Fellows

Eleven members of the American Phytopathological Society were elected Fellows of the Society at the 1986 Annual Meeting in Kissimmee, Florida. Election as a Fellow of the Society is a reflection of the high esteem in which a member is held by his 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.

George E. Bruening

George Emil Bruening was born August 10, 1938, in Chicago, Illinois. He received his B.S. degree in chemistry from Carroll College, and his M.S. and Ph.D. degrees in biochemistry from the University of Wisconsin in Madison. His interest in plant viruses was generated by postdoctoral experience in the laboratory of the late Dr. Wendell M. Stanley in Berkeley. He was appointed assistant professor of biochemistry at the University of California at Davis in 1967, and has risen to the rank of professor. In 1984 he became a member of the Department of Plant Pathology at Davis. He spent sabbatical leaves in the Department of Plant Pathology, Cornell University, in 1974–1975, and in the Department of Biochemistry, University of Adelaide, South Australia, in 1981–1982.

Dr. Bruening's early plant virus work was with the cowpea mosaic virus. His group pioneered significant features of the virus' structure and showed that members of that virus group had two different types of coat protein. They also determined that the virus RNA was polyadenylated at one end and had the unusual feature of a protein covalently bound to the other.

Dr. Bruening has been especially interested in understanding why some cowpea lines resist cowpea mosaic virus. His group found that seedlings of about 6% of 1031 cowpea lines tested were operationally immune to the virus, whereas protoplasts from these immune seedlings were, with one exception, as capable of supporting cowpea mosaic virus as protoplasts from susceptible cowpea seedlings. The exceptional Arlington cowpea protoplasts support only a fraction of the virus increase seen in other cowpea protoplasts. Arlington cowpea protoplasts were subject to intensive biochemical investigations, leading to the conclusion that these protoplasts specifically restrict the production of cowpea mosaic virus proteins. His studies with this system continue.

In 1970 he collaborated with R. J. Shepherd in a classical study demonstrating that a plant virus (cauliflower mosaic virus) contained DNA and not RNA. In the mid 1970's he was the prime mover in studies in collaboration with Roger Beachy and Milton Zaitlin that characterized the way in which tobacco mosaic virus controlled the synthesis of virus-coded protein. He was the author of a paper which has become a model for people who want to study in vitro translation of plant viruses. Dr. Bruening has recently shifted part of his program to a study of the satellite of tobacco ringspot virus. In collaboration with Irving Schneider, interesting multimeric forms of that satellite were found, which suggests that its replication could be similar to that of viroids.

Dr. Bruening was coauthor of a text describing biochemical laboratory experiments which was widely used in biochemistry courses. He has served on the Plant Virology Committee of APS from 1975 to 1977. Currently, he is on the program committee of the American Society for Virology. He has been associate editor of *Virology* since 1973. He was an editor of that journal from 1981 to 1984.

Arun K. Chatterjee

Arun K. Chatterjee was born in 1940, in Bihar, India. He received a B.Sc. degree in agriculture and an M.Sc. degree in plant pathology from Bihar Agricultural College. He received the M.S. and Ph.D. degrees from the University of Guelph, Canada, in 1968 and 1971, respectively. His thesis was titled "Erwinia herbicola: The Degradation of Phloridzin and Observations on Non-Pigmented Variants."

From 1971 through 1977 he was a postdoctoral associate in the Department of Bacteriology and the Department of Biochemistry and Biophysics at the University of California, Davis, and in the Biology Department at the University of Calgary, Canada. He studied and conducted research on the genetics and physiology of *Erwinia* with M. P. Starr, on glycogen synthesis in *E. coli* with J. Preiss, and on lipopolysaccharide defective mutants of *Salmonella* with K. Sanderson. He became an assistant professor of biology at Boston University in 1977. He joined the Department of Plant Pathology at Kansas State University, Manhattan, in 1979.

Dr. Chatterjee's research contributions have ranged from early studies on the taxonomy and physiology of *E. herbicola* and related bacteria, to the physiology and molecular genetics of *Erwinia* spp. He did the pioneering work on the genetics of *Erwinia* spp. and is recognized as the world's authority on this subject. His discoveries on plasmid inheritance in *Erwinia* and construction of Hfr donors of *E. amylovora* and *E. chrysanthemi* opened the field for gene mapping. Other research contributions relate to glycogen hyperproducing mutants of *E. coli* and periplasmic leakiness and temperature sensitivity in lipopolysaccharide-defective mutants of *E. coli* and *Salmonella* spp. He has extensively used the transposon Tn*5* in *Erwinia* genetics and R plasmids in gene mapping and construction of primes. His work on *Erwinia* has contributed immensely to the knowledge of the genetics and physiology of these and other Gram-negative phytopathogenic bacteria.

Dr. Chatterjee developed a generalized transduction in *E. chrysanthemi,* and provided the genetic evidence for a role of pectate lyases in *E. chrysanthemi* pathogenicity and the regulation of pectate lyases and polygalacturonate catabolic enzymes in that organism. His additional research accomplishments include the regulation of pectin lyase and carotovoricin production in *E. carotovora* subsp. *carotovora* and the genetics of syringotoxin production in *Pseudomonas syringae* pv. *syringae.*

Dr. Chatterjee is the author or coauthor of numerous contributions to major journals, and has served as an associate editor for *Current Microbiology.* He often receives invitations to discuss his research in seminars throughout the U.S. and abroad.

Dr. Chatterjee has participated in many national and international symposia and workshops on the genetics and physiology of phytopathogenic bacteria, including those organized by the American Phytopathological Society. He has also served the plant pathology profession as a member of the APS Committee on Bacteriology, as a member of a CSRS review panel, and as a

member of a USDA panel for competitive grants. He also holds memberships in the American Society for Microbiology and the Society for General Microbiology.

Elroy A. Curl

Elroy Arvel Curl was born in 1921 in Arkansas. He grew up on a farm in Louisiana, and served in the United States Navy during World War II. He received a B.S. degree in botany and agronomy from Louisiana Tech University in 1949, and an M.S. degree in botany at the University of Arkansas in 1950. With encouragement from Joe Fulton, he continued graduate studies at the University of Illinois under the supervision of Leo Tehon and Wayne Bever, while working in shade-tree and forest pathology at the Illinois Natural History Survey. He earned the Ph.D. degree in plant pathology from Illinois in 1954, with a dissertation on oak wilt disease. After serving for a short time as assistant plant pathologist with the Illinois Natural History Survey, he joined the research and teaching staff of the Department of Botany and Plant Pathology at Auburn University. He was promoted to the rank of professor in 1967.

Dr. Curl began publishing in *Phytopathology* and *Plant Disease Reporter* as a graduate student. He has continued publishing papers representing a broad range of research accomplishments in forest pathology, legume-crop diseases, and soil microbiology relating to biological control of root and vascular diseases of cotton. His research has attracted significant extramural funding for basic investigations in the areas of nontarget effects of herbicides on soilborne pathogens, and the biological control of root diseases, with emphasis on *Rhizoctonia solani, Sclerotium rolfsii,* and *Fusarium oxysporum* f. sp. *vasinfectum.* Working with Auburn University colleagues, he found a number of important effects of the triazines and other herbicide groups on the physiological processes of these fungi.

Most of Dr. Curl's research since 1954 has contributed to regional investigations in soil microbial ecology with particular emphasis on the rhizosphere. The results of this work have been published in books, methods manuals, and annual reviews, which are widely cited and used by soil microbiologists, plant pathologists, and weed scientists throughout the world. The internationally popular book, "Methods for Research on the Ecology of Soil-borne Pathogens," by L. F. Johnson and E. A. Curl was developed for the purpose of promoting the standardization of techniques in this complex area of investigation. The book, "The Rhizosphere," by Dr. Curl and plant physiologist Bryan Truelove, was published in 1985. This comprehensive work, which deals with the many complex interactions in the rhizosphere in relation to root diseases and plant growth, is designed for use by both advanced students and professionals.

Perhaps the most significant phase of Dr. Curl's career lies in recent work on soil microflora-fauna interactions in relation to biological control. He has pioneered research in this area, and developed the hypothesis that certain mycophagous micro-arthropods may have biological control potential. He has shown that, in the rhizosphere, species of rhizosphere-dwelling Collembola can control the *Rhizoctonia* disease in seedling cotton and also destroy inocula of other pathogens, including chlamydospores of the cotton-wilt *Fusarium.* He believes that these minute, active insects may play a significant role in rhizosphere ecology and root-disease phenomena and warrant much additional study.

Dr. Curl has taught advanced courses in mycology, ecology of soil fungi, and seed and soilborne diseases of plants. His clear and concise teaching methods have been praised by students. Many graduate students who have pursued their research and studies under his direction can be found today in responsible and successful teaching, research, and administrative positions throughout the country.

Dr. Curl has been active in the Editing and Subject Matter committees of the American Phytopathological Society. He has contributed to the development of the "Compendium of Cotton Diseases," served in workshops for promoting biological control, and participated in international panels of root disease experts to plan more effective root-disease investigations. He served on a special task force for the USDA at the University of Florida to assess the status and prospects of biological control of pests. In addition, he is a contributor to the Southern and Caribbean divisions of APS and to other scientific organizations. Dr. Curl also has been editor of the *Journal of the Alabama Academy of Science* and a member of the Academy Board of Trustees.

W. Harley English

W. Harley English was born on April 12, 1911, in LaCrosse, Washington. His early education was in Idaho, Genesee, and Sprague, Washington. He began his undergraduate education in chemistry at the American University in Washington, D.C. He transferred to Washington State College at Pullman, where he obtained the B.S. degree in 1935 and the Ph.D. degree in plant pathology in 1940, under Professor F. D. Heald.

In 1934 he was employed by the U.S. Forest Service in the *Ribes* eradication program for the control of white pine blister rust, and later as a laboratory assistant in plant pathology at Washington State College. While in graduate school, he was a research assistant and a part-time instructor in the department. He was employed by the USDA in Wenatchee, Washington, in 1939 as junior plant pathologist conducting research on postharvest pathology of fruit crops, and in 1946 was promoted to associate plant pathologist. He was appointed associate professor and associate plant pathologist in the Department of Botany and Plant Pathology at Oregon State College in Corvallis, where he worked on the diseases of nursery stock and potatoes. In 1947 he accepted the position of assistant professor of plant pathology and assistant plant pathologist in the Department of Plant Pathology, University of California, Davis. He was promoted to associate professor in 1950, professor in 1956, and became professor emeritus upon his retirement on July 1, 1978.

In the Pacific division of APS, Dr. English held the offices of secretary-treasurer (1968–1970), vice-president (1972–1973), and president (1973–1974). In addition, he served as associate editor of *Phytopathology* and was a member of the public relations, teaching, review of AIBS, *Phytopathology News,* and obituary committees.

Dr. English is recognized for his outstanding teaching and research activities in the area of fruit and nut crops. He has published many technical papers and abstracts. His earlier research in the state of Washington was devoted to postharvest diseases of pome and stone fruit. On pome fruits, he identified 16 fungi that had not been known previously to cause decay of pears in North America. He also determined the relative importance of different fungi in the postharvest decay of apples and showed that a high incidence of lenticel infection by *Penicillium expansum* was correlated with injury to the lenticels by bruising and by the washing process used to remove pesticide residues. His research on certain phenol derivatives to control decay of apples and pears caused by *P. expansum* and *Botrytis cinerea* resulted in the use of

sodium orthophenylphenate as the standard postharvest decay-control treatment for pome fruit in the Pacific Northwest. He implicated, for the first time, *Pullularia* as an important factor in the decay of sweet cherries. He also found that spores of cherry-decay fungi could be killed by exposure to ultraviolet light, and he pioneered the use of carbon dioxide as a supplement to refrigeration in shipping sweet cherries from the pacific coast to eastern markets.

In California, the major emphasis of Dr. English's research was on canker diseases of fruit trees caused by fungi and bacteria. When he began his research, only one canker disease of California stone fruit was recognized (bacterial canker caused by *Pseudomonas syringae*). Together with his students and colleagues, he discovered four canker diseases of these hosts caused by fungi: *Eutypa lata, Ceratocystis fimbriata, Botryosphaeria dothidea,* and *Cytospora leucostoma.* Two of these fungi, *C. fimbriata* and *B. dothidea,* had not been previously recognized as *Prunus* pathogens anywhere in the world. His discovery of *E. lata* in apricots was the first time this disease, now known on apricots and grapes in many countries, had been found in the northern hemisphere. He also showed, for the first time with a plant pathogen, that *E. lata* causes the type of xylem decomposition known as soft rot. He studied the predisposing factors related to the development of *Cytospora* canker of prune and plum trees, and showed that sunburn, soil moisture, nutrition, and ring nematodes are involved in the disease syndrome.

His research on the epidemiology of bacterial canker showed that the pathogen is a toxin-producing, omnipresent epiphyte and that the principal infection court is the leaf scar. He also determined that disease development is related to such factors as ice-nucleating capacity of the pathogen, temperature, soil moisture, nutrition, tree dormancy, rootstock, and the presence of ring nematodes in the soil. He also demonstrated that this pathogen causes a blossom blast disease of almond. In his control studies he found that disease losses could be markedly reduced by selection of the proper rootstock and by pre- and post-plant soil fumigation.

Dr. English's interest in plant pathology did not terminate with his retirement. During the first year of his retirement he served as acting chairman of the department for five months. He continues to serve on department committees, teaches occasionally, participates in graduate degree examinations, and is coauthoring a book on diseases of California fruit and nut crops.

Anton J. Novacky

Anton J. Novacky graduated from the Comenius University in Bratislava, Czechoslovakia, in 1956. He was appointed to the Institute of Experimental Phytopathology and Entomology, Bratislava. He received his Ph.D. degree from the Czechoslovak Academy of Science in Prague in 1965.

Dr. Novacky's publications on aberrant enzyme activities in infected plants prompted an invitation in 1966 from the University of Kentucky to work with Drs. Wheeler and Hampton in their studies of plants under attack by fungi and viruses. Dr. Novacky returned to Czechoslovakia in 1967, but with the invasion of his homeland by the Soviet Union in August of 1968, he and his family fled Bratislava and sought asylum in the United States. He rejoined the laboratory of Harry Wheeler in October, 1968. In July, 1969, Dr. Novacky joined the Department of Plant Pathology at the University of Missouri-Columbia as a Postdoctoral Fellow with R. N. Goodman. He was appointed assistant professor in 1970, associate professor in 1974, and professor in 1982.

During the past 16 years, Dr. Novacky has concentrated his research on phytobacteriological problems. His initial research on the hypersensitive defense reaction (HR) revealed that the phenomenon could be expressed by one plant cell in response to a single bacterium. Seeking increasingly more sensitive procedures to monitor membrane perturbations during HR, Dr. Novacky designed and built his own equipment to measure membrane electropotential changes in single cells of higher plants. Until recently, the technique was restricted to measurements of electropotential difference of the plasma membrane of cells in a small segment of plant tissue.

Dr. Novacky has been able to impale single root cap cells trapped in a microfunnel with his microelectrode and measure the earliest of responses of plant cells to fungal toxins. His publications using electrophysiological techniques have prompted several workers to ask Dr. Novacky to study the effects of their toxins on plant cell membranes. His studies have attracted a steady stream of scientists and their students to spend time in his laboratory to become familiar with electrophysiological techniques.

Dr. Novacky's research has earned him many invitations to international symposia and workshops. In 1983 he received the illustrious Alexander von Humboldt Senior U.S. Scientist Award from the Federal Republic of Germany. In 1984 he was invited by the Japanese Society for the Promotion of Science to spend three months at prominent Japanese universities. His work has significantly contributed to the understanding of signal transmission within and between cells and the metabolic consequences of such signal generation, transmission, and perception.

Joseph M. Ogawa

Joseph M. Ogawa was born April 24, 1925, on a farm near Sanger, California. His early education was in Sanger, and he graduated from high school at Poston II High School in a War Relocation Center in Arizona in 1944. After one semester at the University of Nebraska he was drafted by the U.S. Army and served in the Counter Intelligence Corps in 1945–1946. In 1950 he received the B.S. degree in Pomology from the University of California, Davis. He received the Ph.D. degree in plant pathology in 1954 under the direction of W. H. English.

In 1953 he was appointed junior plant pathologist and lecturer in the Department of Plant Pathology at the University of California, Davis, and was promoted to professor and plant pathologist in the Agricultural Experiment Station in 1968. For the past two years he has served as vice-chairman of the Department of Plant Pathology.

Dr. Ogawa has been active in APS and other organizations. In APS, he has served as vice-president, president, and is the present councilor of the Pacific division. He has also been associate editor of both *Phytopathology* and *Plant Disease.*

His research has been directed at disease problems primarily on fruit and nut crops. He also has studied field, vegetable, and ornamental crops. Throughout his career he has published 140 technical articles, 85 papers of limited distribution, and 94 abstracts. His publications have included the results of investigations of specific diseases of various crops, reviews on postharvest diseases, fungicides, pathogen resistance to fungicides, and a comprehensive textbook, "Fungal, Bacterial, and Certain Nonparasitic Diseases of Fruit and Nut Crops in California."

His research on brown rot (*Monilinia*) of stone fruits, including eradicant action of liquid lime-sulfur on incipient infection on peach fruit, systemic action of benomyl on blossoms of almonds, methods for delaying the development of fungicide-resistant lines,

laboratory and field methods for testing of fungicides, and identification procedures for *Monilinia* species, has provided the necessary information on effective field control of this disease.

Dr. Ogawa identified heat stable enzymes produced by *Rhizopus* and their role in disintegration of canned apricots and deterioration of dried prunes, control of russet scab of prune of unknown etiology, etiology and control of shot hole and leaf blight of almonds, etiology of peach rusty spot, cultural control of downy mildew of hops, and Phytophthora fruit rot of tomato. His research has contributed to our understanding of pre- and postharvest diseases of stone fruits, almonds, pistachios, tomatoes, bananas, plantago, citrus, hops, and ash trees.

Rosario Provvidenti

Rosario Provvidenti was born on July 18, 1921, in Gela, Italy. He received a B.Sc. degree from Catania University, Italy, in 1942, and a doctorate in microbiology from Palermo University, Italy, in 1947. From 1947 to 1950 he was an assistant professor at the Agricultural Technical Institute, Siracusa, Italy. He joined the Department of Plant Pathology at Cornell University's New York State Agricultural Experiment Station at Geneva in 1954 as an experimentalist, and was promoted to research associate and senior research associate. In 1984 he became a full professor in the department.

Dr. Provvidenti is recognized worldwide for his knowledge of viral diseases of vegetables and their sources of resistance. He is a leading authority on the identification of viruses based upon the genetics of indicator plants. He has identified many sources of resistance to virus diseases of vegetables and determined the genetics of their resistance. His cooperative work with plant breeders has contributed significantly to the development of resistant cultivars of several vegetable crops. He investigated fungal diseases of vegetables and contributed significantly to their control by participating in the development of resistant cultivars and improved fungicide spray programs. He was coauthor of the first publication reporting resistance to the benzimidazole fungicides.

In cooperation with pea breeders, Dr. Provvidenti contributed significantly to the identification of sources of resistance and development of resistant varieties. He found genes for resistance in bean to the following viruses: blackeye cowpea mosaic, bean yellow mosaic, broad bean wilt, clover yellow vein, cowpea aphid-borne mosaic, cucumber mosaic, peanut mottle, soybean mosaic, and watermelon mosaic 2. He reported resistance in soybean to bean yellow mosaic virus, in phasemy bean to bean common mosaic virus, in Chinese cabbage and chicory to turnip mosaic virus, and in spinach to broad bean wilt virus.

Dr. Provvidenti has identified sources of resistance to viral diseases of lettuce caused by pathotypes of cucumber mosaic virus and broad bean wilt virus. His work with feral species of *Cucurbita* has resulted in the identification of resistance to six viruses. Some of these species are now being used worldwide in squash breeding programs. He was the first to report the occurrence of two strains of zucchini yellow mosaic virus in the United States, and found resistance or tolerance to both strains in accessions of seven cucurbit species. In field trials in Egypt and elsewhere, these accessions were the only ones that remained free of disease.

In addition to Dr. Provvidenti's contributions to applied plant pathology, he has contributed significantly with a classical study of the influence of temperature on the reversal of dominance in the resistance of pea to bean yellow mosaic virus. He has also been a co-investigator of the genetics of cucumber mosaic virus to host resistance. Dr. Provvidenti also discovered tomato white leaf disease and cooperated on studies that demonstrated the importance of a satellite RNA of cucumber mosaic virus in the etiology of this disease.

In 1978 Dr. Provvidenti spent six months in Cyprus identifying viruses of importance in vegetable crops and some ornamentals. In 1980, because of his pioneering research on resistance in Chinese cabbage to turnip mosaic virus and the characterization of its pathotypes, he was an invited speaker at the first international symposium on Chinese cabbage in Japan. He also visited Korea and China, where he gave a series of lectures on resistance to virus diseases of vegetables, and prepared an 80-page manual that has been translated into Chinese and widely distributed. Since 1984, Dr. Provvidenti has been technical advisor to the Tianjin Academy of Agricultural Sciences. In 1982 he traveled extensively in Turkey and Greece, collecting seeds of *Lactuca* species for the USDA resources laboratory. Since 1983, Dr. Provvidenti has been serving as a consultant to the government of Egypt on viral diseases of vegetables, especially cucurbits. For his contribution in this field, he was asked to present a paper on viral diseases of cucurbits and sources of resistance at the Conference of Virus Diseases of Horticultural Crops in the Tropics held in Taiwan in 1985.

Dr. Provvidenti's advice is sought frequently by plant pathologists and breeders throughout the world who are concerned with the identification of viruses and sources of resistance in vegetable crops. He was a 1985 recipient of the Award of Merit presented by the Northeast division of the American Phytopathological Society.

Alan P. Roelfs

Alan P. Roelfs was born on November 18, 1936, in Stockton, Kansas. He received B.S. and M.S. degrees from Kansas State University in 1959 and 1964, respectively. He received a Ph.D. degree in plant pathology from the University of Minnesota in 1970. In 1961 he joined the U.S. Department of Agriculture. He has worked at the Cereal Rust Laboratory as a plant pathologist and research plant pathologist, and has been associated with the Department of Plant Pathology at the University of Minnesota since 1965. He teaches an advanced graduate course at the University of Minnesota.

Dr. Roelfs has effectively used cereal rust race surveys as a base for analyses of pathogen population dynamics and epidemiological developments. His research on the development and effects of the cereal rusts, including microepidemiology, macroepidemiology, disease prediction, disease modeling, effects of plant disease on productivity, host and pathogen gene identification, relation of specific and general rust resistance, and population genetics, has been productive.

Dr. Roelf's development of an interactive, computer-based system of analysis led to an advance in the postulation of host and pathogen genotypes. With co-workers, he identified specific sources of resistance and characterized and evaluated them for practical use. With student participation, techniques were developed to evaluate resistances that do not provide recognizable infection types but have been durable over time.

Dr. Roelfs participated in the 1983 International Congress of Plant Pathology and the 1984 European and Mediterranean Cereal Rusts Conference. He has served three times as a cereal rust consultant to Morocco, and he is the contact scientist for a PL 480 program in India. With representatives from Australia and

Canada, he is currently working on an international system of nomenclature for wheat stem rust races. In 1976 Dr. Roelfs served as the foliage disease expert on the National Academy of Science wheat studies delegation to the Peoples Republic of China. In 1980 and 1982 he was invited to be a consultant for Epidemiology of Cereal Rusts with the Intra-American Institute for Agricultural Research, based in Brazil. This year he has been invited to serve as consultant by the FAO in Pakistan.

Dr. Roelfs is currently chairman of the Research Committee of the Department of Plant Pathology at the University of Minnesota, and has served on several search committees for the department. He has served on numerous peer review scientist evaluation panels for ARS, and has been an associate editor of both *Phytopathology* and *Plant Disease*. He has been a member of the Epidemiology Committee and chairman of the Regulatory Work and Foreign Diseases Committee.

Norman C. Schenck

Norman C. Schenck was born on July 8, 1928, in Oak Park, Illinois. He was awarded a B.S. degree in biology with honors from the University of Illinois in 1951 and a Ph.D. degree in 1955. In 1956 he was an assistant plant pathologist with the University of Florida's Agricultural Experiment Station at Leesburg. He was promoted to associate plant pathologist in 1963 and plant pathologist in 1968. Dr. Schenck became professor in the Plant Pathology Department at the University of Florida at Gainesville in 1969. He took sabbatical leaves at Auburn University, working with E. A. Curl on identification of soilborne fungi, and at Washington State University with S. O. Graham on factors affecting germination of vesicular-arbuscular (VA) mycorrhizae.

Dr. Schenck has achieved recognition for research in cucurbit and soybean diseases, taxonomy of VA mycorrhizal fungi, and mycorrhizae-pathogen interactions. His research with cucurbit diseases found that the initial inoculum of *Mycosphaerella citrullina,* the causal agent of black rot of cucurbits, was ascospores from overwintering pseudothecia on vine debris. He also reported a naturally occurring bacterial disease on watermelon leaves caused by *Pseudomonas lachrymans.* His applied research and extension responsibilities included the evaluation and recommendation of fungicides for control of cucurbit diseases and the determination of the tank-mix compatibility of numerous pesticides for cucurbit disease control.

Dr. Schenck is probably most noted for his work on VA mycorrhizae. He has been instrumental in promoting and encouraging researchers of other disciplines to conduct research in this area. Extensive surveys of agricultural and native plants in Florida and elsewhere have helped him establish the world's largest collection of VA mycorrhizal fungi. This, in addition to the description of 19 new species, has brought recognition as an authority on taxonomy of these fungi.

He reported the effect of VA mycorrhizal root colonization in reducing the adverse effects of parasitic nematodes and soilborne pathogens of plants. He demonstrated that the differences in the interactions between VA fungi and root-knot nematodes on soybeans depended on the species of fungus involved, and on the susceptibility of the cultivar to the nematode. Extensive studies on environmental and nutritional effects on VA mycorrhizae showed that VA fungi differ in their temperature optima for spore germination, sporulation, and growth promotion. A particularly important observation was that *Gigaspora pellucida* and *Acaulospora laevis* reduced soybean growth. He provided indirect evidence that VA mycorrhizal root colonization does not play a major role in plant nitrogen absorption.

Dr. Schenck has taught courses on fungal plant pathogens and field plant pathology. He organized a course and a regular seminar series devoted solely to mycorrhizae. He began cooperative studies on VA mycorrhizae in Colombia and Brazil, and has served as an advisor-consultant on mycorrhizal projects in Thailand and Malaysia for the U.S. Agency for International Development.

Dr. Schenck has been chairman or served on the Epidemiology, Mycology, and Mycorrhizae committees of the American Phytopathological Society. He currently is a member of the Editorial Board of *Plant Disease.*

Peter H. Tsao

Peter H. Tsao was born in 1929, in Shanghai, China, and came to the U.S. in 1949. He received the B.A. degree from the University of Wisconsin in 1952 and entered the graduate program under the direction of Curt Leben and G. W. Keitt. In 1956 he received the Ph.D. degree and was appointed junior plant pathologist at the University of California, Riverside, to do research on root diseases of citrus. He was promoted to professor in 1970.

Dr. Tsao is an authority on the biology, ecology, and pathology of the genus *Phytophthora,* particularly *P. parasitica, P. cinnamomi, P. palmivora,* and *P. capsici,* and on the biological and cultural control of soilborne diseases of citrus and avocado caused by *Phytophthora.* He has studied the diseases of the tropical plants black pepper, cocoa, rubber, durian, and vanilla, and the taxonomy of *Phytophthora* spp. associated with these and other diseases. His research on soil fungistasis, mycoparasitism, microbial antagonism, edaphic factors in soil that affect disease, and population dynamics in soil have greatly advanced scientific knowledge in these areas.

His quantitative approach to the isolation of *Phytophthora* has had a significant impact on the study of soilborne diseases. In 1960 he and J. W. Eckert developed the *Phytophthora*-selective medium containing pimaricin that was the first permitting differential isolation of *Phytophthora* spp. from decayed plant material. He modified this medium in 1969 and 1977 for isolations from soil. His many review articles present authoritative guidelines and strategies for isolation of *Phytophthora* from soil and plant material, and have had a major impact on understanding the population dynamics of *Phytophthora* in soil and on diagnosis and identification of new species of *Phytophthora* as causal agents of disease.

Dr. Tsao has developed many techniques on the cultural development of *Phytophthora* chlamydospores, sporangia, zoospores, and oospores. His method of inducing production of chlamydospores in deep culture has become a standard. He developed the serial dilution endpoint method for assessing disease potential of *Phytophthora* in soil. He initiated the use of fluorescent brightener compounds to label *Phytophthora* propagules so their activities can be readily observed in soil. A comprehensive taxonomic study of large numbers of *P. capsici* and *P. palmivora*-MF4 isolates from black pepper, cocoa, rubber, betelvine, and other hosts led to the conclusion that the MF4 types should be included within the *P. capsici* epithet, and that the description of *P. capsici* should be changed to include the broad range of variability that existed.

Dr. Tsao has contributed to many aspects of biological control, including survival, soil fungistasis, and mycoparasitism. He showed that biological control of *P. cinnamomi* and *P. parasitica* could be achieved by amendment of soil with organic nitrogenous substances of low C/N ratios. The control in amended soil was shown to be due to the production of ammonia and nitrous acid by microbial action and this suppressed formation and germination of

chlamydospores and sporangia.

Dr. Tsao has been a teacher and an advisor of many Ph.D. and M.S. students. He developed and taught the first course in mycology in the Department of Plant Pathology at Riverside, and has also been active in teaching advanced plant pathology.

He was the recipient of a Guggenheim Award to study in Japan in 1966. He has been a consultant on soilborne diseases and *Phytophthora* problems in the Republic of China, Thailand, Malaysia, India, Indonesia, and French Polynesia. He has held two Foreign Scholar Lectureships at Peking Agricultural University in the People's Republic of China. He has served the American Phytopathological Society on a number of committees and has been invited frequently to participate in scholarly programs in this country and abroad.

Isaak Wahl

Isaak Wahl was born on September 20, 1915, in Kherson, Russia. He emigrated to Poland at the age of seven and received his secondary education in Warsaw. He emigrated to Palestine in 1935 to continue his education at the Hebrew University in Jerusalem and earned the M.S. degree in 1940 and the Ph.D. degree in 1949. He helped establish plant pathology as a discipline in two Israeli universities and taught many of its practitioners.

He served as instructor, lecturer, and associate professor at the Hebrew University Faculty of Agriculture in Rehovot until 1967. From 1962 to 1967 he was head of the Department of Plant Pathology. In 1968 he moved to his present position as professor and head of the Division of Mycology and Plant Pathology, Faculty of Life Sciences, The Tel Aviv University.

Dr. Wahl's greatest research contributions have come from studies of wild oats, wild barley, and wild emmer. *Avena sterilis* and *Hordeum spontaneum* are the same biologic (not taxonomic) species as their respective cultivated counterparts and they are attacked by the same respective arrays of pathogens. Conclusions from studying them can be inferred immediately in terms of the world's accumulated plant pathology, mycology, and genetics literature on their cultivated counterparts. Since these wild species are indigenous to the Middle East, Israel was an ideal place to study coevolution of these wild grains and their obligate parasites. Dr. Wahl has personally done or stimulated more work on them than any other scientist, with the possible exceptions of the Russian geneticist N. I. Vavilov or the Israeli/American geneticist Aaron Aaronsohn.

Dr. Wahl's contributions have been institutionalized in The Tel Aviv University's Institute for Cereal Crops Improvement by the Utilization of the Gene Pools of Their Wild Relatives, which he visualized, founded, funded, and now directs. The Institute includes the H. C. (Pat) Murphy Laboratory for Cereal Rusts Research and the Lieberman Germplasm Bank. In 1984 Dr. Wahl instigated the University of Minnesota/Tel Aviv University Endowed Chair for Disease Resistance Improvement in Cereals.

A long-time member of the American Phytopathological Society and contributor to *Phytopathology,* Dr. Wahl was made an Honorary Fellow of the Israeli Phytopathological Society in 1985. He was honored in 1964 with the Rothschild Prize in Agriculture. In 1978 he became the first Israeli scientist to receive the prestigious Harvey Prize in Science and Technology. He was chosen based on his studies of the progenitor small grain species and their pathogens that are indigenous to Israel. In 1984 The Tel Aviv University, because of the accomplishments of Dr. Wahl's research group, was presented the Bruno Kraisky Award for Service to Humanity.