. Scott

Howard A. Scott was born in Fort Smith, Arkansas, on August 12, 1926. He is recognized for his distinguished contributions in plant pathology over the past 36 years through his research, teaching, and service to the profession. Dr. Scott has made pioneering contributions in virus serology, purification methodology, and elucidation of mechanisms involved in beetle transmission of plant viruses.

After receiving a B.S. degree in biology from Memphis State University in 1949 and teaching at the elementary and high school levels in Lima, Montana, for two years, Dr. Scott began graduate studies at the University of Montana, Missoula. He completed the M.A. degree in botany under the guidance of M. Chessin. In 1958, he received a Ph.D. degree from the University of California, Berkeley, where his research was directed by A. H. Gold and W. C. Snyder. In 1959, he began his professional career at the newly organized USDA Plant Virology Laboratory at Beltsville, Maryland, as research plant pathologist. In 1967, he was appointed associate professor of plant pathology in the Virology-Biocontrol Laboratory, Department of Plant Pathology, University of Arkansas at Fayetteville. He was promoted to the rank of professor in 1969 and to the distinguished rank of university professor in 1988.

The application of serological techniques for detection and identification of viruses has been a continuing theme in Dr. Scott's research. His modification, with co-workers, of the bentonite flocculation test for use in detection of viruses in potato tubers was a predecessor of the more sensitive serological tests for virus detection in tissues that are now used. He was among the first to use gel diffusion for detection of plant viruses, especially for seeds and desiccated tissues. His research enabled determination of serological relationships between plant viruses previously considered serologically distinct. He demonstrated the value of mouse ascites fluid as a source of antibodies for plant viruses. He developed and maintained an extensive collection of virus antisera, which he generously shared with virologists throughout the United States and many other countries.

Throughout his career, Dr. Scott has isolated, purified, and identified several previously undescribed plant and insect viruses, including papaya ringspot virus and watermelon mosaic virus 2. He developed a method for purifying cucumber mosaic virus, which led to the determination of its physical and chemical properties and the development of high quality antiserum specific for this widely occurring virus. The principles described in the original paper have been retained in more recent modifications introduced by virologists to enhance purification of particular strains of the virus. He is a principal scientist in an interdisciplinary team that discovered and characterized several occluded and nonoccluded insect viruses. Among his many contributions to this team effort has been the application of the single radial gel diffusion test for early detection of nuclear polyhedrosis virus in bollworm and the discovery of an endogenous protease in the virus inclusion body.

One of Dr. Scott's most significant research contributions has resulted from a long-term team research effort to determine specific mechanisms of transmission of certain plant viruses by leaf-feeding beetles. This team discovered that both beetle-transmitted viruses and those not transmissible by beetles are present in infectious form in regurgitant and hemolymph of beetles fed on infected plants, and both types of viruses are deposited on leaf surfaces during beetle feeding. This apparent contradiction led to the identification of ribonuclease as the factor in beetle regurgitant that determines transmissibility. This identification and development of a gross-wounding inoculation technique that imitates beetle feeding have led to an understanding of the specificity of beetle transmission of viruses and have basic significance in elucidating the steps in the process of infection of plant cells by viruses. The technique also provides a reliable and practical way to inoculate plants in programs for screening germ plasm for resistance to beetle-transmissible viruses.

Dr. Scott has been a leader in development of biotechnology research at the University of Arkansas. He organized and chaired a committee of faculty whose efforts led to establishment of the Arkansas Biotechnology Center. A major component of the center was a hybridoma facility for production of monoclonal antibodies; financial support was from the university and industry. He served as acting coordinator of the Center in 1987.

Dr. Scott is highly regarded by students for his dedicated, effective teaching of virology at the undergraduate and graduate levels. He has been the driving force in an advanced undergraduate course, "General Virology," which is team-taught by five faculty members from two colleges; the course truly integrates all aspects of virology. The effectiveness and popularity of this course are indicated by increasing student enrollment over the past several years. Dr. Scott also taught a graduate level course in plant virology that emphasized traditional and the most contemporary laboratory techniques. Dr. Scott generated interest and enthusiasm through personal interactions, and he always had time to help students. Both graduate and undergraduate students rank courses taught by Dr. Scott as among the best they have taken.

In 1985, under the sponsorship of the Food and Agriculture Organization of the United Nations, Dr. Scott assisted in estab-

lishing the virus research program at the Soybean Research Institute, Heilongjiang Academy of Agricultural Science in Harbin, China. In 1990, he was selected and very ably served as interim head of the Department of Plant Pathology. In 1991, he received the prestigious John White Award for outstanding research in the College of Agriculture and Home Economics.

Dr. Scott has served two terms on the APS Virology Committee and has recently completed his second term on the Editorial Board of *Phytopathology*. He has served on the Editorial Board for Arkansas Farm Research and has been a member of the State Plant Board, on which he served on the Pesticides Committee and the Seed Committee.

Wayne A. Sinclair

Wayne Alfred Sinclair was born in Medford, Massachusetts, on December 15, 1936. His early education was obtained in the public schools of Canton, MA, and Concord, New Hampshire. He entered the University of New Hampshire in September 1954, where he majored in forestry and then botany; he received a B.S. degree in June 1958. In September 1958, he entered the graduate school of Cornell University, where he majored in plant pathology and minored in plant physiology and entomology. In 1958, he married the former Barbara D. Murdoch. The Sinclairs have raised three children: Cheryl, Thomas, and Douglas.

Upon conclusion of his graduate studies, Sinclair was appointed assistant professor of plant pathology at Cornell University; he filled the position vacated by the retirement of his major professor, Dr. D. S. Welch. Sinclair progressed through the academic ranks and was promoted to professor in 1975. In 1970, Dr. Sinclair spent a sabbatical year with Weyerhauser Company in the Pacific Northwest, where he was a visiting forest pathologist.

During his career at Cornell, Dr. Sinclair has done research on a wide range of important tree problems, including annosum root rot of conifers, air pollution injury to pine, Verticillium wilt, Dutch elm disease, Fusarium root rot of conifer seedlings, and the ecology of ectomycorrhizal relationships. Most recently, Dr. Sinclair has investigated mycoplasmalike organisms (MLOs) and the diseases in ash and elm with which they are associated. Dr. Sinclair's research and that of his students have been at the forefront of investigations in some of these topic areas, contributing in particular to understanding the roles of mycorrhizae and MLOs as they affect the health of trees and shrubs. Dr. Sinclair played a major role in clarifying the roles and relative contributions of two diseases, Dutch elm and the MLO-associated elm yellows, in elm mortality in New York. His current research on elm yellows includes investigations involving cloned MLO DNA probes. This research has resulted in new methods and tools for investigating this disease and has revealed interesting relationships between elm yellows disease in the United States and elm yellows in Europe. In addition, Dr. Sinclair's research on ash yellows disease has yielded new insight into the interactions of environmental stress and pathogenic MLOs in the decline of ash in North America. He also collaborated in a research program that was an important contribution to the recognition of ash yellows MLO as the probable cause of witches'-broom disease in lilac. Dr. Sinclair's lead role in conceptualizing hypotheses and planning and organizing research efforts has been a major force in the successful pursuit of these research topics.

Dr. Sinclair has made important contributions to the extension of our science. For example, he and his colleagues initiated a tree pest leaflet series, with slight modification, that formed the basis for disease control recommendations. Although the leaflet series is aimed at problems in New York State, it has also been used extensively by practitioners and home owners throughout the northeastern United States. He edited, with R. J. Campana, *Dutch Elm Disease: Perspectives After 60 Years*, a major source document. His treatise, *Diseases of Trees and Shrubs*, co-authored by H. H. Lyon and W. T. Johnson, is an outstanding contribution containing 247 pages of color photographs illustrating disorders incited by more than 350 pathogens and environmental factors in 260 plant species. This book is one of the most useful reference works in this field and is certain to be a major diagnostic aid and reference for a long time to come. It has been acclaimed as "one of the 10 best horticultural books of the century."

Dr. Sinclair has contributed to our science through his activities in teaching students in courses on diseases of trees and shrubs since the earliest part of his career. In 1980, Dr. Sinclair accepted the responsibility for teaching the introductory course in plant pathology. He developed this course into one of the country's top introductory courses, dealing with plant pathology principles in depths normally reached only in more advanced courses.

Dr. Sinclair has made outstanding contributions to Cornell University and its College of Agriculture and Life Sciences (CALS) through his service as a member of the Cornell Plantations Advisory Board, the Graduate School Fellowship Area Committee, the Cornell Faculty Committee on Independent Courses, and CALS committees, including those on Financiai Aid and Scholarships, Educational Policy, and the Academic Integrity Hearing Board.

Dr. Sinclair has been a member of the Editorial Advisory Board of *Forest Science*, the leading publication of the Society of American Foresters, and was member of the New York section of that society's Committee on Insects and Diseases. For more than 25 years, Dr. Sinclair has been active in the Northeastern Forest Pest Council, serving as secretary treasurer (1965–1972) and chairman (1972–1976). He also participates actively in the Northeastern Forest Pathology Workshop (chairing it for three years), the International Society for Arboriculture, and the International Organization for Mycoplasmology.

Dr. Sinclair has served APS through his activities as senior editor of *Plant Disease* for three years and as a member of the Editorial Board of *Phytopathology*. In 1988, Dr. Sinclair was appointed editor-in-chief of *Plant Disease*, in which capacity he has served with distinction. He has been on numerous committees of APS, including the Forest Pathology, Mycology, Mycorrhizae, Pollution Damage, Literature Retrieval, and Membership committees. In addition, he has served as secretary treasurer, vice president, and president of the Northeast Division of APS.

David R. Smith

David R. Smith was born in Champaign, Illinois, on July 31, 1945. He received a B.S. degree in agronomy from the University of Illinois in 1968 and received the M.S. and Ph.D. degrees in plant pathology from the same institution in 1970 and 1974, respectively.

Dr. Smith first achieved international recognition as a member of the University of Illinois team that identified the susceptibility of *cms*-T maize to the new race T of *Bipolaris maydis*. Smith and co-workers described race T and the reactions of *cms*-T maize and a wide array of other maize genotypes to this race. They measured yield reductions resulting from infection by race T and described a pathotoxin produced by race T that was useful in detecting *cms*-T seed in blended seed lots. Because of their swift response and the rapid dissemination of their findings during the winter of 1970, the hybrid seed corn industry was able to respond quickly

by shifting to resistant normal cytoplasm hybrids, and thus a recurrence of the devastating effects of the southern leaf blight epidemics of 1970 and 1971 was averted. One of the articles he co-authored from this work has become a "Citation Classic."

Dr. Smith joined DEKALB AgResearch, Inc. in 1973. In 1982, DEKALB Pfizer Genetics was formed as a joint venture of DEKALB AgResearch, Inc. and Pfizer Genetics. Dr. Smith assumed responsibility for reorganizing and merging not only the plant pathology research of the two companies but also their pest data collection, reporting procedures, and service functions. A year later, Dr. Smith became principal plant pathologist with additional responsibility for planning and leading all plant disease related activities and participation in final hybrid advancement meetings. In 1985, Dr. Smith became area director of Host Pest Resistance, assuming supervision of all entomological and pathological research nationally as well as chairing committees on the global evaluation of company germ plasm. In 1990, DEKALB Pfizer Genetics became DEKALB Plant Genetics, and Dr. Smith was named chair of its institutional biosafety committee for recombinant DNA research at the DeKalb location.

Dr. Smith has been principal architect of a plant pathology program that serves as a model for the seed industry. Researchers in the public and private sectors as well as maize growers have benefited greatly from Dr. Smith's leadership in the field of maize pathology. During his tenure with DEKALB, maize hybrids with superior resistances to southern leaf blight, northern leaf blight, gray leaf spot, Goss' wilt, maize chlorotic dwarf virus, and maize dwarf mosaic virus have been commercialized and are available to farmers where these diseases are of concern.

The Corn Pathogen Monitoring Project, initiated by Dr. Smith in 1974, is a systematic survey program that has been widely copied. A differential set of maize cultivars is grown at many locations in the United States and sampled for pathogens throughout the growing season. The project has provided valuable information on the occurrence, distribution, and race structure of maize pathogen populations in the United States. This monitoring project has produced reliable and comprehensive information on the distribution and frequency of races of pathogens such as *Exserohilum turcicum*, including the discovery of race 23.

In 1985, Dr. Smith initiated the Uniform Global Maize Resistance Assessment Project in which all DEKALB elite inbred lines, along with differential lines, are evaluated at numerous locations on five continents for eight agronomic traits, 32 diseases, and 12 insect pests. The project proved its value almost immediately when in 1987 a new race of *Bipolaris maydis* virulent on *cms*-C maize was reported in China. Information on approximately 800 isolates of *B. maydis* collected from the Pathogen Monitoring Project and results from the Uniform Global Maize Resistance Assessment Project demonstrated to industry and university researchers that isolates virulent on *cms*-C maize had not been detected in more than 12 years of monitoring. Because of his knowledge and experience with *B. maydis*, Dr. Smith was selected as the pathology representative from industry of the American Seed Trade Association Group sent to China to investigate the potential of this reported new race.

The scope of Dr. Smith's maize pathology program at DEKALB is tremendous. Dr. Smith's program annually provides more than 1,500 kg of sorghum seed inoculum of various pathogens to the company's breeding locations in the United States. By the time hybrids are nominated for commercial status, they have been evaluated for 20–25 specific diseases. More than 16,000 summarized observations of disease reactions are reported annually to scientists and managers for use in hybrid advancement and placement decisions. Dr. Smith also maintains a productive breeding program, supervises all entomological and pathological research nationally, and chairs several company committees.

Although not a requirement of his position in the seed industry, Dr. Smith has continued to publish and participate in professional societies. In addition to his articles on race T of *B. maydis*, Dr. Smith has described the *rhm* gene in corn for resistance to *B. maydis*, documented occurrence of new races of pathogens, and proposed logical nomenclature for their description. He was selected by the American Society of Agronomy to write the chapter on maize diseases for the third edition of *Corn and Corn Improvement*.

Dr. Smith is actively involved in APS; he has served on several committees: Regulatory and Foreign Plant Disease, Sustaining Associates, Placement, and Collections and Germplasm. He has served as a reviewer for both *Phytopathology* and *Plant Disease*. He is also a member of the American Society of Agronomy, Crop Science Society of America, and Sigma Xi. Dr. Smith currently serves on the Department Advisory Committee, Department of Plant Pathology, University of Illinois at Urbana-Champaign, and on the Maize Crop Advisory Committee, part of an advisory network of the National Plant Germplasm System.

During his 24-year career, Dr. Smith has achieved worldwide recognition as an authority on diseases of maize, their distribution and importance, and the genetics of disease resistance. Dr. Smith's contributions have had fundamental significance for maize researchers in both the public and private sectors and, especially, for maize farmers in the United States.