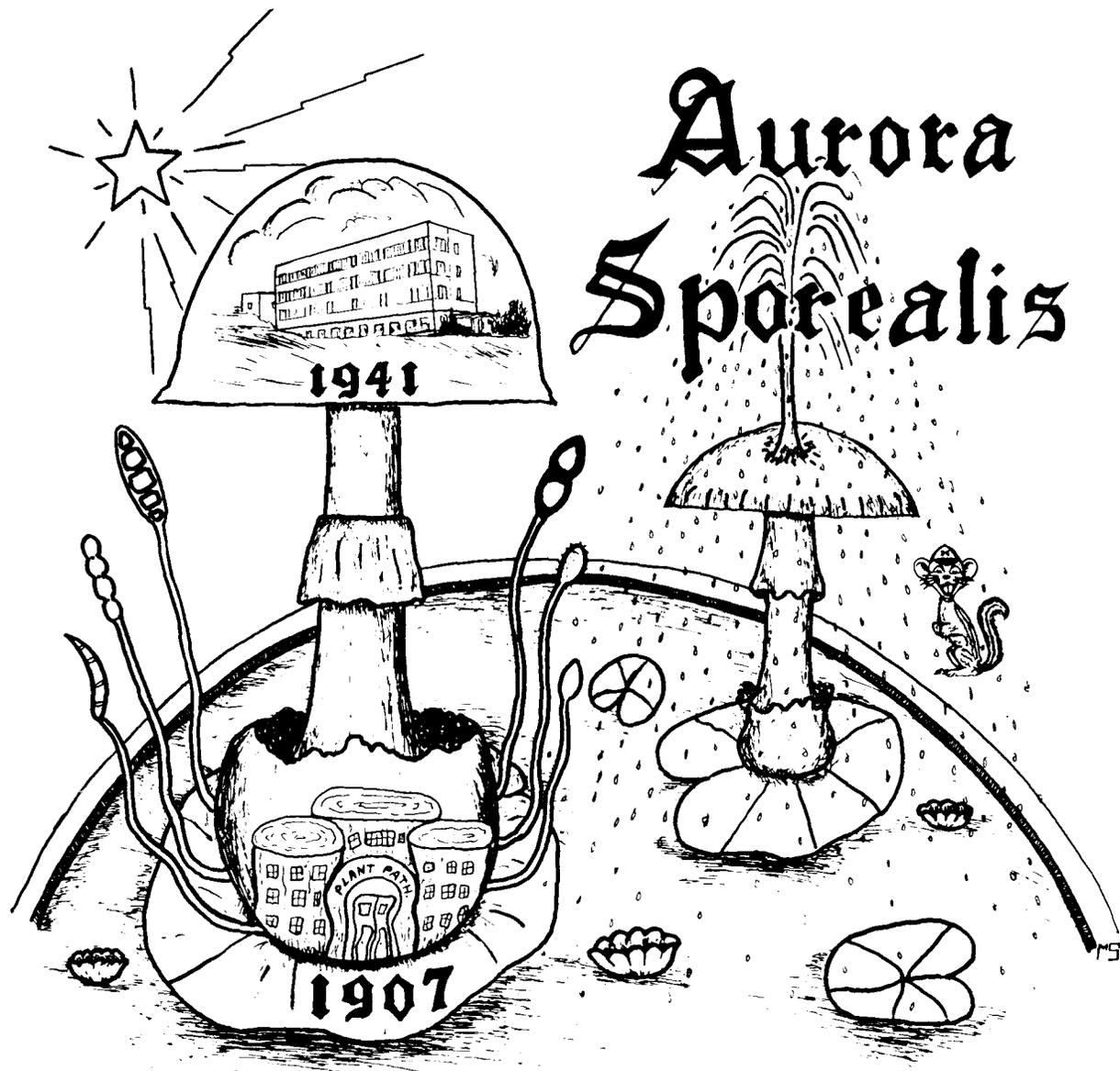


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AURORA SP^{OR}REALIS

SPECIAL CONGRESS EDITION

SECOND INTERNATIONAL CONGRESS OF PLANT PATHOLOGY
UNIVERSITY OF MINNESOTA



Aurora Sporealis

Wherein are recorded the recollections, the ruminations and the raspitations of those who have drunk from the foaming fount of the Department of Plant Pathology of the University of Minnesota and who now spout forth in divers ways

Let the fount foam and never run dry
 Let the spout squirt and never lose power

FOREWARD

Dear Ole Timers:

The Second International Congress of Plant Pathology—1973—represents a unique opportunity for the alumni of the Department of Plant Pathology of the University of Minnesota. It will result in the largest gathering of Ole Timers ever assembled in “the shadow of the Tottering Tower.” The Congress issue of AURORA was prepared especially to commemorate this occasion. It includes a thumbnail sketch of the history of the department, a summary of some of our accomplishments during 1972-73 and a statement of our aspirations, a Rogues Gallery of our current faculty and graduate students, a brief biography of each of the past department heads and a list of all graduates with the titles of their theses. We plan to continue using the format of AURORA to keep you informed of comings and goings within the department, the disposition of Ole Timers and also as a means of conveying our plans and dreams for the Department.

This special congress issue of AURORA also will be used as a public relations vehicle as we interact with our colleagues on the campus, and with various private, state, and federal granting, research, and regulatory agencies. In addition, it will be useful in our extension and continuing education programs within the state as we work with various growers' groups and other segments of our clientele. We are pleased to be able to provide you with this special issue and hope you will find it both enjoyable and useable.

Francis A. Wood
Professor and Head
Department of Plant Pathology

HISTORY OF THE DEPARTMENT OF PLANT PATHOLOGY

THE EARLY YEARS

In the beginning there was the Division of Vegetable Pathology and Botany, established 1 August 1907 with Edward Monroe Freeman as Chief, making it the first division of Plant Pathology in the nation. It was Freeman's idea that "botany could and should function in improving and insuring agricultural production." Yet teaching of plant pathology started even earlier at Minnesota. In 1903, when Conway McMillan was head of the Botany Department on the Minneapolis Campus, Dr. Freeman formulated and taught courses in the field of industrial botany and plant pathology.

In the early stages of building the division, Professor Freeman worked to strengthen the scientific base of the Department of Agriculture which, like many other land-grant institutions of that time, tended to concentrate unduly on the purely utilitarian phases of teaching and experimentation. Several of the wise pillars of the institution agreed with Freeman, who was not only a born innovator but by far the best general biologist on the staff. Inevitably then, he and his associates were called upon to organize and teach a variety of courses, for example, wood technology, soil bacteriology, household bacteriology, and industrial microbiology. Possibly some instructors may have been pressed to keep a step or two ahead of the best students but they held on until the services of specialists could be procured. Freeman was a key person in elevating the Department of Agriculture to the status of an institution of higher learning.

The staff grew in numbers. W.L. Oswald, who had been teaching botany in the School of Agriculture was added to the Division staff in 1908. On 1 July 1909, E.C. Stakman was appointed Instructor and Assistant in the Experiment Station. Thereafter, the record tells a story of steady growth. Stakman was made assistant in plant pathology in 1912 and with a new PhD degree, the following year, was appointed assistant professor and assistant plant pathologist in charge of the Section of Plant Pathology and Bacteriology with mycologist Louis Jensen and pathologist - bacteriologist A. G. Tolaas to help him.

At first a small office in the administration building, plus the use of the agronomy lecture room and laboratories served as the physical plant of the fledgling Division, in early 1908. Improvement came in April of that year when half of the third floor and a lecture room were made available in the horticulture building. Then, by a special appropriation of \$10,000, the Armory Building was remodeled in 1913-14, and this became the Plant Pathology Building, or more commonly known as the Tottering Tower. The name changed too, to Plant Pathology and Botany.



The Tottering Tower

Further staff changes were made. Dr. Freeman was made Assistant Dean of the College of Agriculture and much of the Division work was allocated to others. Sections were ordained with Stakman head of plant pathology, and Oswald head of agricultural botany and the seed laboratory. In 1919, a section of Applied Plant Physiology was organized in cooperation with the College of Science, Literature and the Arts, in which teaching in applied plant physiology and experimental work was done in St. Paul but the teaching of general physiology continued in the Botany Department in Minneapolis. Dr. L.I. Knight was the first physiologist and was supported by three departments: Plant Pathology and Botany, Botany, and Horticulture. Four years later, R.B. Harvey succeeded Knight who had resigned because of ill health.

These early days were exciting ones as dreams and plans came to fruition. To insure and improve agricultural production. Dr. Freeman saw "that the alleviation of many deplorable conditions required the solution of many basic problems." He appreciated the value of experimentation but also recognized its limitations unless "supported by basic researches." Although axiomatic today, it was not in 1908. In the words of Dr. Stakman, Freeman "charted the course of basic investigations for decades to come." To accomplish the many objectives of the emerging department, close cooperation with the U.S. Department of Agriculture was not only desirable but essential. The latter furnished financial aid, personnel, and encouragement. Actually this cooperation started in the field of breeding for rust-resistant cereal varieties by Dr. Freeman while he was in the Office of Grain Investigations in Washington, D C , in 1905-07. This cooperation continued at Minnesota. In fact the earliest published results were based largely on work done in the USDA and were issued in 1909 on cereal smuts and rusts by Freeman and E.M. Johnson. Other early work dealt with diseases of fruits and potatoes.

In plant physiology, early contributions were made by Dr. R.B. Harvey, one of the nation's pioneers in studies of winter-hardiness and of artificial ripening of fruits and vegetables, and he also did some work on the chemical control of weeds.

The work of Stakman and his coworkers on physiological races of *Puccinia graminis tritici* was the beginning of one of the Department's major contributions to science. Work on other cereal rusts, smuts, and other fungus plant pathogens demonstrated convincingly the genetic diversity of microorganisms below the species level and helped to make the concept of genetic variability a part of the intellectual background of all biologists. Practically, it provided a sound basis for breeding crops for disease resistance. Other important contributions with both scientific and practical significance were made in rust epidemiology, the nature of disease resistance, cereal seed treatment, and the relationship of insects to plant disease—research that has continued to the present day.



Dr. E. C. Stakman

Another aspect of the early history concerned legislation and plant protection. The first pure seed law in Minnesota, which required the labelling of seed as to purity and germination, was drafted by Freeman and Oswald in 1913 and passed by the legislature; a State Seed Laboratory was established in the same year in the Division of Plant Pathology and Botany. The laboratory made free analyses and rapidly extended its services throughout the state. It was realized that such regulatory work as was involved should not be permanent because regulation is not compatible with teaching and research. Consequently when the State Department of Agriculture was established in 1919, the administration of the Seed Laboratory was transferred to that department but the laboratory itself remained physically in the Tottering Tower for many years thereafter.

Early experiments made by Stakman and Tolaas with potato seed plots showed that various seed-borne diseases had to be controlled if potato culture, and especially seed potato production, was to be profitable. The value of disease-free seed was shown in demonstration plots and, largely due to the work of Arne Tolaas, the first extension plant pathologist in Minnesota,

seed potato growers formed a State Seed Potato Association. This led to the passage in 1919, of a seed certification law in the legislature—a law formulated largely by Stakman and Tolaas. Tolaas was in charge of the certification program until he retired.

The Division also made a major contribution to the initiation and prosecution of the federal-state barberry eradication campaign. Every plant pathologist in the USA presumably knew all about deBarry and stem rust, and every professor required his students to learn about them also, probably because heteroecism was an interesting biological phenomenon. Few raised the question about the desirability and feasibility of eradicating the bushes as a possible means of reducing damage to wheat and other grains. Prior to 1916 it was firmly concluded that barberries were responsible for early, local epidemics on grasses and nearby wheat. What role they might play in widespread regional epidemics was not yet known but soon there was urgent need to find out.



Teliospores of *Puccinia graminis tritici* using scanning electron microscopy

The catastrophic stem rust epidemic in the spring wheats in 1916 forced pathologists to take stock of their knowledge of stem rust and the means of control. Urged on by resolutions from grass roots groups, the USDA expanded the scope of its epidemiological studies and intensified the breeding work in 1917.

Dean Henry L. Bolley of North Dakota State College provoked a series of events that emboldened the U.S. Department of Agriculture to start a regional barberry eradication campaign as a war-emergency measure to help make sure that "Food will win the war." As the potential value of the campaign had been predicted partly on data obtained in the federal-state rust program at Minnesota, federal authorities virtually commandeered the services of E.C. Stakman who was principally responsible for the success of that program. Thus it was that he acted as pathologist in charge of the campaign from its inception in March 1918 to July of the following year. The campaign continued, however, without interruption since World War I but has been on a maintenance basis for many of its 55 years of existence.

The Rust Prevention Association (not the Crop Quality Council) aided the barberry eradication campaign especially through its executive secretary, the late Donald G. Fletcher—a distinguished alumnus of the University of Minnesota. Supported by businessmen originally mostly from the Twin Cities, including prime mover and organizer Franklin Crosby, the association has contributed indispensable financial and moral support since its organization in 1922, to all measures of cereal rust control and later to other phases of agricultural research and improvement.

As the department grew in those early years, the needs for increased space became acute. Thus during the 1920's the coal bunker and storehouse of the old blacksmith shop were converted into greenhouses and laboratories for experiments in continuous lighting and low temperatures. Remodeling both horizontally and vertically continued during the ensuing decades to meet the increasing demands for space, for by 1924 there were 25 persons on the payroll: 2 professors, 1 associate professor, 2 assistant professors, 11 instructors, 4 assistants, 1 field foreman, and 4 secretarial and clerical staff members. This on a budget of \$103,260 compared with the first year's budget of \$4,175 (1907-08).

Development occurred in the field as well. At first such plots comprised several square rods of sandy, bur-infested soil east of the present veterinary medicine complex. Next an isolation plot was found in the southeast part of the farm. Eventually all fields plots were moved to the present site—literally in some cases, for Dr. Olaf Aamodt tells of wheeling wheelbarrows full of wilt-sick soil from the old to the present flax wilt nursery!



Field House and Field Plots

THE MIDDLE YEARS

After the years of establishment in which diverse activities were started, there was a period of steady growth in which some of these activities were transferred from the department and areas of concentration were developed. As the fame of the department reached the far corners of the globe, students came from all continents to study plant pathology at Minnesota. First came E.L. Waterhouse from Australia in 1920, and since then there have always been students from other countries in the department. In all, they have come from at least 36 nations: from South Africa and Egypt; from New Zealand and Australia; from India, Pakistan, the Philippines, Taiwan, Korea, China, and

Japan; from Great Britain, Norway, and Sweden to Portugal and Italy; from Belgium eastward to Hungary, Poland, and Russia; and in the western hemisphere from Canada, Mexico, Guatemala, seven countries of South America, Puerto Rico and Haiti. Life in the department has been greatly enriched by these students.

From 1928-38, there was an informal but constant student exchange between the University of Minnesota and the University of Halle-Wittenberg in Germany. There was also an informal exchange with Louisiana State University and Cornell University, and more recently Oklahoma State University. Those who traveled abroad to take advantage of such arrangements included J.G. Leach, A.W. Henry, J.J. Christensen, and Helen Hart, from the staff and Clyde Christensen and Frank Kaufert, among the students. They spent a year in Germany when they were still young enough to take in and retain vast quantities of knowledge and beer.

For a quarter of a century or so, emphasis was placed on physiologic specialization in fungi and disease resistance. The nature of resistance, variability of the pathogens, and effective means of testing for resistance, to many diseases of crops have been studied. Often cooperation was enlisted with departments of Agronomy and Plant Genetics and Horticultural Science, as well as various agencies of the USDA. Not only have these efforts provided disease-resistant varieties but they resulted in a backlog of parent material with resistance to many diseases.

Again space became critical. A new building was erected and on 15 October 1941 most of the staff moved to the present plant pathology building, dubbed *Phytobrickhaus erectus*. Here the staff soon became accustomed to private or semi-private offices and what seemed like unlimited laboratory space. This building is half of a "plant science" building that was planned for use by the Divisions of Plant Pathology and Botany and Agronomy and Plant Breeding. Stakman and Hayes, in their infinite wisdom, foresaw the difficulties that might arise when two departments occupied the same building so the "building" finally comprised two wings connected by a brick wall and plans for connecting classrooms and auditorium later.



Plant Pathology Building—1941

Those remaining in the Tottering Tower (*P. tremuloides*) were agricultural botany and physiology staff and the USDA personnel in the rust laboratory. Al Larson was the weed expert and his ability to identify plants was legendary. Ray Landon, one of R.B. Harvey's students, taught physiology courses. Harry Heggness from North Dakota came to work when weed control was an active field within the department.

The federal personnel at this time consisted of Ralph Cotter, who worked on the role of barberries in race hybridization; L.J. Melander, leader of the barberry eradication group and was succeeded later by Thain Stewart; Moses Levine, who is known for his work with Piemeisel on varietal status of *Puccinia graminis*, and Bill Loegering and later Don Stewart who ran the race identification survey. Thus with the departure of most plant pathologists from the Tottering Tower, the traditions of the QCF, the Canyon, the Blue Room, and the Better 'Ole also ended probably with considerable nostalgic feelings.

With the change in buildings there was also some change in staff. Dr. Sharvelle in charge of fruit pathology and disease control came and went to Purdue. Ian Tervet who worked with field crops and taught plant pathology coming from the UK left for Nebraska after a few years. There were replacements for those who left. Eric Mader for Eric Sharvelle, Milton Kernkamp for Ian Tervet, Bill Loegering for Robert Cassel, and Harold Bockstahler for Andrew Downie.

The death of Dr. Louis Dossdall, the mycologist in the department, led to the appointment of Dr. Niel Anderson, who had been employed by the Lake States Forest Experiment Station (as then known). Niel not only taught mycology but developed anew the area of genetics of fungi, and has specialized in *Rhizoctonia* and some *Polyporus* species.

Often the programs for crop improvement included a disease garden. A flax disease nursery was established in 1913 and maintained by J.J. Christensen and his students for the selection of wilt-resistant varieties of flax. Nobel Laureate Norman Borlaug, Clyde Allison, Henry Barker, and Bill Broadfoot among others produced their theses from work on these plots. Barley and wheat disease nurseries existed also to develop root rot resistance as well as resistance to rusts, smuts, scab and other diseases—mainly through the leadership of Helen Hart, Earle Hanson, J.J. Christensen, and Karl Fezer. Matt Moore handled the oat nursery and later added a buckthorn nursery to test early generations of oat lines for resistance to newly produced races of the crown rust fungus that hybridized on the buckthorn. Matt also worked extensively with chemical treatment of grain and designed a seed treater widely used for application of chemicals to seed.

Development of wilt or root rot resistance probably resulted in generalized or horizontal resistance in contrast to aerial pathogens in which vertical resistance was achieved. Exceptions to this occurred with potato research in which Carl Eide developed potato varieties with the horizontal type of resistance to the late blight organism. The influence of this approach led to reconsideration of developing non-race specific rust resistance in cereals.

Corn, tested for stalk rot resistance, smut and other diseases, was part of J.J. Christensen's responsibility with the field crop research. Harry Young's toothpick method became standard

for testing here and in many of the corn belt states. A new crop, soybeans, gained popular acceptance and in the early 1960's Bill Kennedy was asked to track down its pathogens. Now it too has its full complement of diseases that demand attention.

Meanwhile, back in the laboratory, forest pathologist Clyde Christensen had been tapped to head the penicillin laboratory during the World War II period. Several thousand isolates of *Penicillium notatum* and *chrysogenum* were tested for penicillin production, with substantial aid from R.S. Davidson, Chen Tong Tsiang, C Stacy French, and Dorothy Day, among others. This led Clyde into industrial mycology and eventually grain storage; financial support grew to make this an area of strength in the department's research program. Such well-known plant pathologists as George Papavizas, John Tuite, Richard Lutey, and Luis Lopez graduated from this program.

Many of the courses taught aimed at specific subject matter areas such as Diseases of Field Crops taught by J.J. Christensen, then by M.F. Kernkamp. Principle-type courses such as Ecology of Plant Pathogens, taught by Tervet, Kernkamp and Wilcoxson; Physiology of Plant Pathogens taught by Eide, Mader, DeVay, Durbin and Mirocha; and Genetics of Plant Pathogens taught by Stakman, Christensen, Kernkamp and Anderson—in that order—accompanied the Principles course taught by Stakman and Eide for several generations of students as well as the Principles of Disease Control by Sharvelle, King, Wilcoxson and now by Kennedy.

Nematodes became recognized as plant pathogens and a course and research program were initiated with Don Taylor, making the first surveys in the state. When Don left for Illinois, Roger Anderson assumed this responsibility but he in turn turned to greener pastures in Ottawa, and David MacDonald, our current nematologist, came to Minnesota from Cornell.

Virology or virus diseases of plants were added to the department and Carl Eide taught this course early in this period. Later Tom King and Ernie Banttari, who like Eide were North Dakotans, taught the course. Work in virus diseases was done by many; Matt Moore and Banttari on blue dwarf and aster yellows, King on strawberry and raspberry viruses, Eide on potato viruses, and Frosheiser and Wilcoxson on legume viruses.

Many of these changes occurred before and after the change in department head from Stakman to J.J. Christensen. The great numbers of students returning after World War II and the increase in availability of federal funds for research made possible a sixty-member graduate student body. Many departments, both state and federal, were expanding and jobs were plentiful. One of the projects to expand was forest pathology, inherited by David French from Clyde Christensen. Many projects were in full swing from deterioration of wood products to dwarf mistletoe and Hypoxylon canker of aspen, by French and his students. Many of them later rose to prominence, such as John Ohman, Director of the North Central Forest Experiment Station, F.A. Wood, Head of the Department of Plant Pathology at Minnesota, Harry Morton, Paul Manion, and Frank Tainter—to name a few. French was instrumental also in fostering cooperation with the North Central Forest Experiment Station and the University's College of Forestry—the latter being fruitful in the cooperation with Merle Meyer in the use of remote sensing in the detection of forest tree diseases. Work with Dutch elm

disease and oak wilt claimed much of their attention also. One of J.J. Christensen's goals when he became department head was to increase support to the agricultural botany area of the department. Dr. James DeVay was added to the staff and housed in the Tottering Tower to work on Physiology of plant pathogens and also to work on corn diseases. Harry Heggeness worked with weed control and its physiological relations. With the retirement of Al Larson, Thor Kommedahl was persuaded to teach the weed courses and work in the area of ecology of weeds. Dr. Albert Linck a physiologist from Ohio State University, and now Dean of the College of Agriculture at Minnesota, was given responsibility for teaching physiology of weeds and crops, and worked specifically with peas. A cohort of Linck's from Ohio State, Ted Sudia, was added to the staff upon the retirement of Ray Landon. In the next few years, two more men were added, Lee Olson and Ed Stadelman, whose work was in physiology. Thus there was a nucleus of physiologists such that the departmental name was again changed to Plant Pathology and Physiology.

Two sizable grants came to the group in the agricultural botany-plant physiology section. One from the Atomic Energy Commission to study ecology and physiology of weeds and crops. This resulted in a sophisticated facility at Rosemount for measurement of temperature of air and soil, rainfall, light and wind direction and intensity, all recorded on automatic recorders. Workers on this project included Linck, Sudia and Kommedahl with graduate students George Ahlgren and Roger Lambert.

Another grant from the Rockefeller Foundation was awarded to Linck and Kommedahl for the study of mutualistic relationships between plants important in agriculture. This resulted in thesis research by John Ohman (quackgrass), Roger Lambert (peas) and Kenneth Old (soil fungi).

Other grants come to the department. One, starting with Stakman's administration from the AEC, was on radiation effects on fungi, headed by John Rowell continued into Christensen's term. Cargill supported much of the research on grain storage led by Clyde Christensen. The Crops Division of the U.S. Army Biological Warfare Laboratory supported work on the epidemiology of the rusts with Roland Line and Bill Bugbee among other getting degrees from work on this project. Grants from MSF, NIH, and the USDA resulted in expansion of equipment, research, students and increased demands for more space.

RECENT TIMES

Dr. J.J. Christensen had served as head from 1953 to 1961 and had seen the department continue its considerable growth in diversity of research, expansion of facilities, increase in courses, and outreach in extension. The latter was accomplished at the retirement of R.C. Rose (who had concentrated mainly on vegetable diseases) and the appointment of H.G. Johnson, formerly of Yoder Bros. and Green Giant Co., as extension plant pathologist and the establishment in 1956 of a Plant Disease Clinic with Roy Wilcoxson, the first one to be in charge of that clinic.

When Dr. Kernkamp had accepted the post of Assistant Director of the Experiment Station in 1956, Roy Wilcoxson replaced him on the staff working on legume diseases and also accepting leadership on corn diseases. Dr. DeVay left for California and Dr. Durbin from California replaced DeVay; in the process corn went to Dr. Wilcoxson.

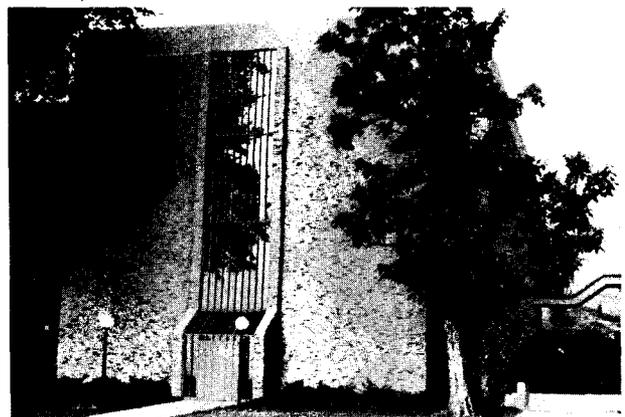
With the rise in support of physiology there was a phasing out of nonphysiological agricultural botany, and the weed taxonomy and ecology courses and research were discontinued when Dr. Kommedahl transferred into the plant pathology area to work on corn diseases and root rot ecology. Wilcoxson now could concentrate on legume diseases.

M.F. Kernkamp, leaving the post in the experiment station became department head in 1961. During this time not only changes in staff but in facilities and projects occurred. Grants continued and the budget for the department reached an all-time high of \$1,000,000 in 1966-67. The departure of Rick Durbin (physiology of fungi) for Wisconsin brought another Californian to the scene, Dr. Chester Mirocha who continued in this field and also worked with Clyde Christensen on mycotoxins in fungi.

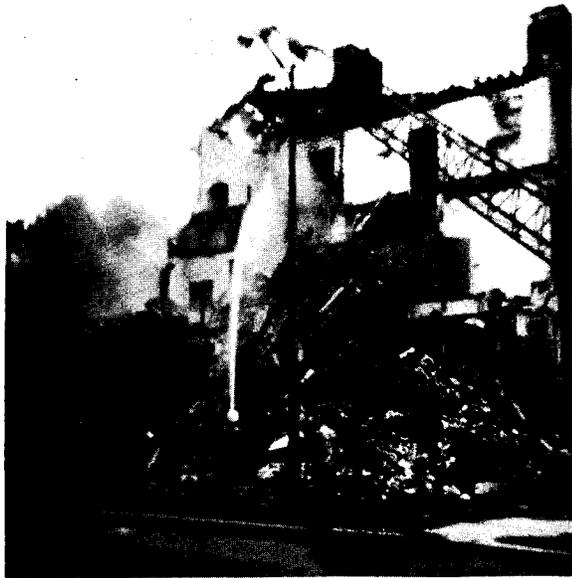
Under Kernkamp's administration the extension staff was expanded by the addition of Howard Bissonnette (from North Dakota Extension staff) to handle diseases of small grains and potatoes, mainly in the Red River Valley, and Ward Stienstra from Michigan State University to work on ornamentals and turf. The support for the Plant Disease Clinic grew to provide several half-time assistants, a full-time supervisor, and a technician—who had contacts with the public numbering 7-8,000.

In research, Robert Brambl of Arkansas, Nebraska (PhD) and Stanford (post-doctoral fellowship) was added to increase competency in the physiology of disease subject matter area. Richard Zeyen (PhD, Minnesota) became part of the department because of his expertise in electron microscopy, a cooperative facility that had been recently added.

Modern facilities for crops research, including elaborate controlled environment rooms, were realized when Plant Science, Phase I (now Crops Research Building) was occupied in 1962, and Phase II (now Plant Science) was completed in 1968. These buildings are shared with the Department of Soil Science and the Department of Agronomy and Plant Genetics. Greenhouse facilities have been increased from time to time over the years—the latest addition being occupied in 1972. In addition to these structures, Plant Pathology has work space in a Crops Service Building and still occupies the old field house near the St. Paul plots, as well as several modest structures at Rosemount. At St. Paul about 30 acres are in operation and at Rosemount, 220 acres are being used by departmental staff. Experimental plot land is also used at branch stations at Waseca, Morris, Lamberton, Crookston, Grand Rapids, Elk River, and the Forest Research Center at Cloquet.



Plant Science Building—Phase II



**Tearing Down the Agricultural Botany Building
(Tottering Tower)**



Additional Headhouse Facilities

The growth of physiology in the department posed somewhat of a threat to other units in the university, especially their own physiological programs; there was even some indication that a new department of Plant Physiology might emerge. In November 1966, this activity within the department was phased out by the Institute Dean and staff members were transferred to the Department of Agronomy and Plant Genetics and to the Department of Horticultural Science. Thus, for the first time in its history, the department has only one major responsibility—plant pathology. On 10 February 1967, the name changed from Plant Pathology and Physiology to the Department of Plant Pathology. This change resulted in loss of personnel and funds, and together with gradual loss of grant funds and retrenchment within the University, the budget dropped from the peak of \$1.1 million in 1966-67 to \$830,000 in 1971-72.

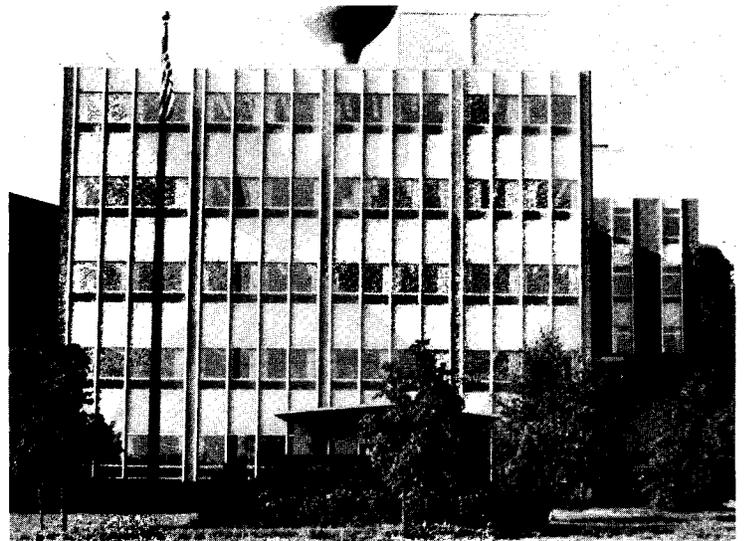
With the emerging role in international programs, several staff members have recently been out of the country. One such person is Dr. T. H. King, who spent nearly 3 years in Thailand and 2 years in Indonesia. Between such travels, he has been in charge of first fruit diseases and diseases of canning crops, then only the canning crops, and more recently has taken on work with wild rice diseases in the Grand Rapids area of the state. With King's assignment to Indonesia, Dr. Kernkamp took over the wild rice work after he relinquished the headship of the department in 1972.

In the early 1960's, the Dean of the Institute of Agriculture formalized international educational relationships by establishing an Office of International Programs within the Institute.

One result was the establishment of a program to develop a college of agriculture at Rabat, Morocco, in which the Departments of Plant Pathology, Soil Science, and Agronomy and Plant Genetics are involved. M.F. Kernkamp was a member of the survey team and later leader of the plant science phase of the project. A full-time staff member, Dr. Benhan Lockhart, was added to the staff of the Department of Plant Pathology and has been in Rabat since 1971, working principally on virus diseases of citrus. Roy Wilcoxson replaced Kernkamp as leader in 1971.

For decades research on diseases of flax and sugar beets constituted an important research area within the department. With the declining importance of flax in favor of soybean, flax work ended although some wilt programs were carried on by USDA personnel in agronomy. Sugar beet research within the department began at the time of Dr. LeClerc in the Tottering Tower and has involved such well-known pathologists as Andrew Downie, Harold Backstahler, Charles Schneider, Howard Bissonnette, and Lucas Calpouzos (now Head of Plant Science at Moscow, Idaho). This program was terminated in the 1960's with the transfer of the USDA personnel remaining to Fargo, North Dakota. Dr. Calpouzos became part of the department staff when Miss Hart retired and Luke then continued on wheat research until he left for Idaho.

The last major change to occur recently was the appointment of Dr. F.A. Wood, from Pennsylvania State University, and a former student of Dr. French, to the headship of the department on 1 July 1972, and with that appointment many more changes are anticipated in the years to come. As of 1 July 1973, there are 13 full professors, 1 associate professor, 3.8 assistant professors, 0.75 instructors, 2 research fellows, 2 research specialists, and about 15 research assistants on the payroll. In addition there are 6 USDA scientists and 4 in the North Central Forest Experiment Station who hold courtesy appointments within the department. There are also 3 professors emeriti. There are 10 civil service employees. These include 2 field superintendents, a stockroom and equipment clerk and several junior scientists. There are 4 secretaries in the main office including one executive secretary.



North Central Forest Experiment Station

AS THE DEPARTMENT HEAD SEES IT

FRANCIS A. WOOD

1973

Historically, the Department of Plant Pathology of the University of Minnesota has received world-wide acclaim for its programs and productivity in the area of field crops pathology, and specifically the cereal rusts. Likewise, the department is well known for its activities in the areas of grain storage pathology, mycotoxicology, and forest pathology. As we plan for the future, it is our hope that we can maintain these outstanding traditional programs. Man in his struggle to survive must implement sociological and technological changes or "advances" as they are often called that can and do result in new challenging problems for the plant pathologist. This is especially true if the pathologist considers it his primary responsibility to protect the photosynthetic mantle of the earth. In the broadest sense, this primary photosynthetic surface has both survival and aesthetic values and as pathologists, we should consider disease in any setting as being within the purview of our responsibility to mankind.

In my opinion, program planning at the Department level in plant pathology should be done within the framework of these thoughts. As a first step in program planning, programs in research, extension and teaching were evaluated and faculty assignments were examined. The primary reason for examining and evaluating faculty assignments and existing programs was to more closely assign faculty talent and interests with overall departmental program goals. This evaluation and realignment effort resulted in the following structure.

- 1.) Dr. E. Banttari was relieved of the barley project in order that he might devote full time to the area of plant virology. He will examine the role of viruses in natural or wild ecosystems.
- 2.) Dr. Neil Anderson will eventually be relieved of the mycology teaching assignment and will devote full time to the genetics of plant pathogens with emphasis on *Rhizoctonia*.
- 3.) Dr. R. Wilcoxson has been relieved of alfalfa and forage disease research and will devote full time to foliar diseases of the small grains (wheat, barley and oats).
- 4.) The Cereal Rust Laboratory, under the direction of Dr. J. Rowell, will have primary responsibility for research on cereal rusts. His staff includes Dr. W. Bushnell, Dr. McVey, Dr. A. Roelfs, and Dr. P. Rothman.
- 5.) Dr. Kommedahl will expand his research program in the area of root rots with emphasis on biological control of root pathogens.
- 6.) Dr. F. Frosheiser will have responsibility for alfalfa disease research.

7.) Dr. Stienstra will narrow his research focus from ornamentals in general to the diseases of turf. Eventually his extension assignment will be narrowed from ornamentals to turf.

8.) Dr. MacDonald has assumed responsibility for teaching introductory plant pathology and will continue to do research on nematode-induced diseases.

9.) Dr. D. French will continue to study the diseases of Forest and Shade Trees; administratively, he has been appointed Assistant Department Head. The assistant department headship does not represent an additional layer of administration between the faculty and the department head, but rather a vehicle for handling day-to-day operations within the department. Theoretically, the establishment of this position should free the department head to devote full time to program planning.

10.) Forest Disease Research in the Department is augmented by collaboration with the North Central Forest Experimentation Station Staff. Recently Dr. Gerald Anderson was appointed project leader of the Forestry Disease Work unit "Canker, Foliar, and Root Diseases of Forest and Christmas Tree Plantation." His staff includes Drs. R. Anderson, D. Skilling, K. Kessler, Dr. A. Shipper and Dr. T. Nichols. At the present time, Drs. Anderson, Skilling and Shipper have appointments on the Plant Pathology staff.

11.) Dr. Kernkamp accepted responsibilities for research on wild rice diseases.

12.) Dr. Zeyen will devote approximately 50% of his time to managing the Institute-wide electron microscope facility, and the other 50% to the study of the physical characteristics of plant viruses.

13.) Dr. R. Brambl will continue research in the area of physiology and biochemistry of fungi and disease processes.

14.) Dr. C. Christensen will continue research in the area of grain storage pathology in cooperation with the College of Veterinary Medicine.

15.) Dr. B. Kennedy has had, and will continue to have, responsibility for soybean diseases and research on bacterial plant pathogens.

16.) Dr. T. King, recently returned from a MOCIA assignment in Gojokarta, Indonesia, and will be responsible for research on the diseases on aquatic plants, exclusive of wild rice.

17.) Dr. C. Mirocha will continue to work in the areas of mycotoxicology and fungus physiology.

18.) As of July 1, 1972, we had two full time extension plant pathologists, Drs. H. Johnson and H. Bissonnette, and one half time research, half time extension plant pathologist, Dr. W. Stienstra. On July 1, 1972, a third full time position in extension was established and the assignment of the extension faculty was reexamined. It has been agreed that Dr. Johnson will be responsible for corn and soybean diseases, Dr. Bissonnette for small grains and potatoes, Dr. Stienstra for turf and to a degree woody ornamentals. The new extension plant pathologist will be assigned duties in the area of vegetable and floricultural crops. As we move into the future, we plan to establish extension positions that are a blend of research and extension, similar to the position occupied by Dr. Stienstra. It is our thought that we can more adequately serve the needs of our citizens by individuals who have both research and extension responsibilities for a given crop.

19.) Dr. R. Meronuck, from the Office of Special Programs, was recently appointed to a newly established position in grain storage extension pathology in the department. Dr. Meronuck will devote approximately 30% of his time to problems related to grain storage pathology.

20.) A "Council of Ancients" has been established in the department, consisting of our retired but active professors emeriti, E.C. Stakman, C.J. Eide, and M.B. Moore. These individuals have devoted their careers to serving the Department and profession of plant pathology and have given invaluable assistance to me in many ways during the past year. I look forward to their advice and assistance in the years to come.

Following the realignment of current faculty, attention was turned to developing job descriptions (programs) for three open positions in the department. The retirements of Professors Eide and Moore on July 31, 1973, yielded two vacancies and a new position in plant pathology extension was established July 1, 1972. It was decided that the two research and teaching positions should be in the general area of epidemiology with one focusing on populations genetics and the other on simulation and modeling of plant disease epidemics. It was also decided that since our coverage in the area of horticultural crops is relatively light, compared to that in the agronomic crop area, that the individuals working in these positions would work on a horticultural crop or crop grouping.

At the present time, a number of our faculty are involved in breeding programs with members of the Agronomy and Horticulture departments. In addition, many of our faculty are studying the influence of environment on disease development or selecting for various types of resistance to given pathogens. Consequently, the addition of faculty members in the fundamental areas described above will provide resource personnel to work with current faculty already engaged in "epidemiological" research.

As the amount of leisure time available to man increases and as our level of social affluence increases, plants become more and more important in our everyday lives. At the same time, population pressure and technological advances have resulted in environmental conditions that are often unfavorable for plant growth. As pathologists it is important that we recognize these events and that we expand our research programs to meet existing needs. Within this context, recreation areas, have and

will continue to assume more importance in our everyday lives. The impact of man on such ecosystems and the interaction of man's impact with that of biological pathogens are not known. With this in mind, the Department has developed a cooperative research program with the National Park Service of the Department of Interior to examine the "Role of Disease In the Ecological and Environmental Management of Parks." This program was initiated in fiscal year 1972-73 with F. A. Wood as program director. During 1972-1973, research projects were initiated in the following areas:

1. The influence of photochemical air pollutants such as ozone and nitrogen dioxide on park vegetation. This project involves studies of not only the direct effects of these compounds but of interactions between these compounds and other pollutants such as sulfur dioxide. In addition, interactions between pollutants and biological pathogens such as bacteria, fungi, and insects will be investigated. Dr. S. Krupa directs this work.

2. The establishment of background levels of air pollution in remote areas. Background levels of ozone, nitrogen dioxide, and sulfurdioxide in remote national park settings will be determined. Subsequently, the contribution of man-related activities to the pollution load of parks in remote areas will be determined. Dr. S. Krupa also directs this work.

3. The pollution of precipitation. The pollution of precipitation, especially rainfall and snow will be examined to determine the array of organic and inorganic compounds present in various locations and the relationship of the composition of rainfall to the proximity of urban areas and man-related activities. Dr. S. Krupa directs this work.

4. The role of viruses in wild ecosystems. The primary objectives in this project will be to ascertain what viruses are present in plants and wild systems and what if any impact they are having on the system. Dr. Banttari is directing this work.

5. Diseases of aquatic vegetation. Little is known about the fungal, bacterial, and viral diseases of aquatic vegetation. From the overall standpoint of water management and with the prospects of "farming" lakes and other bodies of water, it is important that we obtain an understanding and knowledge of the diseases of vegetation in aquatic habitats as well as developing biological methods of controlling weeds in aquatic sites. Dr. King directs this work.

6. The effect of uncontrolled killing diseases on park vegetation. Fundamental to the ecological and environmental management of parks is minimizing man's impact. Since controlling diseases often results in unwanted effects on the ecosystem, it is important to ascertain what will happen in situations involving "killing diseases" if control measures are not applied. Killing diseases such as dwarf mistletoe, of black spruce will be investigated. Dr. D. French directs this work.

7. A survey to determine the major causes of disease in urban and remote parks. This will be accomplished by systematic surveys involving aerial photography and ground survey techniques coupled with a nonsystemic survey involving a mobile Plant Disease Laboratory. Our stationary Clinic has been augmented

with the addition of a mobile Plant Disease Laboratory which will work in the urban areas of the state. The mobile Plant Disease Laboratory is equipped with instruments basic to the field diagnosis of disease problems, an extensive collection of literature and bulletins, and facilities for preparation and storage of specimens. Dr. Stienstra directs this phase of the program.

The National Park Service contract has resulted in the addition of a new flavor to the department, and we look to the future with a high degree of optimism regarding the eventual success of this program.

Traditionally, the Department has had strong educational programs at the graduate level and as the preceding history statement indicates, more than 500 students have graduated at the MS and PhD levels. The caliber of past graduates has been excellent and it is our hope to maintain this excellence. At the present time, we are evaluating the MS and PhD degree program from the standpoint of updating our courses and curriculum, thesis requirements, and evaluation procedures. During this review, graduate level courses will be examined. We plan to maintain a graduate student load of approximately 30 students which we believe is the minimum number essential to the maintenance of viable graduate degree programs.

The Department has also performed an important function in teaching introductory plant pathology for both Agriculture and Forestry students. These courses have served other units in the University as well, such as College of Biological Services. Dr. David MacDonald has assumed the responsibility for teaching introductory plant pathology and he will spend a significant amount of time during the next few years in developing this course. The introductory teaching laboratory was modernized as a facility during the late 1960's and during this past year Dr. MacDonald has added television monitors to the laboratory which make it possible to project specimens being viewed under the microscope. The application of modular and audio-tutorial techniques is also being considered.

Historically, undergraduate majors in plant pathology have not been marked with success in the United States. With the advent of environmental concern for the proper use of pesticides and the increasing importance of plants in the everyday life of man, undergraduate majors in plant pathology or in the broadest sense plant protection are being implemented by various institutions. During the past year, we have developed an undergraduate major in plant pathology which is titled "Plant Health Technology." This program will be initiated in the fall quarter of 1973. It is our intent that the Bachelor of Science in Plant Health Technology will yield practitioners knowledgeable in the elements of diagnosis and treatment of disease and in regulatory practices. Students in the program will be provided with background and basic training in the diagnosis and treatment of diseases of plants in urban, forest, and rural environments. Specifically, diseases caused both by biotic and abiotic pathogens will be considered and pertinent methods of diagnosis and treatment alternatives will be emphasized. Practical experience in disease diagnosis and the prescription of treatment will be provided by requiring a three-month internship in our Plant Disease Clinics. The internship will include both laboratory and field experience. This undergraduate major is sufficiently

flexible to allow a student to prepare himself for graduate studies in plant pathology as well as educate and train him as a practitioner.

In the past, the educational system in plant pathology has been directed almost exclusively toward the training of scientists presumably expert in research and not expert in the diagnosis, prognosis and control of disease. By chance or by inclination, individuals trained in research have assumed the assignment and/or role of practitioner as the need arose. Moreover, the practice of plant medicine and the treatment of plant disease has no legal or private regulation. Consequently, the nurserymen, the retail supplier, various chemical salesmen, the individual in the neighborhood skilled in growing plants and almost anyone can make recommendations for the treatment of plant disease and in fact does practice plant medicine. The situation is somewhat analogous to the medical profession of some 100 years ago when barbers and other tradesmen actually practiced various aspects of human medicine.

Disease in plants is directly analogous to disease in animals and man with the principal difference in the nature of the suscept. Diseases of man and animals are treated by a group of highly trained practitioners given the title "Doctor of Medicine" or "Doctor of Veterinary Medicine." These contingents of professionals have been supported by a smaller group of scientists conducting research on the fundamentals of disease development in man and animals. As each of these two groups has evolved, there has been a distinct separation between the scientist and the practitioner. This separation is reflected in the present educational requirements in human and veterinary medicine, with professional M.D. and D.V.M. programs and the research Ph.D. programs. The development of plant pathology and the accumulation of knowledge about disease in plants and the application of this knowledge for control purposes have not been characterized by a clear separation of the scientist and the practitioner. There is, in fact, a field of plant medicine, but there are no trained practitioners in the sense that we know them in human and animal medicine. It is difficult to assess the need for such practitioners but we consider plant medicine to be at about the same stage that small animal medicine was in the mid to late 1940's. It is our opinion that there is a need to develop and train practitioners at the graduate level in the application of modern technology to the treatment of plant disease. We have developed the rationale for this degree and are in the process of obtaining support for the program and implementing it within the University structure. As we perceive it, the degree will be administered by the Graduate School as an alternate to the PhD degree. It will be clinical rather than research in flavor, and students will be required to complete a core of courses and an internship in our Plant Disease Clinic. The objective of this practitioner graduate degree program is consistent with the overall objective of our undergraduate Plant Health Technology major.

In summary, on the educational front, we plan to maintain the traditionally strong and excellent MS and PhD research program within the department and to add a professional aspect to the educational effort by implementing an undergraduate major in Plant Health Technology and a graduate major at the doctorate level in plant medicine.

The Plant Disease Clinic which was initiated in the late 1950's has been a striking success and during 1972-73, approximately

8,000 inquiries were received. In an effort to expand our clinical services in the state and to project the image of plant pathology to the average citizen and as a part of our national park service contract, we have initiated a Mobile Plant Disease Clinic or Mobile Plant Disease Laboratory. It consists of a 22-foot mobile home that was designed specifically as a plant disease diagnostic laboratory. The mobile and stationary clinics are currently under the direction of Dr. Stienstra and the mobile clinic is manned by two advanced graduate students. The Mobile Plant Disease Clinic will be stationed at various parks, shopping centers, and other areas in the Twin Cities where people concentrate. Movement of the mobile clinic into an area is preceded by advance publicity and while the unit has only been in operation for a few weeks, our initial effort indicates that this function will satisfy a very real need and at this point there is little doubt that it will succeed. I want to emphasize that the mobile and stationary Plant Disease Clinics are not only important from the standpoint of the service provided to the citizens of the state, but that they also have an important educational function with respect to our Plant Health Technology major and our proposed doctorate degree in plant medicine.



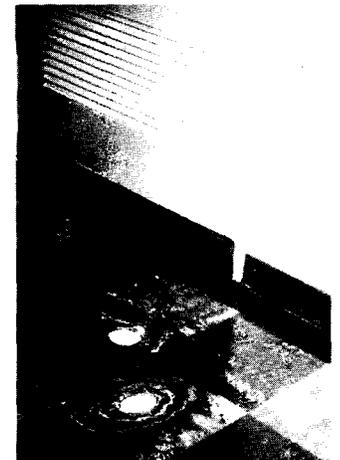
Mobile Plant Disease Laboratory

In the area of international programs, the department will continue to be involved in the Moroccan project and we currently have a virologist, Dr. Ben Lockhart, on station in Rabat as a part of the AID mission in that country. Dr. Wilcoxson is the Departmental Administrative representative for this program and has been working with Dr. Lockhart in program development for the past two years. In many areas of Morocco, plant disease is causing rather staggering losses, and it is obvious that there is need for additional plant pathology expertise. We look forward to expansion of our activities and commitments in this area. Also, we think the new doctorate program in plant medicine will provide training of the type that is needed in many of the developing countries of the world, and consequently it is our hope that this will become an attractive program to students from other countries.

Finally, 1972-73 was marked by the recognition of the efforts of three outstanding Ole Timers. Dr. Lionel Robles of the Institute of Technology, Monterrey, Mexico, received a distinguished service award from the University of Minnesota for his work and accomplishments in the general area of Education and Agricultural research in Mexico. Dr. C.M. Christensen was appointed a Regents Professor in recognition of his outstanding career as a teacher and researcher in plant pathology and in the specific areas of forest pathology, grain storage, and mycotoxology.

The Regents Professorship is the highest award that the University bestows on its faculty in recognition of their contributions. There was also another first for the "Venerable Stak." The Plant Pathology Pathology Building has been renamed Stakman Hall of Plant Pathology in honor and recognition of Dr. Stakman's contribution to the general field of education and specifically in the areas of agricultural education, plant disease research and international agriculture. These awards were truly deserved and we are proud to be associated with these men and their greatness.

Regents' Professor Clyde M. Christensen



Dr. Christensen's Laboratory Entrance—Tile worn through to the concrete beneath is mute testimony to the number of times he entered and left his laboratory.

In the preceding paragraphs, I have tried to describe in some detail the overall development of our Departmental programs in research, extension and instruction. The presentation is sprinkled with bits and pieces of the rationale for some of the major decisions. From this information I hope you can discern the direction that we are moving in the areas of extension, research and instruction.

As we look to the future, with acute food shortage developing in the United States, with many countries of the world confronted with famine and death, with environmental deterioration continuing at an alarming rate, at least in some localities, with the cut-backs in support for agricultural research during the past five years, with the continued and almost uncontrolled increase in world population, and finally with man's insatiable thirst to survive and simply enjoy life, the role responsibility of agriculture in the ultimate survival of mankind is awesome. Within this context, the need for Plant Pathology and Plant Pathologists has never been greater. I am confident that in the immediate future the increasing importance of agriculture in the survival of man will be recognized, that there will be a general expansion of agricultural research in many areas and that Plant Pathology and Plant Pathologists will be in the forefront of this fight for survival. Yes, in a sense the future of Plant Pathology looks bright and I assure you that the Department of Plant Pathology of the University of Minnesota will be among those leading the charge.



EDWARD MONROE FREEMAN, "founder and guiding genius" of the Division of Vegetable Pathology and Botany (as then known) was born of Swiss parents in St. Paul on 12 February 1875. He earned his B.S. degree in 1898, his M.S. degree a year later, and his Ph.D. degree in 1905--all from the University of Minnesota. After a stint in teaching Botany and Pharmacognosy at Minnesota, a summer at Wood's Hole, a year with Marshall Ward at Cambridge University (England), two years as pathologist with the USDA, he was appointed Professor and Chief of the new department on 1 August 1907--thereby establishing the first department of plant pathology in the USA. He held that position until 1940, when he relinquished the title to E. C. Stakman.

In 1913, he was appointed Assistant Dean of the Department of Agriculture at Minnesota and four years later Dean of the College of Agriculture, Forestry and Home Economics. He was instrumental in reorganizing the Department of Agriculture at Minnesota into five divisions: the Experiment Station; the College of Agriculture; the School of Agriculture; the Extension Division; and the Short Courses. In addition, he was a key figure in the founding of the State Seed Laboratory.

Professionally he contributed by serving on the editorial board of PHYTOPATHOLOGY for the first three years of its existence and as President of the American Phytopathological Society in 1917. He wrote the first book on plant diseases in the USA, entitled MINNESOTA PLANT DISEASES. Scientifically, he worked on brown rusts of bromes, the *Lolium* fungus, and the cereal smuts and rusts. As a superb teacher, a sound educator, and pioneer leader he brought distinction to the department, the University and the profession of plant pathology, and pointed the way for others to follow in the years ahead.

ELVIN CHARLES STAKMAN, the Big Chief (and later Head) of the department after Freeman, scientist, educator, philosopher, statesman, and raconteur par excellence, was born the son of a farmer in Algoma, Wisconsin on 17 May 1885. After the B.A. degree in 1906, the M.A. in 1910, and the Ph.D. degree in 1913, Dr. Stakman, following a brief episode as a public school teacher and coach, embarked on a career as plant pathologist and teacher with tremendous facility and success. He was a faculty member at Minnesota from 1909 to 1953. His tenure was divided as Section Chief from 1913 to 1940 and Division or Department Head from 1940 to 1953. Since 1953 he has been Emeritus Professor and actively interested in departmental affairs.

Professor Stakman has served the department, the University, and the profession with distinction. The kudos are legion. He served as Editor-in-Chief of PHYTOPATHOLOGY (1925-29) and President of the American Phytopathological Society (1922). Honorary doctorates were conferred at Halle (Germany), Cambridge (England), Yale, Wisconsin and Minnesota. He was elected a member of the prestigious National Academy of Science. The American Association for the Advancement of Science elected him president in 1949. He is Honorary Chairman of the Second International Congress of Plant Pathology (1973). He has been awarded numerous medals, scrolls, certificates, and plaques testifying to outstanding contributions to science and agriculture. Service on dozens of national and international boards, commissions and committees attest to his stature as a distinguished scholar, scientist and leader world-wide. The American Phytopathological Society named him a recipient of the Distinguished Service Award in 1967. Many societies both American and foreign have elected him to their membership or as a Fellow. In 1954 he was selected as one of "The 100 Most Important People in the World Today."

Minnesota alumni remember that he established a sound, well-balanced teaching program in the department. Students the world over were attracted to Minnesota. Research programs were developed in which both basic and applied research were treated with equal respect. The nature and variation of genetic potential in pathogenic fungi were pursued avidly for a quarter of a century by staff and students under his leadership.

Research at Minnesota spilled over into other places such as Mexico, where under the aegis of the Rockefeller Foundation,

agricultural research started that was recognized recently as the Green Revolution and the awarding of the Nobel Laureate to Norman Borlaug--a Minnesota Old Timer.

Former students remember "Stake" as a fatherly prophet and teacher such as they had never met before or since in their lives. Each encounter was an indelible intellectual experience. Whether in class, seminar, over coffee or beer, Dr. Stakman never tired of helping students to learn. Late-night seminars were particularly memorable.

The Department of Plant Pathology during Stakman's reign was in a growing, building, and developmental phase of its history that might be thought of as its golden age, and in 1973, the building has been named Stakman Hall in recognition of the fame that came to Minnesota through his achievements, dedication, energy, and inspiration.

JONAS JERGEN CHRISTENSEN, third in succession to the headship and frequently Acting Head during many of Stakman's sojourns out of state, was born one of nine children of Danish parents on a farm near Hutchinson, Minnesota on 22 August 1892. His B.S. (1921), M.S. (1922), and Ph.D. (1925) degrees were earned at the University of Minnesota. Except for brief periods as rural school teacher in North Dakota, a sergeant in the U.S. Army Medical Corps during World War I, a Federal Field Agent, and a State potato inspector, Dr. Christensen served most of his professional career on the faculty of the University of Minnesota (1920-1961). Concomitant with the University appointment, he was at various times agent or collaborator with the U. S. Department of Agriculture. From 1953 to 1961 he served as Head of the Department of Plant Pathology and Botany, and was in charge of the Cooperative Rust Laboratory at St. Paul.

The professional world honored him in various ways. As a Guggenheim Fellow he worked with Hans Kniep at the University of Berlin, Germany, in 1929. He was an associate editor of PHYTOPATHOLOGY for three years and served as President of the American Phytopathological Society in 1944. The Elvin Charles Stakman Award was conferred on him in 1959. The Minnesota Chapter of the Society of Sigma Xi named him for its Outstanding Achievement Award in 1963. He received a Fulbright Award to work in Denmark in 1963 during which time he also lectured on genetic variation in plant pathogens.

He served as consultant for the U. S. Department of Agriculture, the U. S. Army Chemical Corps in South America, the Office of the Secretary of Defense (U. S. Government), and the Rockefeller Foundation in Mexico. He served on many other boards and committees both statewide and nationally and was a member, sometimes honorary, of numerous honor and professional societies.



Research interests dealt mainly with genetics of cereal pathogens. He was author or coauthor of two APS Monographs (No. 2 and 3), in addition to many technical journal articles, reviews, and chapters in books.

In his administration he provided for growth and sophistication of equipment and diversity of research and at the same time maintaining strength in field pathology within the department. Agricultural botany, particularly physiology, was expanded in staff, students, and resources during his tenure as Head.

Because of his warm personality, his great concern for graduate students, his sheer enjoyment in working with fellow staff and students, "Chris" or "J.J.", as he was called, was loved by everyone. He was a voracious reader of plant pathological literature, was extremely fertile in ideas for investigation, and was unusually appreciative of the significance of results and was therefore an inspiration and a fount of knowledge to his students and colleagues. His scientific judgement was sought as well as his insights into people and programs in educational efforts. His ability to assess persons was almost without peer. His dedication and energy in promoting the department locally and nationally was boundless and his enthusiasm for life and science was endless.



MILTON FREDRICK KERNKAMP, leaving the post of Assistant Director of the Agricultural Experiment Station to become the fourth Head in 1961, was born in St. Paul, Minnesota on 16 September 1911. His farm experience led him into agriculture and the B.S. (1934), M.S. (1938) and Ph.D. (1941) degrees from the University of Minnesota. His service on the Minnesota faculty was from 1936 to the present except for one year as plant pathologist with the U.S. Department of Agriculture in Mississippi, and four years with the U.S. Army as Company Commander during World War II. (He was later promoted to Lieutenant Colonel.) Concurrent with his appointment as Head, Dr. Kernkamp was Collaborator with the Cooperative Rust Laboratory on the St. Paul campus. In 1972, he relinquished the headship in favor of research and teaching within the department.

Sixteen of the 36 years as a professional scientist were spent in administration--five as assistant director of the Experiment Station and 11 as Department Head. During this time, Dr. Kernkamp established himself as an efficient and able administrator. His abilities were recognized by his being selected as treasurer and business manager for the American Phytopathological Society from 1967 to 1970, and chairman of its building committee. Subsequently, the Society established its national headquarters in a new building in St. Paul.

With the advent of the Second International Congress in Minneapolis in 1973, the Society again turned to Kernkamp for his services as treasurer of the Congress and chairman of the Local Arrangements Committee. He had previously served as secretary-treasurer, vice-president and president of the North Central Division of the American Phytopathological Society, and as associate editor of PHYTOPATHOLOGY for a three-year term.

His research efforts prior to and succeeding his administrative chores dealt with genetic changes in corn smut related to virulence; diseases of sorghum, soybean, and forage crops; and recently diseases of wild rice. His teaching versatility was demonstrated in courses on diseases of field crops, genetics of plant pathogens, agricultural botany, and general botany. At the close of World War II, he served as Instructor in Botany and Chairman, Department of Biological Science, U.S. Army, University Study Center, University of Florence, Italy. In 1972 he was appointed Visiting Professor, Department of Agricultural Botany, University of Sydney, Australia, for a quarter term.

His administration was marked with steady growth and affluence with the realization of the first million-dollar budget in history. Expansion of physical facilities begun during Christensen's term continued; however, agricultural botany and plant physiology were transferred to other departments leading to the change in name to the Department of Plant Pathology. With the continued diversity in research efforts, increased independence in project research followed under Kernkamp's administration. Expansion of the extension staff and Plant Disease Clinic occurred also in recognition of the increasing needs for mission-oriented research and concern for needs of homeowners. His career will continue as professor and plant pathologist in the department that he served well and faithfully in the past decade.



FRANCIS ALOYSIUS WOOD, fifth and newly appointed Head of the department (1972), was born in Perryville, Missouri, on 17 November 1932. His education beyond high school was obtained at the University of Missouri (B.S. in forestry in 1955 and M.A. in botany in 1956) and the University of Minnesota (Ph.D. in plant pathology in 1961). He worked for the botany department and the U.S. Forest Service in Missouri before matriculating at Minnesota. Upon completion of the doctorate and his term as one of the most dynamic seminar chairpersons, Al was appointed assistant professor at Pennsylvania State University leading to a professorship in 1970. Although active mainly in forest pathology, air pollution research also claimed his attention. He served as research associate and as assistant director of the Center for Air Environment Studies at Pennsylvania State University while a member of the university staff. In 1968-69, Dr. Wood was visiting professor at the University of California, Berkeley.

Professional service included membership on several committees of the American Phytopathological Society, a research committee of the Air Pollution Control Association, and the Organizing Committee of the Second International Congress of Plant Pathology. His research delved into oak wilt, maple canker, Fomes root and butt rot, and air pollutant effects on trees--some financed on grants from NSF and the Public Health Service. He has taught courses in forest pathology and air pollution and has given invitational lectures or participated in symposia in both European and American institutions. He also served in the U.S. Army from 1956-1958.

Since assuming responsibilities at Minnesota, a new undergraduate program in Plant Health Technology has been instituted. A mobile plant disease clinic is in service, authorization for additional staff in extension has been approved, five new courses are being offered the coming school year, realignment of staff responsibilities and some reallocation of funds have taken place, plans for new and replacement staff have been made--all within the first year of service. With his energy and imagination, the future of the Department of Plant Pathology at Minnesota looks bright, in keeping with the goals and aspirations of the past.



Dr. David French



Dr. Sagar Krupa



M. F. Kernkamp, E. C. Stakman, J. J. Christensen



Dr. D. MacDonald



Robert Kroll—Field Day

Academic and Research Staff



G. W. Anderson



E. E. Bantari



N. A. Anderson



H. L. Bissonette



R. L. Anderson



R. M. Brambl

Gerald W. Anderson

Dr. Gerald W. Anderson (professor) Project Leader, Forest Disease Research, USDA-Forest Service, joined the academic staff in 1967. He was born in Princeton, Minnesota in 1926 and received his B.S., M.S., and Ph.D. degrees from the University of Minnesota. Dr. Anderson's home address is 3412 31st Ave. N.E. Minneapolis, Minnesota 55418.

Dr. Anderson is Project Leader for forest disease research at the North Central Forest Experiment Station, located on the St. Paul Campus. The geographical territory that he is responsible for includes Wisconsin, Minnesota, Michigan, Iowa, Missouri, Illinois, and Indiana. Research includes work on both coniferous and deciduous tree species and emphasis has been placed on canker diseases of aspen. Dr. Anderson often works in close cooperation with members of the department of Plant Pathology.

Neil A. Anderson

Dr. Neil A. Anderson (professor) joined the staff in 1959. He was born in Minneapolis, Minnesota in 1928 and received his B.S., M.S., and Ph.D. from the University of Minnesota. He and his wife, Barbara, and their children make their home at 65 Langford Park, St. Paul, Minnesota 55108.

Dr. Anderson has taught "Ascomycetes," "Basidiomycetes," in addition to "Genetics of Plant Pathogens." His research interests center on the genetics of parasitism, and the past decade has been spent studying the genetic control of parasitism and heterokaryosis in the Ag-1 and Ag-4 groups of *Rhizoctonia solani*. This work is being continued and studies are underway on the Ag-3 (potato pathogens) and Ag-2 (root crop pathogens) of *R. solani*. Cooperative work with the Department of Agronomy has resulted in the location of resistance in flax to its *R. solani* pathogens which are members of Ag-1 and Ag-4. Genetic studies on oyster mushrooms, *Pleurotus ostreatus* and *P. sapidus* have also been conducted, in addition to crown bud rot of alfalfa caused by *R. solani*.

Ralph L. Anderson

Dr. Ralph L. Anderson (professor) is the Principal Plant Pathologist of the North Central Forest Experiment Station-U.S.D.A., Forest Service. He was born in Minot, North Dakota in 1918 and received his B.S., M.S., and Ph.D. from the University of Minnesota. His home address is 3408 36th Ave. N.E., Minneapolis, Minnesota 55418.

Dr. Anderson's research interests are in *Hypoxylon* Canker of Aspen, White Pine Blister Rust, Black Spruce Dwarf Mistletoe and juvenile diseases of pine and aspens. He carries on active research programs and has been very helpful to the department.

E. E. Banttari

Dr. Ernest E. Banttari (professor) joined the staff in 1963. He was born in 1932 in Bismarck, North Dakota and received his B.S., M.S., and Ph.D. degrees from the University of Minnesota. He and his wife, Marlene, live at 2191 Fulham St. in St. Paul.

Dr. Banttari teaches "Virus Diseases of Plants" as well as "Research Problems in Plant Virology." In the past, Dr. Banttari has been responsible for the development of disease resistant malting barley varieties in conjunction with the Department of Agronomy and Plant Genetics on the Malting Barley Improvement Program. His research interests have resulted in a strong emphasis on cereal viruses, principally the oat blue dwarf virus, barley yellow dwarf virus and the mycoplasma-like agent of aster yellows. He has supervised research on potato virus X and continues some aspects of potato virus research. Currently Dr. Banttari is embarking on a Department of Interior Project for the identification and role of viruses and mycoplasma-like agents in woody plants of park ecosystems.

Howard L. Bissonnette

Dr. Howard L. Bissonnette (professor) joined the staff in 1968. He was born in Detroit, Michigan in 1927 and received his B.S. from St. Thomas College, M.S. and Ph.D. from the University of Minnesota. Dr. Bissonnette and his family reside at 3456 Milton St., St. Paul, Minnesota 55112.

Dr. Bissonnette is an Extension Plant Pathologist who is very active in the Red River Valley portion of Minnesota. His research interests center around integrated control of cereal, potato, and vegetable diseases. Testing agricultural aircraft spray patterns is an integral part of the fungicide application program for disease control. Potato storage research constitutes another active interest, in addition to work on the use of soil fumigants.

Robert M. Brambl

Dr. Robert M. Brambl (assistant professor) joined the staff in 1971. He was born in 1942 in Fort Smith, Arkansas, and received his B.A. from Hendrix College, M.S. from the University of Arkansas, and his Ph.D. from the University of Nebraska. Prior to joining the staff Dr. Brambl spent two years as a postdoctoral fellow at Stanford University. He and his wife, Carol, make their home in Minneapolis.

Dr. Brambl's research interests lie in the area of the metabolism of fungal spore germination. Mechanisms of spore dormancy and activation for growth are the basis for his metabolic studies. Currently he is studying cytoplasmic genes of spore mitochondria in an attempt to identify and isolate individual contributions of nuclear and mitochondrial genetic systems to the assembly and function of mitochondria in germinating spores. In addition to his own research interests, Dr. Brambl is developing a cooperative project to study the physiology and biochemistry of rust and mildew haustoria in conjunction with Dr. W. R. Bushnell of the Cereal Rust Laboratory.



W. R. Bushnell



D. W. French



C. M. Christensen

H. G. Johnson (no photo available)



C. J. Eide



F. I. Froseiser

William R. Bushnell

Dr. William R. Bushnell (professor) is a Research Plant Physiologist, Cereal Rust Laboratory, USDA. He was born in Wooster, Ohio in 1931 and received a B.A. from the University of Chicago, B.S. and M.S. from Ohio State University and a Ph.D. from the University of Wisconsin. He and his family reside at 1555 Oak Ave., St. Paul, Minnesota 55112.

Dr. Bushnell's general area of research is the physiology of rust and powdery mildew diseases. His studies center around host-parasite interactions in living systems at the light microscopic level. Emphasis has been on the development and role of the haustorium and on the cytoplasmic responses of host cells under attack. Future effort will center on the functional activities of the haustorium, and on resistance mechanisms at the cellular level. In addition to his host-parasite interaction work, Dr. Bushnell is actively engaged in growing rust fungi on artificial non-living media with the objectives of improving the media, determining nutritional requirements, and understanding the transition from parasitic to saprophytic growth habits.

Clyde M. Christensen

Regents' Professor Clyde M. Christensen joined the staff in 1929. He was born in Sturgeon Bay, Wisconsin in 1905 and received his B.S., M.S., and Ph.D. degrees from the University of Minnesota. Dr. Christensen and his wife make their home at 2350 Carter Ave., St. Paul, Minnesota 55108.

Dr. Christensen has been named a Regents' Professor, which is the highest honor and acknowledgement a professor can receive from the University of Minnesota. He is also the first member of the College of Agriculture to be so honored. Despite all the recognition and honors, Dr. Christensen teaches "Introductory Mycology" and can normally be found working in his laboratory.

Dr. Christensen's reputation as an author and mycologist is well known, as is his research into fungal deterioration of stored grains. He maintains an extremely vigorous research program in grain storage and mycotoxicology, and works in close cooperation on many projects with the Department of Veterinary Medicine.

Carl J. Eide

Professor Emeritus Carl J. Eide joined the staff in 1930. He was born in Carrington, North Dakota in 1904 and received his B.S., M.S., and Ph.D. degrees from the University of Minnesota. Dr. Eide and his wife make their home at 2228 Hillside Ave in St. Paul, Minnesota 55108.

Professor Eide has taught many excellent courses in the department and his course in "Principles of Plant Pathology" has long been regarded as a reflection of his keen insight and vast understanding of plant pathology. Dr. Eide's "Principles" has been considered the model course for generations of students. In addition to his teaching activities, Dr. Eide has long has active research programs into potato and muskmelon diseases, in cooperation with the Department of Horticulture. Currently, Dr. Eide is engaged in identifying disease resistance in melons and potatoes, along with his general "vegetable disease garden" work. Potato research has long been his strong point and he has produced several remarkable students, in this area, over the years.

Dr. Eide has been asked to be the departmental historian and to write a comprehensive history of the department; additionally, he supervises the publication of the Aurora Sporealis.

Fred I. Frosheiser

Dr. Fred I. Frosheiser (professor) is a Research Plant Pathologist, Agricultural Research Service, USDA and joined the department in 1951. He was born in Keeline, Wyoming in 1913 and received his B.S. and M.S. from the University of Wyoming and Ph.D. from the University of Minnesota. Dr. Frosheiser's home address is 1945 N. Prior, St. Paul, Minnesota.

Dr. Frosheiser's research centers on alfalfa and alfalfa improvement through disease resistance. He works in close conjunction with Dr. Barnes, alfalfa geneticist, in developing alfalfa populations with specific and general disease resistance. The alfalfa variety 'Agate,' resistant to *Phytophthora* root rot, bacterial wilt, and common leaf spot was recently released for forage production in wet soils. In addition to the general disease situation in alfalfa Dr. Frosheiser is concerned with the complex alfalfa - alfalfa mosaic virus situation, and especially the seed transmission and strain differences of this disease agent. Dr. Frosheiser, also runs a rigorous bacterial wilt screening program and has evaluated every available commercial alfalfa variety currently in production for wilt reaction.

In addition to research, Dr. Frosheiser provides extension specialists with the latest information on the disease situation and progress in alfalfa improvement, and occasionally meets with farmers' groups, alfalfa industry personnel, and others to keep them informed on the latest developments.

Herbert G. Johnson

Dr. Herbert G. Johnson (professor) joined the staff in 1954. He was born in Granite Falls, Minnesota, in 1916 and received his B.S. and Ph.D. degrees from the University of Minnesota. Dr. Johnson and his family make their home at 2175 Rosewood Lane South, St. Paul, Minnesota 55113.

Dr. Johnson, Extension Plant Pathologist, is very active in the southern agricultural areas of Minnesota. His extension and research efforts center around diseases of corn, soybeans, fruits and a variety of other plant types. For years, Dr. Johnson was the sole extension plant pathologist for Minnesota and as such has had diverse experiences in the science of plant pathology. Dr. Johnson's research interests include such things as testing agricultural aircraft spray patterns and fungicide effectiveness.

David W. French

Dr. David W. French (professor) is the Assistant Head of Plant Pathology, Associate Director of the Itasca Biology Station, and holds an appointment on the College of Forestry Faculty. Dr. French joined our staff in 1949. He was born in Mason City, Iowa, in 1921 and received his B.S., M.S., and Ph.D. from the University of Minnesota. Dr. French, his wife, Audrey, and their three sons make their home at 1728 Lindig St., St. Paul, Minnesota 55113.

Dr. French's teaching assignments include "Forest Pathology," "Forest Protection," and "Wood Products Deterioration." His research interests range from general mycology, to forest and shade tree pathology, and wood products deterioration. He carries on active research programs in all phases of his fields of interest in addition to his other diverse functions.



B. W. Kennedy



Thor Kommedahl



M. F. Kernkamp



R. E. Kroll



T. H. King



S. V. Krupa

Bill W. Kennedy

Dr. Bill W. Kennedy (professor) joined the staff in 1961. He was born in 1929, in Dallas, Texas and received his B.S. from Southeastern State College, M.S. from Oklahoma and Ph.D. from the University of Minnesota. He and his wife and family reside at 2020 W. Eldridge Ave., St. Paul, Minnesota 55113.

Dr. Kennedy teaches "Prevention and Control of Plant Disease" in addition to "Bacterial Diseases of Plants." His research efforts in the area of soybean disease resistance are in cooperation with the Department of Agronomy; his personal endeavors have been associated with bacterial diseases of plants. Recent research efforts have centered around the bacterial populations residing on foliage surfaces, the action of translocatable toxins produced by bacterial infections, systemic disease, and seed-borne bacterial populations.

Milton F. Kernkamp

Dr. Milton F. Kernkamp (professor), former Head of Plant Pathology (1961-72), joined the staff in 1946. He was born in St. Paul, Minnesota in 1911 and received his B.S., M.S., and Ph.D. degrees from the University of Minnesota. Dr. Kernkamp and his wife, Marge, make their home at 2466 North Albert, St. Paul, Minnesota 55113.

Professor Kernkamp has taught many courses over the years, and is currently teaching a seminar course on "World Food Problems." Dr. Kernkamp has done research on diseases of soybeans, alfalfa, sweet and red clover and bromegrass. Currently he is researching the diseases of wild rice, which became a budding commercial venture in Minnesota, in accordance with the funding made available by the 1971 Minnesota State Legislature. Wild rice is susceptible to a variety of disease problems, the most immediate and severe being leaf diseases caused by species of *Helminthosporium*. Research is being conducted on identification, etiology, and control of rice diseases in conjunction with the departments of Agronomy and Plant Genetics, Entomology, and Soil Science.

Thomas H. King

Dr. Thomas H. King (professor) joined the staff in 1948. He was born in Starkweather, North Dakota in 1912 and received his B.S. from North Dakota State College and M.S. and Ph.D. from the University of Minnesota.

Professor King just returned to the staff after spending approximately two years as Educational Advisor at the University of Gadjah Mada, Yogyakarta, Indonesia on the MUCIA-USAID-Indonesian Project on Higher Education. Currently his research is in the area of aquatic plants, in conjunction with a National Parks Project of the Department of Interior. In the past, Dr. King had done research on fruit and canning crop diseases, with emphasis on the diseases of strawberry, raspberry, plum, apple, canning peas and wild rice.

Thor Kommedahl

Dr. Thor Kommedahl (professor) joined the staff in 1946 and again in 1953. He was born in Minneapolis, Minnesota in 1920 and received his B.S., M.S., and Ph.D. degrees from the University of Minnesota. Dr. Kommedahl and his family make their home at 1840 W. Roselawn Ave., Falcon Heights, Minnesota 55113.

Dr. Kommedahl has taught a number of different courses in the past and presently teaches "Poisonous Plants," "Fungus Disease of Plants" and "Plant Pathology." In addition to his teaching he maintains a strong research interest and program in the areas of biological control of plant diseases, fusarium root diseases of cereals and corn diseases. Research on diseases of corn has centered around southern corn leafblight, root rots, and stalk rot, while research on biological control of plant diseases has been mainly with the control of root and seedling diseases. Dr. Kommedahl has been very active in the American Phytopathological Society, having recently been president of that organization.

Robert E. Kroll

Robert E. Kroll joined the staff in 1972 as a Research Specialist on the Wild Rice Project. He was born in Long Prairie, Minnesota in 1932 and received his B.S. from St. Cloud State College and M.S. from the University of Minnesota.

Mr. Kroll has done research on integrated control of potato late blight prior to working on the wild rice project. He has a wide range of interests but primarily in vegetable pathology and was formerly a graduate student under Dr. C. Eide.

Sagar V. Krupa

Dr. Sagar V. Krupa (post-doctorate fellow) joined the staff in 1973. Dr. Krupa was born in Madras, India in 1940 and received an M.S. from the University of Madras and from the University of Wisconsin, Fil. Lic and Fil. Dr. from the University of Uppsala, Sweden. He and his wife, Nancy Ann, make their home at 1435 W. Jessamine, St. Paul, Minnesota 55108.

Dr. Krupa's past research efforts have been in the biochemistry of disease resistance of ectomycorrhizae of pine and amino acid metabolism in ectomycorrhizae. Presently he is working on air pollution studies with reference to ozone, SO₂, NO₂, and their effects on woody plants. In addition, Dr. Krupa is working on rain water analysis for pollutants and the effect of air pollution on development of ectomycorrhizae.



B. E. L. Lockhart



R. A. Meronuck



D. H. MacDonald



C. J. Mirocha



D. V. McVey

Benham Edward L. Lockhart

Dr. Benham "Ben" Lockhart (assistant professor) joined the staff in 1971 as a Virologist assigned to the University of Minnesota-AID project in Morocco. He was born in Kingston, St. Vincent, British West Indies in 1945 and received his B.S. from University of the West Indies and Ph.D. from the University of California, Riverside.

Dr. Lockhart's assignment is to develop and organize programs of instruction and research at the Institute Hassan II. Specifically, his research deals with virus related problems of plants. Dr. Lockhart has started his program and now has a well organized laboratory, survey, and developing instructional program. Prior to joining the staff at Minnesota, Dr. Lockhart was a post-doctoral research fellow at the University of Nebraska.

David H. MacDonald

Dr. David H. MacDonald (associate professor) joined the staff in 1965. He was born in Cleveland, Ohio, in 1934 and received his B.S. (Horticulture) from Purdue University, M.S. and Ph.D. (Pomology) from Cornell University. Dr. MacDonald and his family live at 690 Continental Drive, New Brighton, Minnesota 55112.

Dr. MacDonald teaches "Introductory Plant Pathology" in addition to teaching "Plant Nematology." His research interests and areas are involved with the influence of cropping practices on indigenous plant parasitic nematodes and the effect of mineral nutrition on the buildup of *Pratylenchus penetrans*. Dr. MacDonald has also been looking at the effect of plant parasitic nematodes on bent grasses and on garden and glasshouse roses. Although Dr. MacDonald has no formal extension responsibilities, he does enjoy working with growers who have problems caused by plant parasitic nematodes.

Donald V. McVey

Dr. Donald V. McVey (assistant professor) is a Research Plant Pathologist, Cereal Rust Laboratory, USDA. He was born in Lafayette, Indiana in 1922 and received his B.S. and M.S. from Purdue University and his Ph.D. from the University of Illinois.

Dr. McVey's research entails the identification and evaluation of genes for resistance to wheat stem rust in the commercial wheats by using stem rust isolates with predetermined avirulence/virulence formulae. He also works with wheat breeders in development of new varieties in addition to identifying genes for virulence and avirulence in stem rust isolates useful for the identification of genes for resistance in wheat.

Richard A. Meronuck

Dr. Richard A. Meronuck joined our staff in July of 1973. He was born in Minot, North Dakota in 1941 and received his undergraduate degree and his M.S. from North Dakota State University in Fargo. He received his Ph.D. degree from the University of Minnesota. He and his wife, Rose, and their two children reside at 10234 Nightengale in Coon Rapids, Minnesota.

Dr. Meronuck divides his time between Extension work in grain storage and in the department and as a program coordinator in the Office of Special Programs. His extension responsibilities cover all aspects of grain storage pathology as well as the administration of any short courses in plant pathology that are offered through the Office of Special Programs. Dr. Meronuck is also responsible for the administration of short courses offered through the Office of Special Programs with the department of Horticulture.

Chester J. Mirocha

Dr. Chester J. Mirocha (professor) joined the staff in 1963 and is also a member of the Plant Physiology faculty. He was born in Wisconsin in 1930 and received his B.S. degree from Marquette University and Ph.D. degree from the University of California. He and his family reside at 1361 Midway Parkway, St. Paul, Minnesota 55108.

Dr. Mirocha teaches "Physiology of Host-Parasite Relationships" in addition to the "Physiology and Biochemistry of Fungi." His research interests lie in the physiology of fungi, mycotoxicology and grain storage areas. In the physiology of fungi, current research centers around the biosynthesis of zearalenone (F-2) by *Fusarium roseum* and the effect of this compound on the development of perithecia in *Fusarium*. Research in mycotoxicology centers around the effects on animals of products produced by *Fusarium* sp. and *Stachybotrys atra*, and analytical methods for the detection of mycotoxins. Detection and identification procedures using gas chromatography and mass spectrometry are used extensively. In the area of grain storage, Dr. Mirocha is concerned with the detection of volatile fungal products and the development of methods of detection for grain deterioration in early stages prior to detectable rise in temperatures.



M. B. Moore



P. G. Rothman



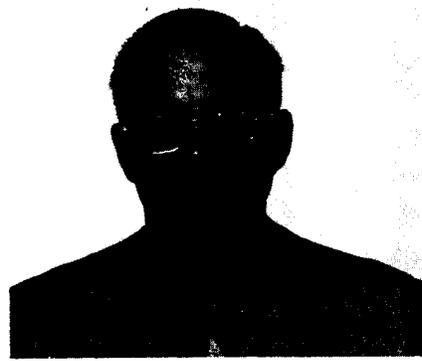
John Mizieko



J. B. Rowell



A. P. Roelfs



A. L. Schipper, Jr.

Matthew B. Moore

Professor Emeritus Matthew B. Moore joined the staff in 1929. He was born in 1905 in St. Paul, Minnesota and received his B.S. and M.S. degrees from the University of Minnesota. Professor Moore and his wife make their home at 793 West Arlington, St. Paul, Minnesota 55117.

The past four+ decades have been occupied by as much teaching as necessary, and as much research as teaching responsibilities would permit. Introductory "Plant Pathology" and "Plant Pathology for Advanced Students" as well as several other courses have processed 3000-4000 students, and a smaller number of excellent teaching assistants. Student success has closely followed a normal curve and may be unrelated to the teaching factor.

Research activities have been concerned with pathological phases of the oat breeding project which is cooperative with the Department of Agronomy and Plant Genetics. The major effort, with all oat diseases, but with crown rust in particular, has been to break away from the traditional major gene for virulence pitted against particular races of the pathogen and instead to set all of the resistance potential of the host against all or as much as available, of the potential virulence of the pathogen. This has met with some degree of success.

Other activities and interests have been the smuts of small grains, seed treatments of small grains, and the major and minor rewards and irritations of bird depredation control, and general supervision of the field research plots.

(written by Professor Moore)

John Mizieko

John Mizieko joined the staff in 1973 as a Research Specialist in Virology. He received his B.S. and M.S. degrees from Colorado State University. Mr. Mizieko is working on the virus diseases of plants in National Parks under the direction of Dr. E. E. Bantari. Prior to coming to Minnesota he had done work in the Plant Virology Laboratory and Colorado State.

Alan P. Roelfs

Dr. Alan P. Roelfs (assistant professor) is a Research Plant Pathologist, Cereal Rust Laboratory, Animal and Plant Health Inspection Service, Plant Protection and Quarantine Programs, USDA. He was born in Stockton, Kansas in 1936 and received his B.S. and M.S. from Kansas State University and Ph.D. from the University of Minnesota. He joined the department in 1971 and he and his family make their home at 1902 Walnut, St. Paul, Minnesota 55113.

Dr. Roelfs interests and responsibilities center around the nation-wide cereal rust epidemiology, spore trapping, field surveys and race surveys of wheat and oat stem rust. In addition, he does work on disease losses, barberry testing and the distribution of resistant genes to wheat stem rust.

Paul G. Rothman

Dr. Paul G. Rothman (assistant professor) is a Research Plant Pathologist, Cereal Rust Laboratory, ARS-USDA. He was born in Detroit, Michigan, in 1923 and received his B.S. and M.S. from Michigan State University and Ph.D. from the University of Illinois. The Rothmans make their home at 1455 Chelmsford St., St. Paul, Minnesota 55108.

Research responsibilities deal with oat stem rust *Puccinia graminis avenae* including cooperative work with APHIS in the identification of races occurring yearly in North America. Emphasis in research centers on the search for sources of resistance to the new races of oat stem rust in the related *Avenae* spp. and the identification of minor or modifying genes to augment the usefulness of the few major genes presently used as sources of resistance. The use of field resistance and tolerance as a method of control providing a broader base of resistance is also under study.

John B. Rowell

Dr. John B. Rowell (professor) is a Research Plant Pathologist, Research Leader, with the Cereal Rust Laboratory, USDA, ARS, NCR, St. Paul, and has held his staff appointment since 1949. He was born in Pawtucket, Rhode Island in 1918. He received his B.S. from the University of Rhode Island and Ph.D. from the University of Minnesota. He, his wife Alice, and family make their home at 1963 Eustis Street, St. Paul, Minnesota 55113.

Dr. Rowell's past research has been on the nature of defense of *Zea mays* to *P. graminis*, rain disposition of primary inoculum of *P. graminis*, and the general epidemiology of wheat stem rusts. He has also done work on genetic models for physiologic studies of resistance to stem rust, systemic properties of nickel in control of stem rust, the physiology of the infection process, establishment of parasitism, research on oils as carriers of rust inoculum, and the genetics of corn smut. Current research interests center on the essential properties required of systemic chemicals to be effective as seed or soil treatments.

The Cereal Rust Laboratory is the national center for research on the stem rusts of small grains. As Research Leader of this facility, Dr. Rowell has the responsibility for direction and supervision of the research unit of five scientists. Their investigations include epidemiological, pathological, physiological, and ecological studies of *P. graminis* and other obligate parasites.

Arthur L. Schipper, Jr.

Dr. Arthur L. Schipper, Jr. (assistant professor) is the Principal Plant Physiologist at the North Central Forest Experiment Station, Forest Service-USDA, and has held a staff appointment since 1968. He was born in 1940 in Bryan, Texas and received his B.S. from the University of the South, M.S. and Ph.D. from the University of Minnesota. Dr. Schipper and his family reside at 2141 North Avon, Roseville, Minnesota 55113.

Dr. Schipper has a wide range of interests in the physiology of disease situations and has worked, to a large extent, on carbohydrate metabolism in relation to disease. His current research centers on the physiology of parasitism of forest tree cankers. His principal efforts have been on the physiology of *Hypoxylon mammatum* canker of trembling aspens.



D. D. Skilling



R. D. Wilcoxson



E. C. Stakman



F. A. Wood



W. C. Stienstra



R. J. Zeyen

Darroll D. Skilling

Dr. Darroll D. Skilling (assistant professor) is the Principal Plant Pathologist, North Central Forest Experiment Station, USDA-Forest Service and joined the staff in 1969. He was born in Carson City, Michigan in 1931 and received his B.S. and M.S. from the University of Michigan and his Ph.D. from the University of Minnesota. Dr. Skilling and his family make their home at 1937 Rosedale Drive, St. Paul, Minnesota.

Dr. Skilling's research responsibilities are to disease problems of the conifer forests. Major emphasis has been on diseases of nursery stock and of newly established plantations. In recent years this work has been concentrated on needlecast diseases and diebacks. Major projects are *Scleroderris* canker on red pine, *Scleroderris lagerbergii*; *Lophoderium* needlecast on Scotch and red pines in nurseries and plantations caused by *Lophoderium pinastri*; brown spot needle disease of Scotch pine Christmas trees, *Scirrhia acicola*; *Rhizosphaera* needlecast on blue spruce caused by *Rhizosphaera kalkhoffii* and red pine shoot blight, causal organism, *Sirococcus strobilinus*.

Elvin C. Stakman

Professor Emeritus Elvin C. Stakman holds the first Ph.D. awarded in Plant Pathology at the University of Minnesota and has been on the staff since July 1, 1909. He was born in Algoma, Wisconsin in 1885 and in addition to receiving his B.S., M.S. and Ph.D. from the University of Minnesota he had been awarded honorary degrees from: Halle (Germany), Yale, Rhode Island, Wisconsin, Minnesota, and Cambridge (England). Dr. Stakman lives at 1411 Hythe St., St. Paul, Minnesota 55108.

Professor Stakman maintains consultantships with the Rockefeller Foundation as well as an active writing program. He may be found, on most days, in his office on the third floor of the Plant Pathology Building. Dr. Stakman actively participates in departmental functions, and has been most generous in sharing his time and talents with graduate students and staff. Despite his multitude of involvements, Dr. Stakman finds time for his famous informal discussions with students, which have contributed so much to so many over the years.

Ward C. Stienstra

Dr. Ward C. Stienstra (assistant professor) joined the staff in 1970. He was born in Holland, Michigan in 1941 and received his undergraduate degree from Calvin College and his M.S. and Ph.D. from Michigan State University. He and his wife, Myrna, and their children reside at 6035 McKinley St. in Fridley, Minnesota.

Dr. Stienstra divides his time between extension work and research, but recently has been involved in planning the "Plant Disease Diagnosis" course for undergraduate students. His extension responsibilities cover turf diseases, trees and ornamentals in addition to supervision of the Plant Disease Clinic. He is the department's representative on the Urban Horticultural Project in addition to having many active cooperative projects with the Department of Horticulture. Dr. Stienstra's research centers around diseases of turfgrasses and their control, and disease control of ornamental plants. His cooperative projects have also involved the production of disease-free mum varieties.

Roy D. Wilcoxson

Dr. Roy D. Wilcoxson (professor) joined the staff in 1957. He was born in Columbia, Utah in 1926 and received his B.S. from Utah State University and M.S. and Ph.D. from the University of Minnesota. Dr. Wilcoxson and his family reside at 1491 Raymond Ave., St. Paul, Minnesota 55108.

Dr. Wilcoxson teaches "Ecology of Plant Pathogens," "Insects in Relation to Plant Disease" and is planning the course in "Plant Disease Diagnosis." Dr. Wilcoxson has studied the diseases of alfalfa, forage legumes and grasses, corn, and small grains. Factors influencing development of infection have received major attention because of the need to induce controlled epidemics on breeding materials. All research has been conducted in cooperation with plant breeders. Peripheral research interests have been in the physiology of plant pathogens, especially reproduction of fungi, and translocation in fungi, as well as electron microscopy of the alfalfa mosaic virus infection of alfalfa.

Dr. Wilcoxson is also responsible for International Programs and his major effort has been to work with students from Asia and Africa. During the past two years the development of plant pathology, breeding research, and teaching at the Hassan II Agronomic Institute, Rabat, Morocco has been a major effort.

Francis A. Wood

Dr. Francis A. Wood (professor), Head of Plant Pathology, joined the staff in 1972. He was born in Perryville, Missouri in 1932 and received his B.S. and M.S. degrees from the University of Missouri and his Ph.D. in 1961 from the University of Minnesota. Dr. Wood, his wife Dolores, and their seven children live at 1977 Ryan Ave. W., St. Paul, Minnesota 55113.

Dr. Wood is the fifth Head of the Department of Plant Pathology. From 1961 to 1972 he was associated with the Pennsylvania State University and served as a Professor in the Plant Pathology Department as well as Assistant Director of the Center for Air Environment Studies. Dr. Wood is a forest pathologist whose research interests include epidemiology, aerobiology and air pollution in addition to general plant pathology. He has taught various courses including, Forest Pathology, Epidemiology, Air Pollution Effects, and Pollution of Environmental Systems.

Richard J. Zeyen

Dr. Richard J. Zeyen (assistant professor) joined the staff in 1971. He was born in Mankato, Minnesota, in 1943 and received his B.S. and M.S. degrees from Mankato State College, Ph.D. from the University of Minnesota. His home address is 2281 Hillside Ave., St. Paul, Minnesota 55108.

Dr. Zeyen is in charge of the Cooperative Electron Microscopy Laboratory of the Minnesota Agricultural Experiment Station (Plant Pathology, Entomology, Fisheries and Wildlife, Agronomy, Soil Science, Horticulture, and Food Science). He has general research interests in cytology, histochemistry, histopathology, and specific interests in diagnostic virology and pathogen-tissue specificity. He has worked on various virus diseases including the oat blue dwarf virus, potato viruses, hydrangea ringspot virus; in addition to ultrastructural problems of bacterial toxemia, mycoplasma-phloem relationships and penetration of tissues by fungi.

Darryl L. Anderson — Grad Bio

Darryl L. Anderson was born in Omaha, Nebraska, in 1945 and received his B.S. in Forestry and M.S. in Plant Pathology from the University of Minnesota. Mr. Anderson is an Instructor in Forest Pathology and is a student under Dr. D. W. French. His research interests have centered around the biology of Hypoxyton mammatum canker of aspen, from ultrastructure to epidemiology. He has also done ultrastructural work on the effects of high altitude on mammalian nervous tissue.



Dereje Ashagari — Grad Bio

Dereje Ashagari was born in Memz, Ethiopia, in 1942 and received his B.S. from Haile Sellassie I University, and his M.S. from Oklahoma State University. Mr. Ashagari is on leave from his post as Lecturer at the College of Agriculture, Haile Sellassie I University and is sponsored by the Rockefeller Foundation. He has conducted research on yield loss and control measures on covered and loose smut of sorghum, on race identification of Puccinia graminis var. tritici, and on receptivity to infection by stem rusts of selected wheat varieties under field conditions.



Dale R. Bergdahl — Grad Bio

Dale R. Bergdahl was born in Minnesota in 1944 and received his B.S. in Forestry from the University of Minnesota. Mr. Bergdahl is a Junior Scientist and graduate student under Dr. D. W. French. His research interests center on Commandra rust of jack pine and general field research projects in forest pathology.



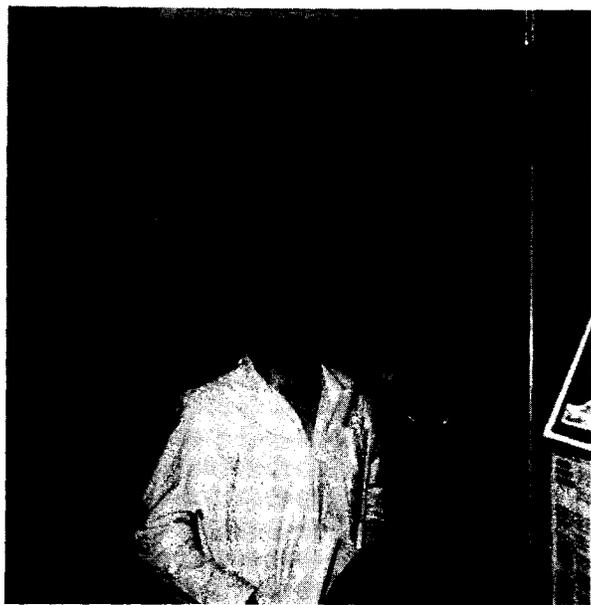
Robert V. Crow — Grad Bio

Robert V. Crow was born in Arlington, Minnesota, in 1940, and received his B.S. from St. John's University, B.S. and M.S. from Mankato State College. Mr. Crow is a graduate research assistant under Dr. D. MacDonald. His research centers around nematode diseases of plants; Meloidogyne hapla and Pratylenchus spp. as disease agents on strawberries in Minnesota.



William W. Donald – Grad Bio

William W. Donald was born in Lynbrook, New York, in 1950 and received his B.S. degree from the State University of New York at Stony Brook. Mr. Donald's research concerns the early detection of grain deterioration by monitoring and identification of fungal volatiles prior to the heating phase of deterioration. He also has an interest in the morphogenesis and physiology of insect induced plant galls. Mr. Donald is a graduate research assistant under Dr. C. J. Mirocha.



Gene T. P. Hsu – Grad Bio

Gene T. P. Hsu is a native of Taiwan and is a graduate student in virology, under Dr. E. E. Bantari. Mr. Hsu's research entails the genetics and transmission of the oat blue dwarf virus-aster yellows agents in the aster leafhopper. He has wide ranging interests in plant viruses and in general plant pathology.



Craig R. Grau – Grad Bio

Craig R. Grau was born in Manning, Iowa, in 1946 and received his B.S. and M.S. degrees from Iowa State University. Mr. Grau is a teaching assistant and a student under Dr. T. Kommedahl. His research interests are root rot complexes, especially in peas, and virus diseases of pea and bean plants. He is also interested in Sclerotinia spp. attacking field beans and soybeans.



Barry J. Jacobsen – Grad Bio

Barry J. Jacobsen was born in Racine, Wisconsin in 1947 and received his B.S. and M.S. degrees from the University of Wisconsin. Mr. Jacobsen is an Assistant Extension Plant Pathologist-Director of the Plant Disease Clinic, and a student of Dr. M. F. Kernkamp. He has done research on the resistance of radish to Aphaneomyces raphasi, and is currently working on the interaction between Meliodogyne hapla and Verticillium sp. in the Verticillium induced wilt disease of potato.



Bulent Kiral — Grad Bio

Bulent Kiral was born in Eskisehir, Turkey, in 1944 and received his B.S. from Atatirk University. Mr. Kiral is an AID-Academic Fellow and a student of Dr. J. B. Rowell. He is doing research on adult and seedling stem rust resistance in wheat. Mr. Kiral is on leave from the Agricultural Extension Service in the northwestern portion of Turkey.



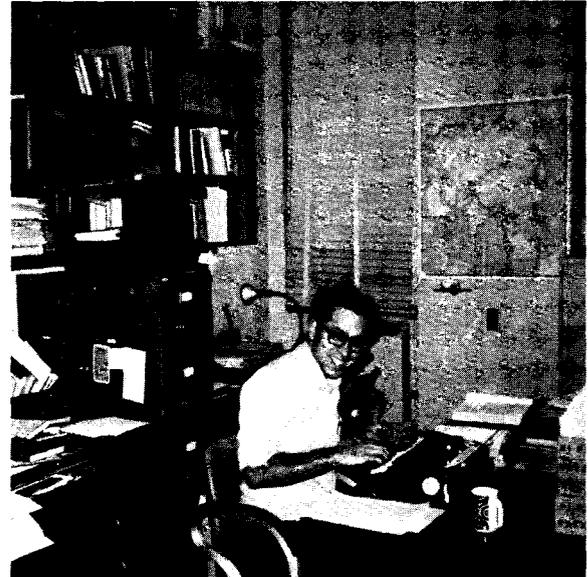
John A. Laurence — Grad Bio

John A. Laurence was born in Berea, Ohio, in 1949 and received his B.S. degree from the Pennsylvania State University. Mr. Laurence is a graduate research assistant under Dr. B. W. Kennedy. His interests range from seed borne bacterial diseases of soybean to the interactions of pollutants on trees. Current research stresses the population dynamics of bacterial pathogens on soybean seeds during germination.



Jeri J. Ooka — Grad Bio

Jeri J. Ooka was born in Oloo, Hawaii in 1945 and received his B.A. and M.S. from the University of Hawaii. Mr. Ooka is a graduate research assistant under Dr. Thor Kommedahl and is working on stalk and ear rots of corn, caused by Fusarium moniliformes. He is especially interested in the aerobiology of F. moniliformes.



Dickson J. Phiri — Grad Bio

Dickson J. Phiri was born in Rhodesia, South Africa and is working on his Ph.D. program under Dr. C. J. Mirocha. Mr. Phiri's research centers around the physiology of early stages of bean rust infections; primarily the induction of starch depletion prior to the beginning of actual fungal penetration of cells. His general interests are in the area of physiology of parasitism.

Douglas J. Sarojak

Douglas J. Sarojak was born in Bristol, Connecticut, in 1946 and received his B.S. and M.S. degrees from Oklahoma State University. Mr. Sarojak is a graduate research assistant under Dr. N. A. Anderson in the area of genetics of plant pathogens. His research centers on the resistance in alfalfa to crown rot caused by Rhizoctonia solani, and the pathogenicity of heterokaryons formed by the fungus.



Howard F. Schwartz — Grad Bio

Howard F. Schwartz, formerly a graduate research assistant under Professor Moore, is currently finishing his thesis writing on oat diseases while being at the University of Nebraska. His research interests range from crown rust of oats to fungal and bacterial plant pathogens in irrigation systems.



Elmer J. Schmidt — Grad Bio

Elmer L. Schmidt was born in Nacogdoches, Texas in 1946 and received his B.S. in Forestry at the University of Minnesota. Mr. Schmidt is a graduate research assistant under Dr. D. W. French and is working on forest product decay caused by biological agents.



Bryan L. Shearer — Grad Bio

Bryan L. Shearer was born in Sydney, New South Wales, Australia, in 1945, and received his B.S. from the University of Western Australia. Mr. Shearer is a graduate research assistant under Dr. R. D. Wilcoxson. His research concerns the ecology of plant pathogens and he has placed special emphasis on Septoria spp. parasitizing cereals. His current research concerns the population dynamics of several species of Septoria parasitizing wheat.



Larry L. Singleton — Grad Bio

Larry L. Singleton was born in Sapulpa, Oklahoma, in 1943 and received his B.S. and M.S. from Oklahoma State University. Mr. Singleton is an NDEA-Fellow and a student under Dr. Milton F. Kernkamp. His research activities have centered around cereal grains, and specifically, the evaluation of selected, nonspecific resistance characters of oat lines for reducing yield losses caused by Puccinia coronata var. avenae.



Bent Skovmand – Grad Bio

Bent Skovmand was born in Denmark in 1945 and received his B.S. and M.S. degrees from the University of Minnesota. Mr. Skovmand is a research fellow and student of Dr. R. D. Wilcoxson. His research interests lie in the diseases of wheat and barley. He is particularly involved with the inheritance of generalized resistance to stem rust of wheat.



Robert J. Slattery – Grad Bio

Robert J. Slattery was born in Wisconsin in 1944 and received his B.S. and M.S. degrees from the University of Wisconsin. Mr. Slattery, formerly a research assistant, is a student under Dr. C. Eide and is now with the Seed Potato Certification Program of the State of Minnesota. His research interests are in the area of potato and vegetable diseases, and he has conducted extensive studies on Verticillium sp. that parasitize potatoes.

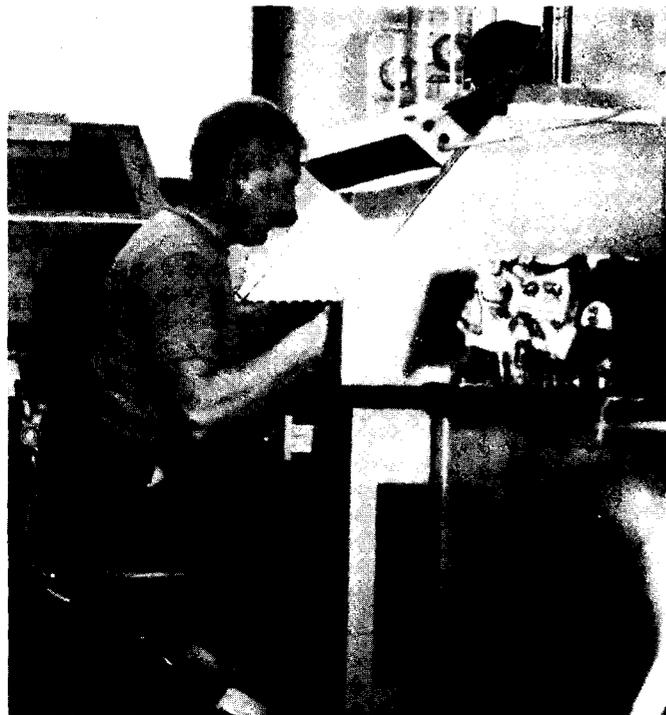
John A. Steele – Grad Bio

John A. Steele was born in Troy, Alabama, in 1947 and received his B.S. and M.S. degrees from Auburn University. Mr. Steele is a graduate research assistant and student under Dr. C. J. Mirocha. His research interests center on toxins produced by fungi, and have included production of Ochratoxin A, biosynthesis of F-2, and identification of tenuazonic acid. He also maintains an interest in developing computer software and computer programs for mass spectroscopy.



William H. Anderson – Grad Bio

William H. Anderson was born in Escanaba, Michigan, in 1933 and received his A.A. from North Park College, Chicago; B.S. and M.S. from Michigan State University. Mr. Anderson is a student of Dr. E. E. Bantari and is currently on leave from the University of Wisconsin, Oshkosh. His research interests center around malting barley improvement and specifically upon the head blight caused by Helminthosporium sp.



James R. Venette – Grad Bio

James R. Venette was born in Boulder, Colorado in 1945 and received his B.S. and M.S. degrees from the Colorado State University. Mr. Venette is a graduate research assistant under Dr. B. W. Kennedy. He is presently working on bacterial diseases of soybeans; loss evaluation and chemical control measures. He has also done work on potato tuber infections caused by Alternaria solani.



Gloria M. Warner – Grad Bio

Gloria M. Warner received her M.S. from the University of Minnesota and is a graduate student under Dr. D. W. French. She has worked extensively on the transmission of fungi by migratory birds. Her interests range from general mycology to general plant pathology. Mrs. Warner has, at various times, been both a research and teaching assistant.



Patrick J. Weicherding – Grad Bio

Patrick J. Weicherding was born in Sleepy Eye, Minnesota, in 1949 and received his B.S. in Forestry from the University of Minnesota. Mr. Weicherding is a teaching assistant (College of Forestry-Extension Forestry) and a student of Dr. D. W. French. His research in plant pathology concerns the economics of various treatment programs for Dutch elm disease in municipalities within the state of Minnesota.

Carol Windrels – Grad Bio

Carol Windrels was born in Long Prairie, Minnesota, in 1948 and received her B.A. from St. Cloud State College and an M.S. from the University of Minnesota. Ms. Windrels is a graduate research assistant for Dr. T. Kommedahl. Her research interests are in the ecology of plant pathogens and she has studied population dynamics of *Fusarium* species in cultivated soils (corn) and prairie soils. Current research objectives center on the effect of animal wastes on root rot, stalk rot and foliar diseases of corn.



James C. Wolf – Grad Bio

James C. Wolf was born in Newark, New Jersey, in 1946 and received his B.S. from the Pennsylvania State University and an M.S. from the University of Minnesota. Mr. Wolf is a graduate research assistant under Dr. C. J. Mirocha. His research interest concerns the fungal sex hormone, zearalene (F-2) in relation to sexual reproduction in *Fusarium roseum*. His primary interest in current research stresses the biosynthesis, and inhibition of synthesis, in the fungal life cycle.



Supporting Personnel

The heart of any academic department can be found in the supporting personnel. The quality of these individuals, who give unselfishly of their time and talents, determine the tone and pace of the department. We are indeed fortunate to have the secretarial talents of Mary Homlund, Joanne Dorsher, Pamela Gans, Judy Carey, and our former head secretary, the recently retired Grace Aschenbach.

Technical help and field supervision have long been a strong point in our department, thanks to the efforts of Orville Bielenberg, Leonard Sargent, Art Stark, Dave Lang, and Roberta Brehmer. These people along with others such as David Long of the Cereal Rust Laboratory, Jerry Behrens, Sadanand Pathre and Beth Schauerhamer of the Mycotoxicology Laboratory and Lois Johnson of the Electron Microscopy Laboratory provide the technical skill and expertise necessary to make research programs successful.

Pamela Gans



Mary Homlund



Judy Carey

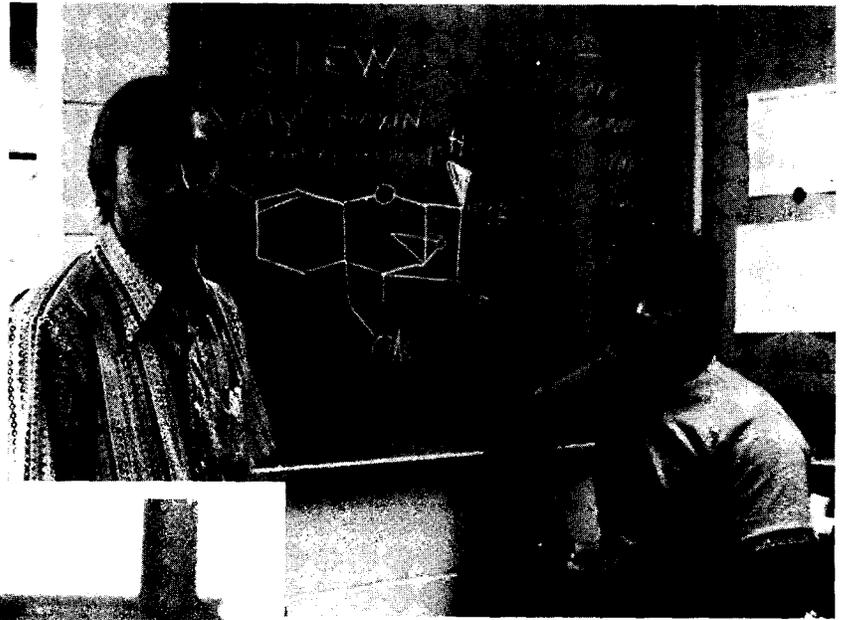


Joanne Dorsher



Grace Aschenbach

Orville Bielenberg



Jerry Behrens

Sadanand Pathre

David Long



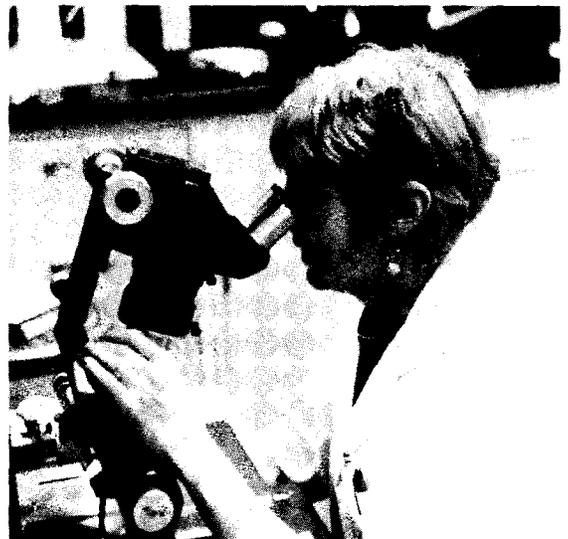
Leonard Sargent



David Lang



Roberta Brehmer



Lois Johnson

M.S. Degrees Granted in the Division of Plant Pathology and Botany

Name	Year	Thesis subject
1. Jehle, R. A.	1910	Life history study of <u>Sclerotinia fructigena</u> (Persoon) Schroeter.
2. Nisbit, Jane	1910	A study in the identification of quack grass.
3. Stakman, E. C. (M.A.)	1910	A study in cereal smuts in Minnesota.
4. Tolaas, A. G.	1912	Bacteriosis of cultivated mushrooms.
5. Piemeisel, F. J.	1915	Life history and parasitism of <u>Ustilago zeas</u> (Becker) Unger.
6. Rose, R. C.	1915	A fruit spot of the wealthy apple.
7. Schneiderhan, F. J.	1915	A histological investigation of the infection phenomena of loose smuts of wheat and barley.
*8. Levine, M. N.	1916	The effect of ecological factors on the morphology and physiology of <u>Puccinia graminis</u> and <u>P. phleipratensis</u> urediniospores. (Not in thesis file).
9. Hoerner, G. R.	1918	Infection capabilities of crown rust of oats.
10. Leach, J. G.	1918	The parasitism of <u>Puccinia graminis tritici</u> Erikss. and Henn. and <u>P. graminis tritici-compacti</u> Stak. and Piem.
11. MacInnes, Jean	1919	Wheat scab.
12. Fogelman, Raymond	1920	The host range of <u>Fusarium</u> species causing wheat scab.
13. Puttick, G. F.	1920	The reaction of the F ₂ generation of a cross between a common and a durum wheat to two biologic forms of <u>Puccinia graminis tritici</u> .
14. Bailey, D. L.	1921	Sunflower rust.
15. Brierley, Philip	1922	Some factors affecting the development of the blackleg disease of the Irish potato.
16. Christensen, J. J.	1922	Studies on the parasitism of <u>Helminthosporium sativum</u> P. K. and B.
17. Lambert, E. B.	1922	The effect of chemical dusts on cereal smuts.
18. Noble, R. J.	1922	Studies on flag smut of wheat.
19. Sanford, G. B.	1923	The relation of soil factors to the development of potato scab.
20. Cotter, R. U.	1924	Specialization of <u>Puccinia graminis tritici</u> in the Hordeae.
21. Flor, H. H.	1924	Investigations on the control of covered smuts of small grains.
22. Hart, Helen	1924	Factors affecting the development of <u>Melampsora lini</u> (Pers.) Desm.
23. Melander, L. W.	1924	Studies on the relation of Berberis species to <u>Puccinia graminis</u> Pers.
24. Nelson, R. M.	1924	A study of the rots of coniferous timber under varying degrees of artificial shade.
25. Broadfoot, W. C.	1925	Studies on the parasitism of <u>Fusarium lini</u> Bolley.
26. Craigie, J. H.	1925	The liberation, germination, and vitality of the aeciospores of <u>Puccinia graminis</u> .

*Missing from files (checked 10/19/38 and 8/25/64)

Name	Year	Thesis subject
27. Hynes, H. J.	1925	The inheritance of resistance and susceptibility to <u>Puccinia graminis tritici</u> in a cross between Federation wheat and Khapli Emmer.
28. Johnson, T.	1925	Factors affecting the growth, reproduction, and pathogenicity of <u>Helminthosporium gramineum</u> Rab.
29. Rodenhiser, H. A.	1925	Experiments on the control of smuts of small grains.
30. Schall, L. A.	1925	Studies on the parasitism of orange leaf rust of wheat (<u>Puccinia triticina</u>).
31. Greaney, F. J.	1926	Root and foot rots of wheat in Manitoba.
32. Peterson, P. D.	1926	Reactions of selfed lines of corn to root rots caused by <u>Gibberella saubinettii</u> (Sacc.) Mont. and <u>Fusarium moniliforme</u> Sheldon.
33. Jackson, L. W. R.	1927	A study of the heart rot of aspen (<u>Populus tremuloides</u> Michx.) in Minnesota.
34. Wallace, J. M.	1927	Physiologic specialization as a factor in the epidemiology of <u>Puccinia graminis tritici</u> Erikss. and Henn.
35. Anderson, C. George	1928	The value of disinfecting seed of sweet corn.
36. Lindgren, R. M.	1928	The effect of wood rotting fungi on some mechanical properties of wood.
37. Parson, H. E.	1928	Physiologic specialization in <u>Puccinia coronata avenae</u> .
38. Bamberg, R. H.	1929	A bacterium antibiotic to <u>Ustilago zaeae</u> (Beckm.) Unger.
39. Eide, C. J.	1929	A study of the physiology of different strains of <u>Ustilago zaeae</u> .
40. Holton, C. S.	1929	Studies in the genetics and physiology of <u>Ustilago avenae</u> and <u>Ustilago levis</u> .
41. Person, Lee H.	1929	Studies in the control of cereal rusts by dusting with sulphur.
42. Peturson, Bjorn	1929	Physiologic specialization in <u>Puccinia coronata avenae</u> .
43. Allison, Clyde C.	1930	Sex relationships in some of the cereal smuts.
44. Christensen, Clyde M.	1930	Physiologic specialization and saltation in <u>Pestalozzia funerea</u> Desm.
45. Hines, Lee	1930	Physiologic specialization of <u>Puccinia graminis tritici</u> Erikss. and Henn. in relation to the development of epidemics of stem rust on wheat.
46. Kaufert, Frank H.	1930	Experiments on the control of damping-off of conifers.
47. Shumway, C. P.	1931	Studies in the cytology and genetics of <u>Sorosporium reilianum</u> (Kuhn) Mc Alpine.
48. Walter, J. M.	1931	Some factors influencing infection of corn by <u>Ustilago zaeae</u> .
49. Kamat, M. N.	1932	Some factors influencing the pathogenicity of <u>Puccinia sorghi</u> (Schw.).
50. Ukkelberg, H. G.	1932	Some factors affecting the dissemination of <u>Puccinia graminis</u> Pers.
51. Churchward, J. G.	1933 (June)	Pathologic and genetic studies on <u>Tilletia tritici</u> (Bjerk.) Winter.
52. Graham, T. W.	1933 (June)	The parasitism of <u>Helminthosporium gramineum</u> Rab.

Name	Year	Thesis subject
53. Evans, Milton		
54. Hafstad, G. E.	1933 (June)	The probable relation of delayed segregation to variation in <u>Ustilago zeae</u> (Berkm.) Ung.
55. Hubert, Kurt	1933 (December)	Some studies on <u>Ustilago nuda</u> (Jens.) Kell. and Sw. <u>Ustilago tritici</u> (Pers.) Rostr., the loose smuts of barley and wheat, and on an intermediate type of loose smut of barley.
56. Haglund, Frances E.	1933 (December)	The microflora of sweet corn seed in relation to quality.
57. Moore, M. B.	1934	Studies in the genetics and cytology of <u>Ustilago zeae</u> (Beckm.) Ung.



58. Darling, Henry M.	1935 (June)	A study of scab resistance in the potato.
59. Syed, Vaheeduddin	1935 (December)	Hybridization and segregation in crosses between <u>Sphacelotheca sorghi</u> and <u>Sorosporium reilianum</u> .
60. Ling, Lee	1936 (June)	Factors affecting the development of <u>Urocystis occulta</u> (Wallr.) Rab.
61. Wang, Chi Shi	1936 (June)	Development and cytology of <u>Ustilago crameri</u> Kcke.
62. Gemmell, Alan R.	1937 (June)	A study on the interaction of two fruit rotting fungi.
63. Kernkamp, M. F.	1938 (June)	The relative effect of genetic and environmental factors on growth types of <u>Ustilago zeae</u> .
64. Borders, Huey I.	1938 (December)	A study of bacteria pathogenic to cereal rusts.
65. Laskaris, Thomas	1938 (December)	Studies on peridial color and lysis in <u>Sphacelotheca sorghi</u> (Link) Clinton.
66. King, Thomas H.	1939 (March)	Studies on factors affecting the growth and pathogenicity of <u>Fomes lignosus</u> Klotzsch.

Name	Year	Thesis subject
67. Hanson, Earle W.	1939 (June)	Factors affecting the development and virulence of <u>Fomes lignosus</u> .
68. Cherewick, W. J.	1940 (March)	Rhizoctonia root-rot of sweet clover.
69. Chen, Shan-Ming	1940 (December)	Induced variation in <u>Rhizoctonia solani</u> .
70. deZeeuw, D. J.	1940	Pathological and cultural differences in isolates of <u>Rhizoctonia solani</u> Kuhn.
71. Preston, D. A.	1940 (December)	Seasonal trends of air borne fungus spores in the vicinity of St. Paul, Minnesota.
72. Vaughn, J. R.	1940 (December)	Factors affecting the nature of resistance of potatoes to scab.
73. Downie, A. R.	1941 (March)	Root rot and damping off of oats.
74. Borlaug, N. E.	1941 (March)	Red stains of box elder trees.
75. Lachmund, H. G.	1941 (August)	Observations relative to the behavior and control of white pine blister rust in California.
76. Lorenz, R. C.	1942 (August)	Discolorations and decay resulting from increment borings in hardwood.
77. Andrews, E. A.	1943 (March)	Root rots and seedling blight of grasses in Minnesota.
78. Thomas, W. D.	1943 (March)	Stability and variation in six physiologic races of <u>Actinomyces scabies</u> .
79. Felix, Pierre-Louis	1944 (March)	Plan B without thesis.
80. Rodriguez, Jose	1945 (June)	Effect of light intensity and temperature on the infection types of some physiologic races of <u>Puccinia graminis tritici</u> on certain wheat varieties and the relation to wheat production in southern Mexico.
81. Hsu, Nancy Ju-Shen (Mrs. Ling)	1946 (June)	Studies on bacterial soft rot of potato tubers.
82. Robles, Leonel H.	1946 (August)	The pathogenicity of <u>Helminthosporium</u> spp. on corn.
83. Kotila, Martha A.	1946 (December)	Studies on the potato late blight fungus, <u>Phytophthora infestans</u> (Mont.) de Bary.
84. Ortega, C. Benjamin	1946 (December)	Physiologic specialization in <u>Rhizoctonia</u> sp. on vegetable crops.
85. Teller, Morris N.	1946 (September)	A study of variation in Sclerotinias isolated from stone fruits.
86. Kommedahl, Thor	1947 (June)	Studies on late wilt of flax.
87. Daly, Joseph M.	1947 (December)	Utilization of nutrients by rust fungi.
88. Felix, Luis C.	1948 (March)	A study of differences in seed performance of Mexican basic types of corn.
89. Barbosa, Carlos G.	1948 (December)	A study of Mexican leaf rust of wheat made at the University of Minnesota.
90. Boosalis, M. G.	1948	Studies on the parasitism of <u>Rhizoctonia solani</u> Kuhn on soy-beans.
91. Munnecke, D. E.	1949 (June)	The pathogenicity of certain haploid monosporidial isolates of <u>Ustilago zeae</u> (Beckm.) Ung.
92. Ibrahim, I. A.	1949 (June)	The effect of some environmental conditions and chemicals on the development of races 2, 6, 7 and 8 of <u>Puccinia graminis avenae</u> .

Name	Year	Thesis subject
93. Lu, Shih-I	1950 (March)	Cultural characters of <u>Ustilago zeae</u> Mutants.
94. French, David W.	1949 (August)	The synergistic relationship of pentachlorophenol, copper naphthenate, and phenyl mercury loeate.
95. Gibler, John W.	1950 (June)	Studies on the pathogenicity and control of <u>Rhizoctonia solani</u> on soybeans.
96. Hsia, Yu Tien	1950 (June)	Effects of 2,4-D on <u>Helminthosporium sativum</u> .
97. Tveit, Martin T.	1950 (June)	A study of root rot and seedling blight of oats.
98. Shurtleff, Malcolm C.	1950 (July)	Effects of rusts on water loss in wheat and oats.
99. Bird, Julio P.	1950 (December)	The fungi associated with pepper wilt in southern Minnesota.
100. Campos, Alfredo	1950 (August)	Resistance to stem rust in Mexican wheat and hybrids.
101. Henderson, Lavanial	1950 (December)	Plan B without thesis.
102. Wallace, H. A. H.	1951 (June)	A rare seed-borne fungus disease of wheat.
103. del Prado, Frank	1951 (August)	A study of the micro-flora of rice seed and the relation of these organisms to quality and storage deterioration of rice.
104. Grahek, Theodore A.	1951 (August)	Studies on the relation of fungi to the deterioration of stored wheat.
105. Melendez, Angelita	1951 (August)	Reactions of Mexican bean varieties to races Alpha, Beta and Gamma of <u>Colletotrichum lindemuthianum</u> (Sacc. and Magn.) Bri. and Cav., and determination of the races of the fungus which are native to Mexico.
106. LeTourneau, Duane	1951 (December)	A colorimetric method for the quantitative determination of 2,4-Dichlorophenoxyacetic acid.
107. Fridlund, Paul R.	1952 (June)	Physiologic specialization and adaptation in <u>Phytophthora infestans</u> (Mont.) de Bary.
108. Nelson, Richard R.	1952 (June)	Factors affecting susceptibility of potatoes to bacterial soft rot.
109. Cardenosa, Ricardo	1952 (August)	Pathogenicity of Helminthosporium of corn.
110. Norquist, Myrtle A.	1952 (December)	Mutation in <u>Penicillium roquefortithom</u> .
111. Hemerick, Glen A.	1952 (December)	The relation of <u>Ascochyta imperfecta</u> to alfalfa seed production in Minnesota.
112. Postigo, Rosendo	1952 (December)	The pathogenic effect of certain races of <u>Puccinia graminis tritici</u> on resistant varieties of wheat.
113. Murillo, Gabriel P.	1952 (December)	Studies on root rots of wheats in Mexico.
114. Papavizas, George C.	1953 (June)	Aggressiveness and pathogenicity of certain physiologic races of <u>Puccinia graminis tritici</u> Erikss. and Henn.
115. Schneider, Charles L.	1953 (June)	A study of some factors affecting the development of root rot of barley.
116. Thurston, H. David	1953 (June)	Physiologic specialization in <u>Phytophthora infestans</u> (Mont.) de Bary.
117. Keplinger, Joseph A.	1953 (July)	Plan B without thesis.
118. Venkataram, C. S.	1953 (August)	Plan B without thesis.

Name	Year	Thesis subject
119. Drescher, Robert F.	1953 (August)	Experimental plugging of felts used in the paper industry.
120. Tuite, John F.	1953 (December)	The mold flora of barley seed in relation to the deterioration of stored barley.
121. Reilly, Joseph J.	1954 (March)	Corn seedling diseases and their relationship to stalk rot.
122. Konerza, Riley D.	1953 (December)	Plan B without thesis.
123. Klug, Robert J.	1954 (March)	Plan B without thesis.
124. Campbell, Robert J.	1954 (June)	Studies on the biology and epidemiology of <u>Endoconidiophora fagacearum</u> Bretz., the cause of oak wilt.
125. Castronovo, A. J. P.	1954 (June)	Significance of variation in <u>Phytophthora infestans</u> .
126. Hayden, Eugene B., Jr.	1954 (June)	Races and biotypes of <u>Puccinia graminis tritici</u> Erikss. and Henn. in relation to spring wheat improvement.
127. Ali, Syed Bazley	1954 (August)	Plan B without thesis.
128. Rodriguez, A. E.	1954 (December)	Seedling blight of corn as affected by treatments of the parent plants.
129. Mohamed, Hosni A.	1955 (March)	Variability in the pathogenicity of races 49 and 139 of <u>Puccinia graminis tritici</u> Erikss. and Henn.
130. Ochoa, Carlos N.	1955 (March)	Reaction of some South American species of <u>Solanum</u> (<u>Tuberarium</u>) to different races of <u>Phytophthora infestans</u> .
131. Schroeder, Harry W.	1954 (March)	Physiologic variation in cultural races of <u>Diplodia zeae</u> .
132. Olien, Charles R.	1955 (June)	Mode of action of organic mercury seed treatments.
133. Olmsted, Donald S.	1955 (June)	The value of some recently introduced fungicide as treatments for potato seed pieces.
134. Wilcoxson, Roy D.	1955 (June)	Morphologic studies on stem rust resistance.
135. Wood, Elsa J.	1955 (March)	Mutation for growth types in <u>Ustilago zeae</u> (Beckm.) Unger.
136. Castano, J. J.	1955 (August)	Nutritional factors influencing development and pathogenicity of certain races of <u>Rhizoctonia solani</u> .
137. Smith, David H.	1955 (July)	Evaluation of certain chemical compounds for the control of wheat stem rust.
138. Ellingboe, Albert H.	1955 (December)	A comparative study of the Ascochyta and Phoma black stem fungi on forage legumes in Minnesota.
139. Failles, George D.	1956 (June)	The effect of calcium ions and pH on damping off of soybeans by <u>Rhizoctonia solani</u> Kuhn.
140. Knutson, Kenneth W.	1956 (December)	A study of parasitic aggressiveness in <u>Phytophthora infestans</u> .
141. Anderson, Neil A.	1957 (June)	Studies on the epidemiology and control of the oak wilt fungus, <u>Endoconidiophora fagacearum</u> Bretz.
142. de la Isla, Ms. Lourdes	1957 (June)	Variability in the species of <u>Stemphylium</u> on red clover and alfalfa.

Name	Year	Thesis subject
143. Flores, Marco A.	1957 (March)	Biology and control of coffee stem canker caused by <i>Nectria</i> canker.
144. Frederiksen, Richard A.	1957 (July)	The nature and causes of boll blight of flax.
145. Goth, Robert W.	1957 (June)	Behavior of interspecific crosses in the genus <i>Sphagelotheca</i> .
146. Lambert, Roger G.	1957 (August)	The effect of certain temperature treatments on fruit development in <i>Pisum sativum</i> .
147. Natour, Rashad M.	1957 (June)	Some biological properties of extracts from wheat stem rust (<i>Puccinia graminis</i> var. <i>tritici</i> Erikss. and Henn.) that are toxic to wheat.
148. Threinen, James	1957 (August)	The use of irradiation in studying the life history and pathogenicity of two varieties of <i>Diaporthe phaseolorum</i> .
149. Wyllie, Thomas D.	1957 (March)	The effect of time, temperature, moisture content, and molds on the deterioration of wheat seed in storage.
150. Anderson, Roger V.	1957 (December)	The effects of ionizing radiations on the host-parasite relationships of stem rust of wheat.
151. Chung, Hoo Sup	1957 (August)	Antagonistic effects of the microflora of barley leaves on the pathogenicity of <i>Helminthosporium sativum</i> .
152. Walker, Kenneth R.	1957 (August)	The influence of insecticides on the effectiveness of fungicides as protectant seed treatments for corn.
153. Bissonnette, Howard L.	1958 (August)	Physiologic specialization in <i>Aphanomyces euteiches</i> .
154. Chen, Der-Fen	1958 (June)	Some biological effects on <i>Eremothecium ashbyii</i> by polonium-210 and ultraviolet radiations.
155. Christensen, Edgar V.	1958 (July)	Some factors affecting the development of <i>Rhynchosporium secalis</i> on bromegrass.
156. Fuentes, Santiago F.	1958 (June)	Observations on the survival of three pathogenic bacteria of tomato.
157. Haglund, William A.	1958 (June)	Nematodes associated with peas in Minnesota and their effect on the development of root rot and yield.
158. Kotheimer, John B.	1958 (December)	The microflora of barley kernels in relation to staining and discoloration.
159. Ohman, John H.	1958 (August)	Studies on the pathological deterioration of oak wilt-killed red oaks and control of the disease.
160. Covey, Ronald P., Jr.	1959 (June)	Studies on the seedling blight of corn caused by <i>Fusarium graminearum</i> .
161. Line, Roland F.	1959 (June)	A study of potato seed piece decay.
162. Intrama, Siriphong	1959 (August)	The <i>Curvularia</i> disease of gladiolus.
163. Castillo, Bernardo S.	1959 (March)	The mechanical transmission of strawberry viruses to other herbaceous plants.
164. Banttari, Ernest E.	1959 (December)	The cause and transmission of blue dwarf of oats and two kinds of dwarfing in barley.
165. Lutey, Richard W.	1959 (December)	Studies on <i>Septoria</i> leaf blotch—with special reference to epidemiology and the production of artificial epidemics.

Name	Year	Thesis subject
166. Elliot, Arthur M.	1960 (March)	Studies on the epidemiology of certain races of <u>Puccinia graminis tritici</u> .
167. Bean, George A.	1960 (June)	Effect of environmental factors on the development of <u>Phoma herbarum</u> var. <u>medicaginis</u> on alfalfa and red clover.
168. Penner, Donald	1960 (June)	Studies on the absorption and translocation of iron and phosphorus in <u>Glycine max</u> .
169. Andersen, Arne S.	1960 (July)	The duration of effectiveness of activity of systemic fungicides in wheat seedlings against stem rust.
170. Gustafson, Paul A.	1960 (August)	Plan B without thesis.
171. Miller, Charles W.	1960 (August)	Ecological variability in stem rust reactions of Kubanka wheat.
172. Schleder, Eric G.	1960 (July)	The relation of certain nematode species to the development of <u>Fusarium wilt</u> of flax.
173. Tumbleson, Myron E.	1960 (December)	Reproductive potential of <u>Cyperus esculentus</u> L.
174. Cho, Yong Sup	1961 (August)	Factors affecting sporulation of <u>Aphanomyces euteiches</u> Drechs.
175. Fields, Richard W.	1961 (March)	Studies on the deterioration of stored pea seed by <u>Aspergillus</u> species.
176. Follstad, Merle N.	1961 (June)	The microflora of barley in the field, during malting, and in storage.
177. Gerwitz, David L.	1961 (June)	Some metabolic changes in wheat due to stem rust infection at different temperatures.
178. Mallik, Muhammad A. B.	1961 (June)	Influence of soil factors on seedling blight of corn.
179. Merrill, William, Jr.	1961 (June)	Investigations on the evaluation of preservative treatment of rigid insulated materials.
180. von Ruden, Dale A.	1961 (December)	<u>Fragaria virginiana</u> — an index host for viruses of strawberry.
181. Welty, Ronald E.	1961 (December)	Moisture content, germination percentage, germ damage, and storage fungi in corn stored four years in a commercial bin, and factors affecting the growth of <u>Aspergillus restrictus</u> .
182. Davila, Edmundo	1961 (June)	Late blight infection of potato tubers.
183. Littlefield, Larry J.	1962 (March)	Histological and physiological studies on corn stalk rot disease.
184. Lopez, Luis Cesar	1962 (March)	Factors affecting invasion of stored seed of sorghum and beans by fungi.
185. Carlson, Lauren E.	1962 (March)	Relation of microorganisms to the quality of pea seed.
186. Abrahamsen, Mary	1962 (July)	Plant tissue culture studies with hosts of obligately parasitic fungi.
187. Shimabukuro, Richard H.	1962 (June)	The absorption and translocation of 3-amino-1, 2,4-triazole in bean (<u>Phaseolus vulgaris</u>).
188. Ahlgren, George E.	1962 (June)	The distribution of phosphorus in soybean and the interspecific competition for phosphorus between soybean and barnyard grass.
189. La, Yong Joon	1962 (June)	Studies on variability and pathogenicity of <u>Cercospora beticola</u> Sacc. on sugar beet.
190. Bugbee, William M.	1962 (June)	Studies on the epidemiology of <u>Cylindrocladium scoparium</u> Morgan.

Name	Year	Thesis subject
191. Schroeder, David B.	1962 (June)	Morphology and wood destroying properties of <u>Asterostroma cervicolor</u> (Berk. and Curtis) Masee and <u>Corticium radiosum</u> (Fr.) Fr.
192. Shen, Josephine M.	1962 (July)	Studies on the nuclei of the wheat stem rust fungus.
193. Ashraf, Mohammad	1962 (August)	Studies on the biology of <u>Cochliosolus sativus</u> (Ito and Kurib.) Drechsler ex Dastur, the perfect stage of <u>Helminthosporium sativum</u> P. K. and B.
194. Kraft, John M.	1962 (August)	Factors affecting seed set and storage of flax.
195. Hadidi, Ahmed L.	1962 (August)	The effect of tannic acid and other substances on the infectivity of potato virus X.
196. Saari, Eugene E.	1962 (December)	Pathogenicity of <u>Puccinia coronata avenae</u> on <u>avena</u> spp.
197. Borich, Patrick J.	1963 (March)	Comparative studies with single-urediospore lines of Races 15B and 56 of <u>Puccinia graminis tritici</u> .
198. French, Edward R.	1963 (December)	Investigations on root rot of soybeans, with emphasis on <u>Fusarium oxysporum</u> as the causative agent.
199. Asare-Nyako, Andrew	1963 (August)	Etiology of the northern leaf blight of corn.
200. Norgren, Robert L.	1963 (June)	Host range, life cycle, and factors affecting reproduction of <u>Aphelenchus avenae</u> Bastian, 1865.
201. Morton, Harrison L.	1964 (March)	The establishment of wood-rotting fungi by spores and mycelium.
202. El-Kandelgy, Sayed M.	1964 (March)	Mechanical and insect transmission of red clover vein-mosaic virus.
203. Halloin, John M.	1964 (June)	The competition of wild oats with wheat, barley and oats for phosphorus and potassium.
204. Breen, Patrick J.	1963 (December)	The absorption and translocation of Cu-64 by <u>Phaseolus vulgaris</u> .
205. Froyd, James D.	1964 (June)	Studies of the biology of Hypoxylon canker of aspen.
206. Lopez, Rafael	1964 (July)	Pathogenicity and phenotypic variability within 38 and related races of <u>Puccinia graminis</u> F. sp. <u>tritici</u> .
207. Sauer, David B.	1964 (December)	Microbiological Studies of Wheat Stored at Moisture Contents of 12-16 Percent.
208. Monson, Arvid M.	1964 (December)	Infection of potato tubers by <u>Phytophthora infestans</u> .
209. Fanse, Hemant A.	1965 (March)	Invasion by storage fungi of rice stored at moisture contents of 13.5 to 15.5%.
210. Kucharek, Thomas A.	1965 (March)	The Frequency, Mode of Entry, and Mechanisms of Infection of <u>Fusarium Moniliforme</u> in <u>Zea Mays</u> L.
211. Manion, Paul Donald	1965 (March)	Nectria Type Cankers of Aspen in Minnesota.
212. Williams, Wayne T.	1965 (June)	The nature of resistance of <u>Poa pratensis</u> L. to <u>Erysiphe graminis</u> DC.
213. Eugenio, Cesaria P.	1965 (December)	Genetic Studies on <u>Pleurotus oftreatus</u> (FR.) Kummer.
214. Schipper, Arthur L., Jr.	1965 (December)	Sources of fungal inoculum and its effect on cellulosic fiberboard.
215. Knutson, Donald M.	1965 (December)	Air-borne inoculum and the rate of disease development in epidemics of leaf and stem rusts of wheat.

Name	Year	Thesis subject
216. Leath, Kenneth T.	1965 (March)	Histological study of the resistance of <u>Zea Mays</u> to <u>Puccinia Graminis</u> .
217. Stallknecht, Gilbert F.	1966 (June)	A comparison of fungicidal activity of triphenyl tin hydroxide, dithane M-45, and tribasic copper sulfate against <u>Cercospora beticola</u> in laboratory and greenhouse tests.
218. Sun, Ming-hsien	1966 (June)	Factors affecting the infection of <u>Helminthosporium turcicum</u> on corn.
219. Smith, Mark A.	1966 (June)	Survival of stem rust urediospores on foliage of wheat and variability in some morphological characters of wheat in different environments.
220. Hill, John R.	1966 (June)	Toxicity of a culture filtrate from <u>Helminthosporium sorokinianum</u> to <u>Puccinia graminis</u> var. <u>tritici</u> , race 32.



221. Hulluka, Mengistu	1966 (June)	The reaction of seedling and adult plants of 45 varieties and lines of oats to 28 physiologic races of <u>Puccinia graminis</u> var. <u>avenae</u> .
222. Dueck, John	1966 (August)	Host-parasite relations of <u>Erysipha graminis</u> in micro-culture.
223. Kenney, Michael J.	1966 (August)	Host range and survival of <u>Verticillium albo-atrum</u> Heinke and Berthold.
224. Silberman, Meira B.	1966 (September)	Mechanism of Phosphate Absorption in <u>Rhizoctonia Solani</u> .
225. Rick, Paul D.	1966 (September)	Carbon Dioxide Fixation in the Dark By Rust Uredospores and Rust-Infected Host Tissue.
226. Pandey, Mahesh C.	1966 (October)	Influence of Nutrition and Temperature on the Production and Ejection of Ascospores of <u>Leptosphaerulina Briosiana</u> .

Name	Year	Thesis subject
227. Nyvall, Robert F.	1966 (December)	Factors Affecting The Survival Of <u>Fusarium Moniliforme</u> In Soil.
228. Zinada, Abdul-Aziz H.	1967 (June)	Some Factors Affecting the Reaction of Soybean to <u>Pseudomonas glycinea</u> .
229. Warner, Gloria Mae	1967 (August)	The Role of Birds in the Dissemination of Fungi.
230. Chang, Annabelle I-Pin	1967 (June)	Biological Control of Seedling Blight Disease of Corn.
231. Alabanza, Armagedon Aglugub	1967 (July)	The Epidemiology of Potato Late Blight: Measurement of Field Resistance in Small Field Plots.
232. Meza, Carlos R.	1967 (August)	Effect of Inoculum Potential on the Parasitism of <u>Rhizoctonia Solani</u> Kuhn.
233. Hunter, Barry Bailey	1967 (December)	Plan B - no thesis.
234. Morrison, Richard Harold	1968 (March)	Relationships of <u>Cylindrocladium floridanum</u> and <u>C. scoparum</u> to Soil and Host Plants.
235. Tainter, Franklin Hugh	1968 (March)	The Biology of Eastern Dwarf Mistletoe.
236. Onesirosan, Peter Tosan	1968 (June)	Factors that influence the sporulation of <u>Helminthosporium teres</u> in culture.
237. Seid, Alton Harry	1968 (July)	Plan "B" - no thesis.
238. Hoskin, Daphne Alderson	1969 (March)	The Haustorial Sac of <u>Erysiphe graminis</u> .
239. Anderson, Darryl L.	1969 (June)	Studies on the Infection of <u>Populus tremuloides</u> by <u>Hypoxylon pruinaum</u> .
240. Moloney, Donal	1969 (June)	Plan "B" - no thesis.
241. Groth, James Vernon	1969 (June)	Studies of Heterokaryosis in the genus <u>Thanatephorus</u> .
242. Sullivan, Timothy P.	1969 (August)	Living Haustoria of <u>Erysiphe graminis</u> in Host Cells opened by Microsurgery.
243. Menge, John A.	1969 (June)	The Ecology and Survival of <u>Cylindrocladium floridanum</u> in Soil.
244. Bevis, Roderick Reid	1970 (June)	The Effect of Temperature on Urediospore Germination, Appressorial Formation, and Penetration of <u>Puccinia graminis</u> f. sp. <u>Avenae</u> .
245. Swendsrud, David P.	1970 (June)	Physiological Studies on <u>Darluca filum</u> , a Hyperparasite of Uredinales.
246. Mont, Ricardo	1970 (July)	Studies on Nonspecific Resistance to Stem Rust on Spring Wheat.
247. Schwandt, John	1970 (August)	The Incompatibility of <u>Pleurotus ostreatus</u> (Fr.) kummer in nature.
248. Lieberman, John	1971 (June)	Studies in the biosynthesis of F-2 a fungal estrogen produced by <u>Fusarium</u> .
249. Siwula, John T.	1971 (December)	Plan B: Attraction of the Plasmodia of <u>Physarum Polycephalum</u> . The Problem of Pesticides. The Chemical Control of Powdery Mildews.
250. Wolf, James C.	1971 (December)	Regulation of the sexual stage in <u>Fusarium roseum</u> 'graminearum.
251. Windels, Carol Elizabeth	1972 (July)	Populations of <u>Fusarium</u> spp. in Natural and Agricultural Soils.

Name	Year	Thesis subject
252. Pelaez, Alfredo	1972 (August)	The Role of Copper Fungicides in Altering Populations of the Bacterial Blight Pathogen on Leaf Surfaces of Soybean.
253. Atif, Abdul Hakim	1973 (March)	Detached leaf culture as a method of studying stem rust development and resistance in wheat.
254. Kroll, Robert	1973 (June)	The effect of inoculum concentration on late blight – <u>Phytophthora infestans</u> .
255. Huddler, George W.	1973 (June)	Seed dispersal and spread of the eastern dwarf mistletoe <u>Arceuthobium pusillum</u> Peck.



256. Skovmand, Bent	1973 (June)	Variation in wheat characteristics involved in morphological resistances to wheat stem rust.
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Ph.D. Degrees Granted in the Division of Plant Pathology and Botany

Name	Year	Thesis subject
1. Stakman, E. C.	1913	A study in cereal rusts: Physiological races.



*2. Bisby, G. R.	1919	Studies on some <i>Fusarium</i> diseases of potato and truck crops. (Not in thesis file)
3. Dosdall, Louise	1922	Factors influencing the pathogenicity of <i>H. sativum</i> Pammel, King and Bakke.
4. Leach, J. G.	1922	The parasitism of <i>Colletotrichum lindemuthianum</i> (Sac. and Mag.) Bri. and Cav.



*Missing from files

Name	Year	Thesis subject
5. Newton, Margaret	1922	Studies in wheat stem rust (<u>Puccinia graminis tritici</u>).
6. Barker, H. D.	1923	A study of wilt resistance in flax.
7. Henry, A. W.	1923	Root rots of wheat.
8. Hursh, C. R.	1923	Morphological and physiological studies on the resistance of wheat to <u>Puccinia graminis tritici</u> (Pers.) Erikss. and Henn.
*9. Noble, R. J.	1923	Studies on the parasitism of <u>U. tritici</u> Koern., the organism causing flag smut of wheat.
10. Bailey, D. L.	1924	Specialization in <u>Puccinia graminis avenae</u> Erikss. and Henn.
11. Levine, M.N.	1924	Statistical studies on the variation of biologic forms of <u>Puccinia graminis tritici</u> and the effect of ecological factors on the susceptibility of wheat varieties.
12. Christensen, J. J.	1925	Physiologic specialization and parasitism of <u>Helminthosporium sativum</u> P. K. B.
13. Sanford, G. B.	1925	A study of some factors relative to the pathogenicity of <u>Actinomyces scabies</u> (Thaxter) Güssow.
14. Lambert, E. B.	1927	The relation of weather to the development of stem rust in the Mississippi Valley.
15. Seal, J. L.	1927	Cocoanut bud rot in Florida.
*16. Johnson, H. W.	1928	Storage rot of the Jerusalem artichoke.
17. Rodenhiser, H. A.	1928	Physiologic specialization in some cereal smuts.
18. Cotter, R. U.	1929	Factors affecting the development of the aecial stage of <u>Puccinia graminis</u> Pers.
19. Flor, H. H.	1929	Some factors affecting the severity of the root rot complex of sugar cane.
20. Hart, Helen	1929	Morphological and physiological studies on stem rust resistance in wheat.



* Missing from files

Name	Year	Thesis subject
21. Peterson, P. D.	1929	Reactions of selfed lines of corn to seedling blight caused by <u>Gibberella saubinettii</u> (Mont.) Sacc. and <u>Fusarium monilliforme</u> Sheldon.
22. Tu, Chih	1929	Physiologic specialization in <u>Fusarium</u> spp. causing head blight of small grains.
23. Wallace, J. M.	1929	Physiologic specialization as a factor in the epidemiology of <u>Puccinia graminis tritici</u> Erikss. and Henn.
24. Johnson, D. E.	1930	The relation of the cabbage maggot and other insects to the spread and development of soft rot of cabbage.
25. Johnson, E. M.	1930	Virus diseases of tobacco in Kentucky.
26. Johnson, T.	1930	A study of the effect of environmental factors on the variability of physiologic forms of <u>P. graminis tritici</u> .
27. Melander, L. W.	1930	The relation of <u>Berberis</u> spp. to <u>Puccinia graminis</u> .
28. Nelson, R. M.	1930	Experiments with blue stain fungi in southern pine.
29. Greaney, F. J.	1931	The prevention of cereal rusts by the use of fungicidal dusts.
30. Broadfoot, W. C.	1932	Studies on foot- and root-rot of wheat in western Canada.
31. Dickinson, Sydney	1932	The genetic implications of hyphal fusions in certain fungi.
*32. Holton, C. S.	1932	Studies in the genetics and cytology of <u>Ustilago avenae</u> and <u>U. levis</u> .
33. LeClerg, E. L.	1932	The parasitism of <u>Rhizoctonia solani</u> Kühn on the sugar beet.
34. Starr, G. H.	1932	The study of diseases of canning crops in Minnesota.
35. Loh, T. C.	1933 (March)	A study of the pathogenicity and physiology of certain organisms of rice.
36. Bamberg, R. H.	1933 (June)	The black chaff disease of wheat.
37. Walter, J. M.	1933 (June)	Some factors influencing the development of corn smut, <u>Ustilago zeae</u> (Beckm.) Unger.
38. Eide, Carl J.	1934 (June)	The pathogenicity and genetics of <u>Gibberella saudinetii</u> (Mont.) Sacc.
39. Thornberry, H. H.	1934 (June)	Studies on the filtration and ultrafiltration of tobacco-mosaic virus.
40. Tyler, L. J.	1934 (June)	Studies on variability of <u>Sphacelotheca sorghi</u> (link) Clinton.
41. Verrall, A. F.	1934 (June)	Variation in <u>Fomes igniarius</u> Linn. Ex Gill.
42. Sharvelle, E. G.	1934 (June)	The nature of resistance of flax to <u>Melampsora lini</u> (Pers.) Lev.
43. Allison, C. C.	1935 (June)	Studies on the genetics and cytology of smuts of barley and oats in relation to their pathogenicity.
44. Forbes, Irvin L.	1935 (June)	Factors affecting the development of <u>Puccinia coronata</u> in Louisiana.
45. Harrar, J. G.	1935 (June)	Factors affecting the pathogenicity of <u>Fomes lignosus</u> Klotzsch.
46. Kaufert, Frank Henry	1935 (June)	The biology of <u>Pleurotus corticatus</u> Fries.
47. Churchward, J. G.	1936 (June)	Studies on physiological specialization of the organisms causing bunt in wheat, and the genetic of resistance to this and certain other wheat diseases.

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Name	Year	Thesis subject
48. Vaheeduddin, Syed	1936 (December)	Studies on the pathogenicity and genetics of some sorghum smuts.
49. Cormack, M. W.	1936 (December)	The relation of <i>Cylindrocarpum</i> and <i>Fusarium</i> to root-rot and winter-killing of alfalfa and sweet clover in Alberta.
50. Christensen, Clyde	1937 (June)	Studies <i>Valsa sordida</i> , Nitschke, <i>Cytospora chrysosperma</i> (Per.) Fr. and <i>Valsa nivea</i> (Hoff.) Fr.



Dr. Ralph Lorenz and Dr. Clyde Christensen

51. Gibbs, Gordon J.	1937 (December)	Factors influencing the control of club-root caused by <i>Plasmiodiophora brassicae</i> Wor.
52. Lindgren, Ralph M.	1937 (June)	Some relations and effects of fungi causing blue-stain of wood.
53. Ling, Lee	1937 (June)	The physiology and parasitism of <i>Urocystis occulta</i> (Wallr.) Rab.
54. Wang, Chi Shi	1937 (July)	The cytology and pathogenicity of <i>Ustilago crameri</i> .
55. Person, Lee H.	1937 (August)	<i>Rhizoctonia</i> stem and root rot of beans.
56. Bonde, Reiner	1938 (March)	A study of blackleg and seed-piece decay in the Irish potato.
57. Cassell, R. C.	1938 (June)	Factors affecting the distribution of physiologic races of <i>Puccinia graminis tritici</i> Erikss. and Henn.
58. Davies, F. R.	1938 (June)	Studies on the nature of variation in some members of the Fungi Imperfecti.
59. Chilton, St. John P.	1938 (July)	Further studies on the cytology and genetics of <i>Ustilago zeae</i> (Beckm.) Ung.
60. Hwang, Liang	1939 (June)	The effect of light on the viability of urediospores of certain cereal rusts.
61. Siggers, Paul V.	1939 (June)	The brown-spot needle blight of pine seedlings.
62. Tyner, Lawrence E.	1939 (June)	The effect of crop debris upon the pathogenicity of cereal foot- and root-rotting fungi.
63. Allison, J. Lewis	1940 (June)	Studies of a leaf spot disease on <i>Bromus inermis</i> .
64. Tervet, Ian W.	1940 (June)	Variability in <i>Ustilago levis</i> (Kell. and Sw.) Magn., <i>Ustilago avenae</i> (Pers.) Jens. and <i>Ustilago hordei</i> (Pers.) Kell. and Sw.

Name	Year	Thesis subject
65. Petty, M. A.	1940 (December)	The effect of certain environmental factors on the phenotypic variability and genetic variation in <u>Ustilago zea</u> (Beck.) Unger.
66. Watson, I. A.	1941 (March)	Pathological and genetical factors in relation to breeding rust resistant wheat.
67. Laskaris, Thomas	1941 (June)	Studies on Delphinium crown rot.
68. Kernkamp, Milton F.	1941 (June)	The relative effect of genetic and environmental factors of growth types of <u>Ustilago zea</u> (Beck.) Unger.



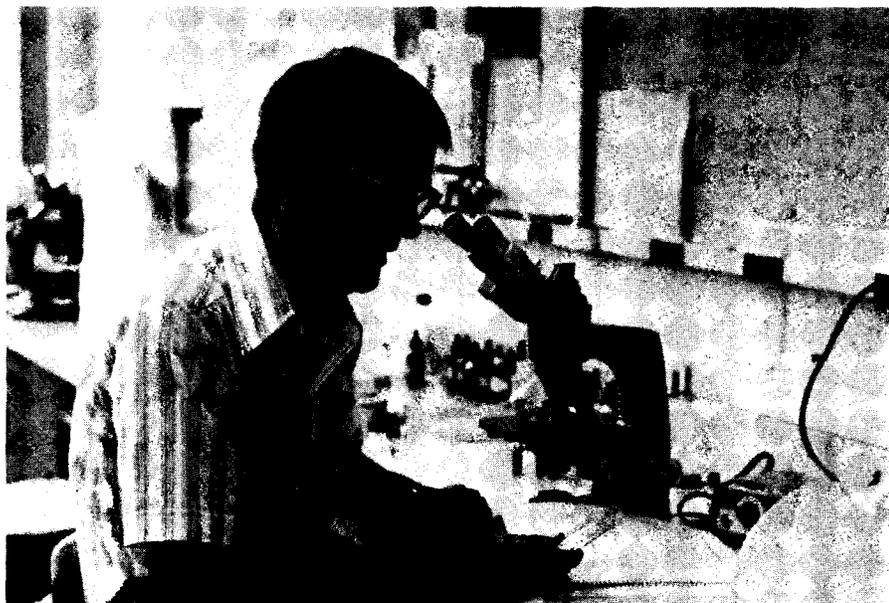
69. Schaal, Lawrence A.	1941 (June)	Variation and physiologic specialization in <u>Actinomyces scabies</u> .
70. Voorhees, Richard K.	1941 (June)	The life history and taxonomy of <u>Physalospora rhodina</u> (Berk. and Curt.) Cke.
71. Borlaug, Norman E.	1942 (June)	Variation and variability of <u>Fusarium lini</u> .



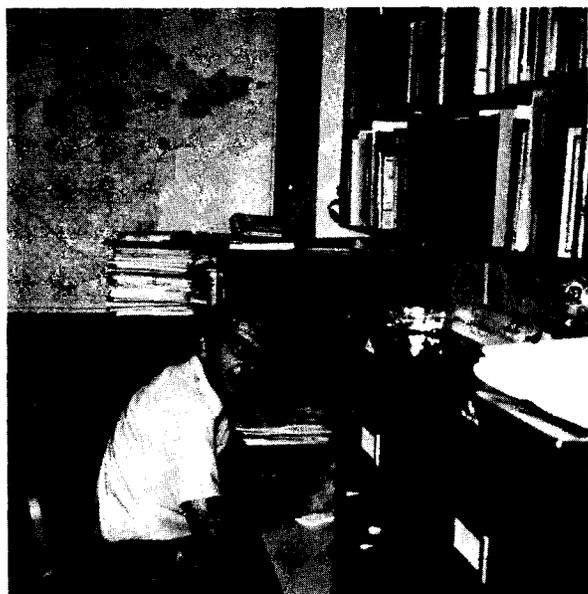
Name	Year	Thesis subject
72. Graham, Thomas W.	1942 (June)	Variation and variability in <u>Helminthosporium gramineum</u> .
73. Martin, W. J.	1942 (June)	A study of the genetics of <u>Sorosporium syntherismae</u> and <u>Sphacelotheca panici-miliacei</u> .
74. Downie, Andrew R.	1942 (December)	Damping off and root rot of sugar beets caused by <u>Aphanomyces cochlioides</u> (Drechs.).
75. Gottlieb, David	1942 (December)	Studies on the nature of wilting due to vascular parasites.
76. Hanson, Earle W.	1942 (December)	Seedling blights and foot rots of wheat in the spring wheat region of northern United States.
77. Vaughan, E. K.	1942 (August)	Bacterial wilt of tomato caused by <u>Phytomonas solanacearum</u> (E.F.S.) Bergey et. al.
78. Cherewick, William J.	1943 (March)	Studies on the biology of <u>Erysiphe graminis</u> D. C.
79. Chen, Shan-Ming	1943 (June)	Studies on <u>Rhizoctonia solani</u> Kühn.
80. Darling, Henry M.	1943 (December)	The yield of triumph potatoes in Alabama as affected by tuber-borne diseases, and certain other factors related to the production of seed in the South.
81. Darley, Ellis F.	1945 (August)	Panel diseases of <u>Hevea brasiliensis</u> .
82. Wilson, Coyt T.	1946 (March)	Concealed damage of peanuts.
83. King, Thomas H.	1946 (April)	Studies on the relationship of <u>Fomes lignosus</u> Klotsch and <u>Polyporus zonalis</u> Berkeley and on the factors affecting the pathogenicity of <u>Fomes lignosus</u> .
84. Gattani, Mohan Lal	1946 (July)	Studies on the behavior of diploid lines of <u>Ustilago zeae</u> (Beckm.) Ung.
85. Davidson, Richard S.	1947 (March)	Factors affecting the development of bacterial soft rot of potato tuber initials.
86. Vaughn, John R.	1947 (July)	The nature of resistance of potatoes to scab and some factors affecting the type of pustules.
87. Tsiang, Chen Tong	1947 (June)	Root rot of flax.
88. Thomas, Walter D., Jr.	1947 (June)	Factors influencing the epidemiology of late blight on potatoes.
89. Presley, John T.	1947 (June)	Verticillium wilt of cotton with particular emphasis on variation of the causal organism.
90. Preston, Dudley A.	1947 (June)	Bacterial canker on cowpeas in Oklahoma.
91. Feldman, Albert W.	1947 (August)	Studies on the physiological aspects of <u>Ustilago zeae</u> (Beckm.) Ung.
92. Silverborg, Savel B.	1947 (March)	Factors affecting the growth and survival of <u>Phytophthora palmivora</u> .
93. Borders, Huey I.	1947 (December)	Studies on the development and control of <u>Sclerotinia sclerotiorum</u> (Lib.) deBary.
94. Hingorani, Monohar K.	1947 (December)	Physiologic and pathologic studies of certain physiologic races of <u>Puccinia graminis avenae</u> .
95. Misra, A. P.	1947 (December)	Factors affecting variability in development of flax rust.
96. Murakishi, Harry	1948 (June)	Variation of <u>Fusarium bulbigenum</u> var. <u>niveum</u> .

Name	Year	Thesis subject
97. Orellana, Rodrigo	1948 (June)	Effect of soil types on the development of <u>A. scabies</u> of potatoes.
98. Hendrix, J. Walter	1948 (March)	Studies on inheritance of <u>Stemphylium</u> resistance in tomatoes.
99. Hasanain, S.	1948 (June)	Study of stem rust reaction and other characters in Indian wheat varieties and their crosses.
100. Hak, Tewfik Abdel-	1948 (June)	Morphology and behavior of certain races of <u>Puccinia graminis tritici</u> Erikss.
101. Teller, Morris N.	1948 (December)	Trace elements in relation to fungus and host metabolism.
102. Young, Harry C.	1949 (June)	Resistance in corn to several pathogens causing seedling blights and stalk rots.
103. Rowell, John B.	1949 (June)	The pathogenicity of <u>Alternaria dauci</u> f. sp. <u>solani</u> .
104. Sackston, W. E.	1949 (June)	Studies on the pasmo disease of flax.
105. Anwar, A. A.	1949 (June)	Factors affecting the survival ability of <u>Helminthosporium sativum</u> and <u>Fusarium lini</u> in soil.
106. Hasan, S. F.	1949 (June)	Root rot of oats in relation to varietal improvement.
107. Mehta, P. R.	1949 (December)	Factors affecting the development of corn rust, <u>Puccinia sorghi</u> Schw.
108. DuCharme, E. P.	1949 (December)	The nature and control of the Tristeza disease of citrus.
109. deZeeuw, Donald J.	1949 (March)	Minor element nutrition in relation to plant disease.
110. Loegering, William Q.	1949 (June)	Prevalence and distribution of physiologic races of <u>Puccinia graminis tritici</u> in the United States from 1938 to 1947 as affected by the distribution of wheat varieties.
111. Mullin, Robert S.	1950 (March)	Stem rust in Virginia.
112. Khan, Abrar M.	1950 (June)	Factors affecting the pathogenicity of <u>Rhizoctonia solani</u> on legumes.
113. Munnecke, Donald E.	1950 (August)	A study of diagnostic characters of physiologic races of <u>Puccinia graminis tritici</u> .
114. Wismer, Chester A.	1950 (December)	Studies on the control of the pineapple disease of sugar cane caused by <u>Ceratostemella paradoxa</u> (DeSeynes) Dade.
115. Cohen, Mortimer	1951 (March)	Studies on pathogenicity and sexuality of certain isolates of <u>Phytophthora palmivora</u> Butler.
116. Goodman, Jacob J.	1951 (March)	Physiological studies of fungi associated with the deterioration of stored grains.
117. Baskin, A. David	1950 (December)	The fungicidal and herbicidal action of cyanamides.
118. Kausar, Abdul G.	1951 (June)	Studies on the biology of <u>Dendrophoma obscurans</u> (Ellis and Everhart) Anderson.
119. Boosalis, Michael G.	1951 (June)	The epidemiology of <u>Xanthomonas translucens</u> (J. J. and R.) Dowson on cereals and grasses.
120. Bedi, Kishan S.	1951 (June)	Factors affecting the formation of sclerotia, apothecia and survival of <u>Sclerotinia sclerotioria</u> (Lib.) De Bary.
121. Gibler, John W.	1951 (December)	Studies on the control of <u>Rhizoctonia solani</u> on soybeans.

Name	Year	Thesis subject
122. Kommedahl, Thor	1951 (June)	Factors affecting the pathogenicity of <u>Fusarium lini</u> Bolley.

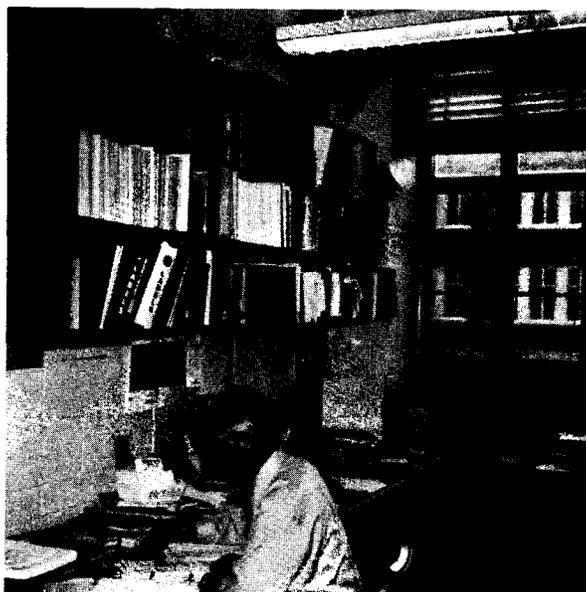


123. Hotson, Hugh H.	1951 (March)	Studies on the physiology of the rust fungi.
124. Chao, Tung Fang	1952 (March)	A study of pythotoxic action of 2,4-dichlorophenoxyacetic acid on certain aquatic plants.
125. French, David W.	1952 (March)	The phenomena of plugging in paper machine wet felts.



126. Ibrahim, Ismail A.	1952 (June)	Studies on the effect of some environmental conditions and chemicals on the development of <u>Puccinia graminis avenae</u> Erikss. and Henn.
127. Atkinson, Robert E.	1952 (June)	Studies on viruses of cereal grains.

Name	Year	Thesis subject
128. Shukla, Tapa Nath	1952 (June)	Variability in resistance of certain wheat varieties to <u>Puccinia graminis tritici</u> race 15.
129. Peturson, Bjorn	1952 (June)	Studies on specialization and pathologic effects of <u>Puccinia coronata</u> Corda.
130. Anderson, Ralph L.	1952 (June)	Factors influencing the incidence of Hypoxylon canker of aspen.
131. Lu, Shih-I	1952 (August)	A study of variation in black pigment production in <u>Ustilago zaeae</u> (Beckm.) Unger.
132. Krog, Norman E.	1952 (August)	The effects of uranium salts on higher plants.
133. Skiles, Robert L.	1952 (December)	The strawberry viruses in Minnesota.
134. DeVay, James E.	1953 (June)	Biochemical studies of sex and pathogenicity in <u>Ustilago zaeae</u> (Beckm.) Ung.
135. Johnson, Herbert G.	1953 (June)	Investigations on the control of root rot of canning peas.



136. Lyle, James A.	1953 (June)	A comparative study of <u>Sclerotium rolfsii</u> Sacc. and <u>Sclerotium delphinii</u> Welch.
137. Michaelson, Merle E.	1953 (June)	Factors affecting development of stalk rot of corn caused by <u>Diplodia zaeae</u> and <u>Gibberella zaeae</u> .
138. Miller, Lawrence I.	1953 (June)	Studies of the parasitism of <u>Cercospora arachidicola</u> Hori and <u>Cercospora personata</u> (B. and C.) Ell. and Ev.
139. Stewart, Donald M.	1953 (June)	Factors affecting local control of white pine blister rust.
140. Andrews, Edward A.	1953 (July)	Seedling blight and root rot of forage grasses.
141. Goto, Shosuke	1953 (July)	Leaf diseases of oats.
142. Andrews, Stuart R.	1953 (August)	Western red rot of ponderosa pine.
143. Roane, Curtis W.	1953 (December)	Genetic variation and cytology of <u>Helminthosporium carbonum</u> Ullstrup and the importance of the pathogen in the development of disease-resistant maize.

Name	Year	Thesis subject
144. Shurtleff, Malcolm C., Jr.	1953 (December)	Brown patch of turf caused by <u>Rhizoctonia solani</u> .
145. Nelson, Richard R.	1954 (March)	Studies on <u>Stemphylium</u> leaf spot of alfalfa.
146. Butler, Edward E.	1954 (August)	Mycoparasitism of <u>Rhizoctonia solani</u> .
147. Fridlund, Paul R.	1954 (August)	Studies on virus diseases infecting hardy <u>Prunus</u> grown in Minnesota nurseries.
148. Schwinghamer, Erwin	1954 (August)	Physiologic specialization and the nature of parasitism in <u>Colletotrichum linicolum</u> Pethyb. and Laff.
149. Logsdon, Charles E.	1954 (December)	Studies on ring rot of potatoes.
150. LeTourneau, Duane J.	1954 (December)	Catalase activity and chlorophyll content of several species of <u>Triticum</u> in relation to their resistance to <u>Puccinia graminis tritici</u> .
151. Frosheiser, Fred I.	1955 (March)	Studies on the etiology and epidemiology of <u>Diaporthe phaseolorum</u> var. <u>caulivora</u> , the cause of stem canker of soybeans.
152. Swaebly, Mary Ann	1955 (July)	Variability in the infection of wheat by <u>Puccinia graminis tritici</u> and studies on extracts from rust urediospores.
153. Schroeder, Harry W.	1955 (December)	Factors affecting resistance of wheat to scab caused by <u>Gibberella zeae</u> (Schw.)
154. Turk, Fateh M.	1955 (December)	The biological relationship between the oak wilt pathogen <u>Endoconidiophora fagacearum</u> Bretz, and the fungi found in wilted oak.
155. Broyles, James W.	1955 (September)	Comparative studies of races and biotypes of <u>Puccinia graminis</u> , with special reference to morphology of urediospore germination, chemical composition, and factors affecting survival.
156. Singh, Sheodhan	1956 (June)	Physiology and epidemiology of <u>Helminthosporium teres</u> .
157. Paharia, Kishun D.	1956 (June)	The effect of cropping sequences on soil microflora in relation to development of root rots of cereals.
158. Hawn, Elmer J.	1956 (December)	Studies on crown bud rot of alfalfa in southern Alberta.
159. Santiago, Joaquim C.	1956 (March)	Epidemiology of wheat stem rust in Portugal and the effect of environmental factors and certain mutagenic agents on the prevalent physiology races of <u>Puccinia graminis tritici</u> .
160. Drescher, Robert F.	1956 (July)	The relation of certain microorganisms to the plugging of paper machine wet felts.
161. Tuite, John F.	1956 (March)	The relationship of <u>Aspergillus glaucus</u> to the deterioration of stored wheat.
162. Hayden, Eugene B.	1956 (August)	Progressive development of infection by <u>Puccinia graminis</u> var. <u>tritici</u> Erikss. and E. Henn. (Guyot) on certain varieties of wheat and the relation of stem rust to yield.
163. Nair, P. Narayanan	1956 (December)	Factors affecting resistance of flax to <u>Fusarium lini</u> Bolley.
164. Bird, Julio	1956 (December)	Mosaic of <u>Jatropha gossypifolia</u> in relation to the leaf-curl virus of tobacco in Puerto Rico.
165. Olien, Charles R.	1956 (December)	Studies on necrosis in the infection of <u>Khapli emmer</u> by the stem rust fungus, <u>Puccinia graminis tritici</u> .
166. Papavizas, George C.	1957 (March)	Factors influencing invasion of stored wheat seed by <u>Aspergillus</u> spp. and the effects of such invasion or germination and amount of germ damage.

Name	Year	Thesis subject
167. Reiling, Theodore P.	1957 (March)	Studies on virus diseases of canning peas in Minnesota.
168. Bromfield, Kenneth R.	1957 (June)	The effect of temperature on seedling reaction of selected wheat varieties to <u>Puccinia graminis tritici</u> .
169. Campbell, Robert N.	1957 (June)	Studies on the biology of some woodstaining fungi.
170. Klug, Robert J.	1957 (July)	Physiological studies of mutants of <u>Colletotrichum linicolum</u> induced by radiation.
171. Orjuela, Juan	1957 (June)	Variability in reaction of wheats to isolates of races 38 and 48 of <u>Puccinia graminis var. tritici</u> .
172. Oshima, Nagayoshi	1957 (June)	Physiology of <u>Hypoxyton pruinaum</u> (Klot.) Cke.
173. Wilcoxson, Roy D.	1957 (July)	A study of penetration by <u>Puccinia graminis tritici</u> .



174. Ellingboe, Albert H.	1957 (December)	A comparative study of fungi that cause spring blackstem of forage legumes, particularly alfalfa and red clover.
175. Hildreth, Robert C.	1957 (December)	Genetic variation and variability of <u>Fusarium solani</u> , <u>F. pisi</u> and <u>F. oxysporum</u> , <u>F. pisi</u> race 2.
176. Liu, C. Y.	1957 (December)	Biochemical variability, biological reaction of certain strawberry viruses and their mechanical transmission.
177. Campos, Alfredo	1958 (March)	The importance of stem rust races in relation to the production of rust resistant wheats for Mexico.

Name	Year	Thesis subject
178. Silverman, William	1958 (July)	A study of the necrosis sometimes associated with infection of cereal plants by <u>Puccinia graminis</u> Pers.
179. Thurston, H. David	1958 (June)	The relative survival ability of races of <u>Phytophthora infestans</u> in mixtures.
180. Dutta, Prasanta K.	1958 (August)	The effects of previous crops on growth, yield and certain chemical constituents of two soybean varieties.
181. Wood, Leon S.	1958 (December)	Genetic variation of <u>Helminthosporium sativum</u> in relation to seedling blight of small grains.
182. Herrett, Richard A.	1959 (June)	Studies on the absorption, translocation, and metabolism of 3-amino-1,2,4,-triazole in perennial plants.
183. Qasem, Subhi A.	1959 (July)	Studies on deterioration of stored corn by fungi.
184. Chakravarti, B. P.	1960 (March)	Pathogenic capabilities of the wheat stem rust fungus <u>Puccinia graminis tritici</u> in certain rust resistant and tolerant varieties of wheat.
185. Haglund, William A.	1960 (March)	Studies on the sulphur nutrition of <u>Aphanomyces euteiches</u> and its relationship to root rot of peas.
186. Anderson, Neil A.	1960 (June)	Studies on the effects of the Cronartium rusts on jack pine and the epidemiology of these fungi.
187. Kavanagh, Thomas	1960 (June)	Infection and developmental studies on <u>Ustilago nuda</u> and <u>Ustilago tritici</u> .
188. Taylor, Donald P.	1960 (June)	Biology and host-parasite relationships of spiral nematode, <u>Helicotylenchus microlobus</u> .
189. Knutson, Kenneth W.	1960 (December)	Studies on the nature of field resistance of the potato to <u>Phytophthora infestans</u> .



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190. Ortega, Jacobo	1960 (December)	Genetic factors controlling stem rust resistance in Kenya farmer wheat.
191. Renfro, B. L.	1960 (August)	Studies concerning epidemiology of black stem of alfalfa.
192. Wyllie, Thomas D.	1960 (August)	Host-parasite relationships between soybean and <u>Rhizoctonia solani</u> .
193. Rodriguez, Ricardo A.	1960 (December)	The nature of resistance in muskmelons to Fusarium wilt.

Name	Year	Thesis subject
194. Kennedy, Bill W.	1961 (August)	Studies on bacterial angular leafspot, a new disease of strawberry in Minnesota.
195. Elliott, Arthur M.	1961 (December)	Ecological studies of <u>Pseudoplea trifoli</u> .
196. Frederiksen, Richard A.	1961 (December)	Studies on the transmission, effect, and control of two viruses on <u>Linum usitatissimum</u> L.
197. Goth, Robert W.	1961 (December)	Studies on the effects of viruses on <u>Trifolium spp.</u>
198. Guzman-Naranjo, Julia	1961 (June)	The nature of the partial resistance of certain clones of three species of potatoes to <u>Phytophthora infestans</u> (Mont.) DeBary.
199. Harrison, Monty D.	1961 (December)	Studies on potato russet scab.
200. Lambert, Roger G.	1961 (August)	Physiological interactions between <u>Avena sativa</u> and <u>Medicago sativa</u> .
201. Ohman, John H.	1961 (July)	The role of <u>Agropyron repens</u> in the germination and growth of certain crop plants.
202. Wood, Francis A.	1961 (August)	A study of the epiphytology of Hypoxylon canker of aspen.



Name	Year	Thesis subject
203. Covey, Ronald P.	1962 (March)	Field resistance of flax to pasmo.
204. Garrett, Wiley N.	1962 (June)	The asexual production of new biotypes of <u>Puccinia graminis</u> var. <u>tritici</u> .
205. Line, Roland F.	1962 (August)	Factors affecting the germination of spores of <u>Puccinia graminis</u> var. <u>tritici</u> .
206. Lutey, Richard W.	1962 (August)	Studies on the microflora of barley.
207. Jorgensen, Johannes	1962 (August)	Intra- and Interspecific matings of barley.
208. Ryan, Edward W.	1962 (December)	The effects of five grass species on growth and root rot of wheat.
209. Banttari, Ernest E.	1962 (December)	The effect of inoculum concentration, nutritive substances, and host resistance on spring black stem of alfalfa.
210. Gerwitz, David L.	1962 (December)	Some physiological changes in bean due to infection by <u>Uromyces phaseoli typica</u> .
211. Mumford, David L.	1962 (December)	Studies on the identification and nature of resistance in barley to spot blotch caused by <u>Helminthosporium sativum</u> .
212. Roberts, Bill J.	1962 (December)	The effect of temperature on seedling reaction of oats to <u>Puccinia graminis</u> var. <u>avenae</u> .
213. Milholland, Robert D.	1962 (December)	Biological adjustments of rust fungus cells to wheat cells.
214. Brinkerhoff, Lloyd A.	1962 (June)	Variability of <u>Xanthomonas malvacearum</u> , the cotton bacterial blight pathogen.
215. Telneset, Stein O.	1963 (July)	Studies on potato tuber diseases.
216. Bean, George A.	1963 (June)	Studies on the physiology and pathogenicity of Helminthosporium species attacking bluegrass (<u>Poa pratensis</u> L.).
217. Anderson, Gerald W.	1963 (June)	The biology and control of some Cronartium rusts on jack pine.
218. Merrill, William, Jr.	1963 (December)	The physical and chemical effects of common mold fungi on wood fiberboard.



Name	Year	Thesis subject
219. Horricks, J. S.	1963 (December)	The influence of crop residues on soil microorganisms in relation to plant growth.
220. Rogers, Wallace E.	1964 (March)	The effect of micro-environment on germination, infection and sporulation of <u>Spetoria passerinii</u> on barley, <u>Hordeum vulgare</u> .
221. Follstad, Merle N.	1964 (June)	Identification, characteristics, and biology of <u>Pullularia pullulans</u> (De Bary) Berkhout, a common fungus on barley grains.
222. Zaki, Abdel-Hamid I.	1964 (June)	Some physiological studies on healthy and rust-infected bean plants.
223. Abrahamsen, Mary	1964 (June)	Some aspects of the carbohydrate metabolism of germinating soybean seedlings in relation to levels of carbohydrates and carbohydrate precursors.
224. Littlefield, Larry J.	1964 (June)	Translocation in Fungi: <u>Rhizoctonia Solani</u> and <u>Lentinus Tigrinus</u> .
225. Sundheim, Leif	1964 (June)	Epidemiology, Ecology, and Host-Parasite Relationships of <u>Leptosphaerulina Briosiana</u> on <u>Medicago sativa</u> .
226. Old, Kenneth M.	1964 (June)	Fungistatic effects of bacteria on rotting fungi.
227. Shimabukuro, Richard H.	1964 (June)	Studies on the Effect of Atrazine on Oat (<u>Avena Sativa</u> (L.) Var. Minhafer).
228. Bissonnette, Howard L.	1964 (August)	The effect of soil Mycoflora on the Seedling diseases of sugar beets.
229. Stingl, Helmut	1964 (December)	Studies on the Strawberry Virus Complexes.
230. Brown, George Eldon	1965 (March)	Effect of Oxygen Concentration on Pythium Seed Rot of Soybean.
231. Asare-Myako, Andrew	1965 (June)	The role of leaf microflora on epidemiology of the northern leaf blight of corn.
232. Bernier, Claude Charles	1965 (June)	Mechanical Transmission of Aphid-Borne Raspberry Viruses to Herbaceous Hosts.
233. Carlson, Lauren Earl	1965 (June)	Studies on the Root Rot of Peas Caused by <u>Aphanomyces Euteiches Drechs</u> .
234. Garza-Chapa, Raul	1965 (July)	Studies on the Behavior of Single-Basidiospore isolates and heterokaryons of <u>Rhizoctonia solani</u> .
235. Schroeder, David B.	1965 (July)	Seedling blight, stalk rot and ear rot of sweet corn caused by <u>Penicillium oxalicum</u> .
236. Welty, Ronald E.	1965 (August)	Factors influencing wilt of muskmelon caused by <u>Fusarium oxysporum</u> form melonis.



Name	Year	Thesis subject
237. ElKandelgy, Syed M. I.	1965 (December)	Effect of red clover flower extract and sugars on infection of <u>Gomphrena globosa</u> by red clover vein-mosaic virus.



238. Bugbee, William M.	1965 (December)	Studies on the aggressiveness of race 15B and race 56 and progenies from crosses of these races of <u>Puccinia Graminis</u> var. <u>Tritici</u> .
239. Husain, Syed M.	1965 (December)	Studies on the phenomenon of apical dominance and its relationship to nutrient accumulation in <u>Pisum sativum</u> L. var. Alaska.
240. Cross, John E.	1966 (March)	Variability in pathogenicity in the bacterial blight pathogen of soybeans.
241. Lopez-Frias, Luis Cesar	1966 (March)	Factors affecting invasion of grains and seeds by <u>Aspergillus flavus</u> , and effects of the fungus on germination of the seeds.
242. Livingston, Clark H.	1966 (June)	Phenolic compounds of potato tubers in relation to predisposition to bacterial soft rot.



Name	Year	Thesis subject
243. Dorworth, Charles E.	1966 (June)	Variations in germination, microflora, and fatty acids of soybeans stored under different combinations of moisture content, temperature, and time.
244. Ahlgren, George E.	1966 (June)	Studies on the absorption and translocation of phosphate by soybean leaves.
245. Leath, Kenneth T.	1966 (September)	The Resistance of <u>Zea Mays</u> to <u>Puccinia Graminis</u> .
246. Keeling, Bobbie L.	1966 (July)	Studies on the nature of barley resistance to <u>Helminthosporium teres</u> .
247. Saari, Eugene E.	1966 (November)	Susceptibility of North American <u>Thalictrum</u> spp. to infection by <u>Puccinia recondata</u> f. sp. <u>tritici</u> .
248. Bohnenblust, Kenneth E.	1966 (December)	Growth and Survival of the Pathogen Causing Russet Scab of Potatoes.



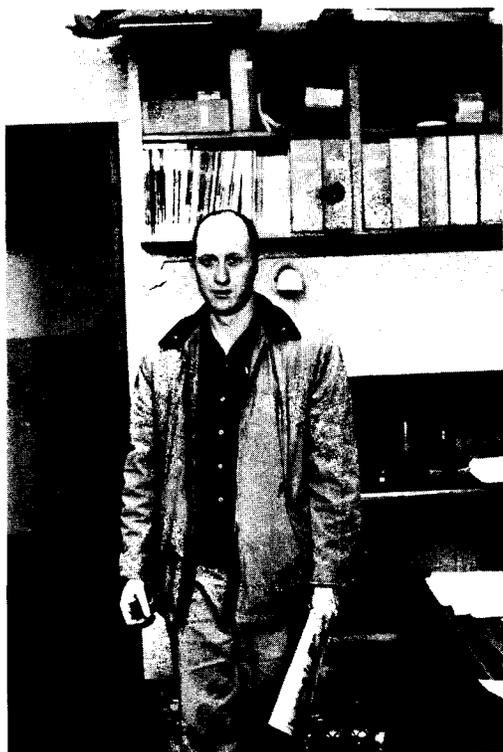
249. Chung, Hoo Sup	1967 (March)	Germination of Conidia and Reproduction in <u>Phoma herbarum</u> Var. <u>Medicaginis</u> .
250. Norgren, Robert L.	1967 (March)	Investigations on the Biology of the Soil Inhabiting Nematode <u>Tylenchus joctus</u> Thorne.
251. Patel, Kantilal	1967 (June)	The bionomics of <u>Tylenchorhynchus martini</u> .
252. Castano, Jose J.	1967 (July)	The role of storage conditions, Chemical Treatments, and storage fungi on maize seedling blight caused by <u>Gibberella zeae</u> .
253. Morton, Harrison L.	1967 (July)	The Germination of Polyporus Dryophilus Basidiospores.
254. Vest, Jr., Hyrum Grant	1967 (August)	Resistance in Flax to <u>Rhizoctonia solani</u> and the Effect of Heterokaryosis on Virulence.

Name	Year	Thesis subject
255. Manion, Paul Donald	1967 (December)	Factors affecting the germination of Basidiospores of the heart rot fungus, <u>Fomes Ignarius</u> in the infection of trembling aspen.
256. Froyd, James Donald	1967 (December)	Bacterial Blight of Mock Orange (Philadelphus) Caused by <u>Pseudomonas syringae</u> .
257. Sauer, David Bruce	1967 (December)	Fungus Flora, Germinability and Fat Acidity Values of Stored Corn.
258. Feng, Kuo Ao	1967 (December)	Effects of N-1-Naphthylphthalamic Acid on Growth and Bud Formation of Tobacco Callus <u>in vitro</u> .
259. Heagle, Allen Streeter	1968 (March)	The Nature and Effect of Adult Plant Resistance to Crown Rust in Several Commercial Oat Varieties.



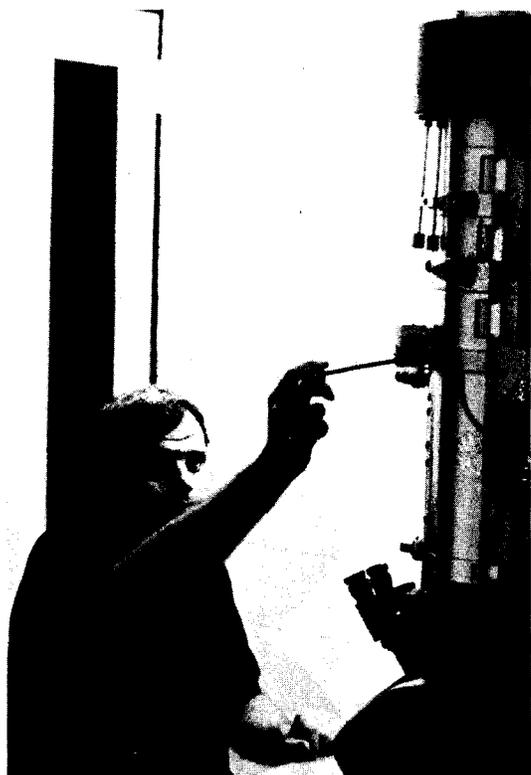
260. Sturgeon, Roy V. Jr.	1968 (March)	An Investigation of Certain Factors in the Host-pathogen Relationship of <u>Cercospora arachidicola</u> on the Peanut Plant <u>Arachis hypogaea</u> .
261. Skilling, Darroll Dean	1968 (July)	The biology of Scleroderris canker in the Lake States.
262. Fansie, Hemant Amritrao	1968 (August)	Studies on the Microbiology of Stored Rice.
263. Palmer, Louis Thomas	1968 (August)	The Ecological Relationships of <u>Diabrotica longicornis</u> , <u>Meloidogyne incognita</u> and <u>Pratylenchus</u> spp. in the <u>Fusarium</u> Root Rot Complex of <u>Zea mays</u> .
264. Crane, Gerald Lee	1968 (December)	Mineral oil as a foliar spray for the potential control of Cercospora leaf-spot and virus yellows diseases of <u>Beta vulgaris</u> . L.
265. Douglas, Dexter P.	1968 (December)	Factors influencing the survival and infective capabilities of <u>Fusarium oxysporum</u> f. sp. <u>Melonis</u> in the soil.

Name	Year	Thesis subject
266. Eugenio, Cesaria P.	1968 (December)	Factors influencing the biosynthesis of the fungal estrogen (F-2) and the effects of F-2 on perithecia formation by <u>Fusarium</u> species.
267. Schipper, Arthur Louis	1968 (December)	A beta amylase activator, resident in rust uredospores, active in starch depletion of rust infected tissue.
268. Smith, Mark Arthur	1968 (December)	Effects of light on the development of bacterial blight of soybeans and the histological and histochemical changes in soybean leaves infected with <u>Pseudomonas glycinea</u> .
269. Stallknecht, Gilbert F.	1968 (December)	Carbon dioxide fixation in the dark by uredospores of <u>Uromyces phaseoli</u> and its relation to nucleic acid metabolism during germination.



270. Vargas, Joseph Martin Jr.	1968 (December)	The effect of radiation, temperature, medium, and certain chemicals on the sporulation of <u>Helminthosporium dictyoides</u> .
271. Pandey, Mahesh Chandra	1969 (June)	Effect of light on the development of <u>Leptosphaerulina</u> leaf spot on alfalfa.
272. Moreno Martinez, Ernesto	1969 (July)	Studies of the Fungus Flora of Black and White Pepper and of the Factors Affecting its Development.
273. Nyvall, Robert	1969 (July)	Biotic factors affecting the growth of <u>Fusarium roseum</u> in the soil.
274. Carley, Harold E.	1969 (August)	Factors affecting the epidemiology of pea (<u>pisum sativum</u> L.) root rot caused by <u>Aphanomyces euteiches</u> drechs.
275. Kucharek, Thomas	1969 (December)	Factors influencing teliospore germination of <u>Puccinia recondita</u> f. sp. <u>Tritici</u> .

Name	Year	Thesis subject
276. Wang, Sinn S. (Andrew)	1969 (December)	Spatial distribution of the incompatibility factors of <u>Pleurotus ostreatus</u> (FR.) Kummer in nature and a genetic analysis of sporocarp production.
277. Haissig, Bruce	1969 (December)	Physiological aspects of adventitious root initiation in brittle willow purposes <u>Salix fragilis</u> (L.) (Pl. Phys.).
278. Salisbury, Philip James	1970 (June)	The Effect of High Concentrations of Solutes in Agar Substrates on Growth of <u>Pythium</u> spp., and on Susceptibility of Seedling to Damping-Off and Root-Rot caused by <u>Pythium</u> spp.
279. Cho, Yong Sup	1970 (June)	Studies on the nature of resistance in alfalfa plants to bacterial wilt.
280. Prescott, Jon M.	1970 (June)	Resistance and Virulence Relationships in the <u>Triticum aestivum</u> : <u>Puccinia graminis tritici</u> System.
281. Warren, Herman L.	1970 (June)	Ecological factors affecting the prevalence of <u>Fusarium</u> species associated with roots of crop plants.
282. Chang, Annabelle I-Pin	1970 (June)	Ecology of Fungi in the Rhizosphere of Corn.
283. Roelfs, Alan Paul	1970 (June)	Gradients in Horizontal Dispersal of Cereal Rust Uredospores.
284. Zeyen, Richard J.	1970 (December)	Histology and Ultrastructure of <u>Avena sativa</u> L. infected with the oat blue dwarf virus.



285. Lapis, Delfin B.	1970 (December)	Effect of mineral oil in controlling three foliar diseases of wheat.
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Name	Year	Thesis subject
286. Tainter, Frank H.	1970 (December)	Ultrastructure of Eastern Dwarf Mistletoe (<u>Arceuthobium pusillum</u> peck).
288. Meronuck, Richard A.	1971 (March)	Toxic Isolates of <u>Alternaria</u> and <u>Penicillium</u> spp.
289. Gibbs, Alwyn F.	1971 (July)	The relationship between leaf sugar and Helminthosporium leaf spot in Kentucky bluegrass.
290. Dueck, John	1971 (July)	Some Physiological and Ultrastructural aspects of Systemic Toxemia in Soybean.
291. Miller, James D.	1971 (December)	Studies on Phenotypic Variability within <u>Puccinia graminis</u> var. <u>tritici</u> .
292. Chang, Ho-Shii	1972 (June)	Effect of light on uredospore germination, tropism of germ tubes, and uredosporus development of <u>Puccinia graminis tritici</u> and <u>P. tecondita</u> on wheat.
293. Morrison, Richard E.	1972 (June)	Relationships of <u>Cylindrocladium Floridanum</u> and <u>C. Scopearium</u> to Soil and Host Plants.
294. Mew, Twng Wah	1972 (August)	Studies on Natural Occurrence of Plant Pathogenic Fluorescent Pseudomonads in the Phyllosphere of Soybean.
295. Ohh, Seung Hwan	1973 (June)	Factors affecting resistance of <u>Pisum sativum</u> to root infection by <u>Pythium ultimum</u> .

Seminar 21st Jan 1937:

Present:-
 Lomas H. King
 Ward Marshall
 W. P. Gemmill
 J. Christensen
 E. Jensen
 C. H. Taylor
 J. H. Gibbs
 Most excellent supper by
 Ward Marshall
 Lewis Allison
 Helen Hart
 G. Leach
 H. John P. Chilton
 R. H. Bassell
 Carl Heid
 J. P. Cronie
 Lawrence Hanson
 Phares Becker
 C. S. Wang
 E. M. Chen
 C. H. G. G. G.
 Paul V. G. G.
 M. F. Rembang
 Ralph M. G. G.

-1932-
 Clyde Allison
 James M. Walter
 George E. Haftad
 Arthur Chaffin
 A. V. G. G.
 J. G. Leach
 G. S. Miller
 W. H. G. G.
 D. M. Stewart
 J. M. Darling
 G. H. G. G.
 M. K. G. G.
 Clyde Christensen
 J. J. Christensen
 Audrey Dickerson
 J. C. Loh
 E. G. G. G.
 J. H. Farber
 R. H. Bamberg

Thursday Night Seminar

Thursday night seminars are as much a part of the department at Minnesota as are the basic functions of research, extension and teaching. The seminar is a teaching - social function and in fact means many different things to many different people. The seminar has survived changes in administrations, "mandatory" and "voluntary" attendance demands, changes in format, changes in quality of its chairmen, misuses, abuses, praise and distain, but in the final analysis it has proven a worthy venture.

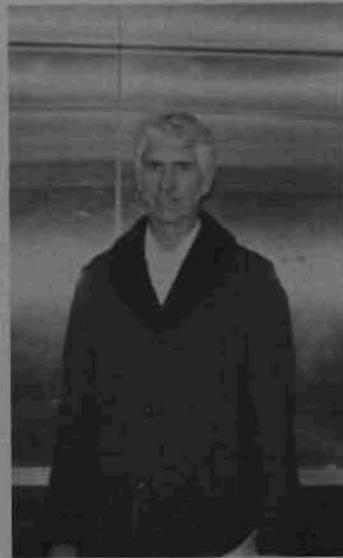
This seminar is a peculiar and seemingly anachronistic event in this age of unilateral mass communication, however, it was established on the principle of interpersonal communication which is a sound basis for social as well as intellectual learning. Over the years arguments have raged as to whether to expand or eliminate this seminar, but never has anyone successfully argued against the basic premise of interpersonal communication and stimulation as the basis for learning and maturing. The seminar will survive as long as there is interest in learning and intellectual development.

Like Hyde Park in London, one may mount his or her soapbox and try ideas out, pontificate if they please, expound, expand or simply try to convey factual information. The seminar offers a chance for immediate feedback from one's intellectual peers, which is a rare phenomenon nowadays. Many a person has come to grips with his or her strengths and weaknesses before the seminar and most would admit, in retrospect, that the experience led to a better understanding of themselves, if nothing else. The seminar is many things but mostly people; the quality of the individuals comprising the seminar makes it what it is. Enthusiasm for the seminar ebbs and flows but this uniquely Minnesota function survives.





John Mizicko



Dr. McVey



Professor Moore—Bird Control



Dr. Robert Brambl



Professor Moore's Desk



Floraine Toutenhof