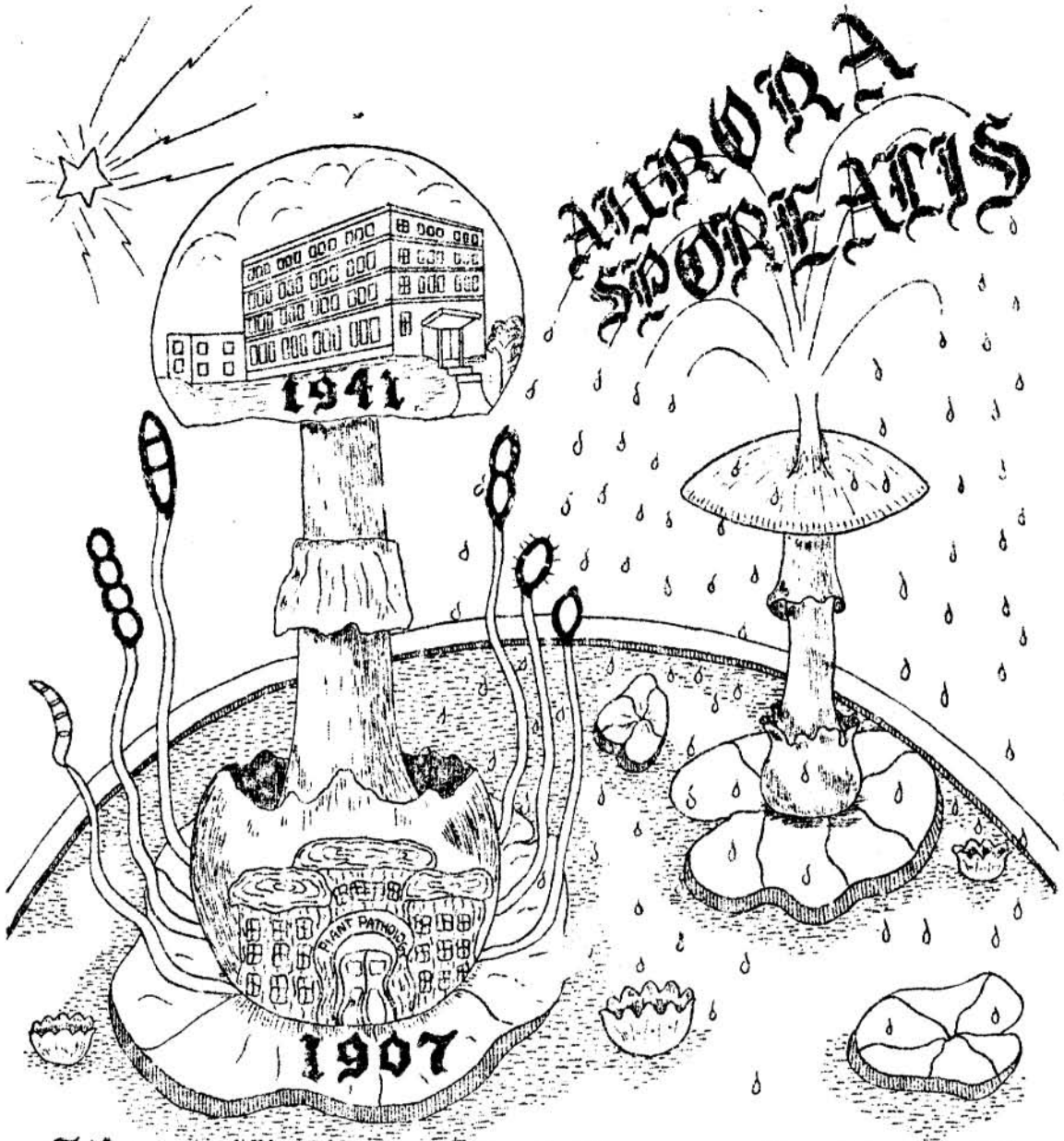

Wherein are recorded the recollections, the ruminations and the raspirations of those who have drunk from the foaming fount of the Department of Plant Pathology of the University of Minnesota and who now spout forth in divers ways

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

AURORA SPOREALIS

Volume 23, Supplement 1947

To DEAN FREEMAN,
PARTICULARLY, WE OFFER THIS SPECIAL ISSUE OF AURORA SPOREALIS,
CONTAINING AN INFORMAL CHRONICLE OF EVENTS DURING THE FIRST FORTY YEARS OF THE
DIVISION OF PLANT PATHOLOGY AND BOTANY AT MINNESOTA:

1907 -- 1947

To contributors we are very grateful. For errors in fact
and in judgment, we beg your indulgence.

Contents

EDWARD MONROE FREEMAN, founder and guiding genius during the early development of the Division of Plant Pathology and Botany at the University of Minnesota, was born in St. Paul, February 12, 1875, of Swiss parents, the original spelling of the name having been Frymann. He graduated in 1892 from Central High School in St. Paul and in 1898 from the University of Minnesota, where he also received the degrees of Master of Science in 1899 and Doctor of Philosophy in 1905. Both undergraduate and graduate work was done under the major advisorship of Conway MacMillan.

During his senior year in college, Freeman was appointed Scholar in Pharmaceutical Botany, and the following year Instructor in Botany and Pharmacognosy in the College of Pharmacy. This was followed by a summer's work in 1900 at Wood's Hole Biological Station and by study in 1901-02 with Marshall Ward at Cambridge University, England. On return from Europe, he served as Instructor and Assistant Professor of Botany at Minnesota, in the College of Science, Literature, and the Arts. After receiving the doctorate he spent two years in Washington, D. C., in the U. S. Department of Agriculture, as Pathologist in the Office of Grain Investigations. His most significant appointment for us, however, was in the College of Agriculture of the University of Minnesota when he was made Professor and Chief of the Division of Vegetable Pathology and Botany on August 1, 1907, establishing thereby the first department of plant pathology in an American university.

In 1913, Dr. Freeman was appointed Assistant Dean in the Department of Agriculture and became responsible for the College of Agriculture; in this capacity he was instrumental in reorganization of the Department of Agriculture into its five units: the Agricultural Experiment Station, College of Agriculture, School of Agriculture, Extension Division, and the Short Courses. In 1917 he was made Dean of the College of Agriculture, Forestry and Home Economics, which title he held until his retirement in 1943, when he became Dean Emeritus. In 1940 he relinquished the title of Chief of the Division of Plant Pathology and Botany to E. C. Stakman.

Everyone who has been in the department any length of time remembers Dr. Freeman on mycological forays. In 1898, 1900, and in 1902-1905 he was assistant in the Geological and Natural History Survey of Minnesota. This took him over much of the State and gave him opportunity to develop his natural propensities as a collector and natural history student and also laid the foundation for his life-long interest in the fungi. From the data collected, he published in 1901 lists of the Erysiphaceae and the Uredinales of the State and in 1905 a book entitled "Minnesota Plant Diseases," which was the first book on plant diseases published in the United States.

With Marshall Ward, Dr. Freeman worked on the brown rusts of bromes, gained an appreciation of host specialization in parasitic fungi, and developed an interest in the problems of immunity and resistance. While in England he also became interested in the Lolium fungus; and his doctor's dissertation, "The seed fungus of Lolium temulentum L., the Darnel" was published in Philosophical Transactions of the Royal Society, London, Series B 196: 1-27, 1903.

While with the U. S. Department of Agriculture, and in his early years with the Minnesota Agricultural Experiment Station as collaborator with the Office of Grain Investigations, Dr. Freeman worked on cereal smuts and rusts. As a result, two bulletins were published (with Edward C. Johnson), entitled "The loose smuts of barley and wheat," U. S. Department of Agriculture, B.P.I. Bul. 152, 1909, and "The rusts of grains in the United States," B.P.I. Bul. 216, 1911, which laid the pattern of many of the subsequent investigations carried out in his department. Dr. Freeman acted as collaborator with the U. S. Department until 1933.

During his senior year Dr. Freeman was editor-in-chief of the Minnesota Gopher. He was an associate editor of Phytopathology during the first three years of its development (1911-1914) and served on the editorial committee of the Journal of Agricultural Research during the first 15 volumes of its growth (1913-1918).

Under Edward M. Freeman's picture in the Minnesota Gopher of 1898 appears the quotation, " 'Young man, Providence sent you'--Prexy."

--Louise T. Dosdall

The First Decade - 1907-1917

- E. M. Freeman

Preface

Institutions---and the Division of Plant Pathology and Botany must be classed as one-- have prenatal histories that are frequently important because personalities and events in such prenatal periods influence profoundly subsequent history. Indeed, institutions are largely the reflection of personalities involved. They may originate, accelerate or retard the birth and progress of the institution, in which they are inextricably woven. At any rate, they leave their stamp, be these faint and easily forgotten or deep and indelible. For this reason, eschewing what might be deemed a becoming modesty, I offer first an account of events that led up to the establishment of the Division of Plant Pathology and Botany at the University of Minnesota.

The first courses offered in the field of Industrial Botany and Plant Pathology at the University of Minnesota were given in the Department of Botany in the College of Science, Literature, and the Arts of the Minneapolis campus, when that department was under the headship of Professor Conway McMillan; and the courses were formulated and given by myself, then an Assistant Professor of Botany.

In 1903, '04, and '05 a course in Plant Pathology was offered, also a course in Industrial Botany, and a third course in Timber and Wood Rots. The latter course was designed especially for Engineering students, but there were no registrations and the course was later discontinued. The Plant Pathology and Industrial Botany courses were accepted as required courses in the College of Agriculture. I left the Department of Botany in 1905 to go to the U. S. Department of Agriculture to take charge of Cereal Disease Investigations. The Industrial Botany course was continued in the Botany Department for some years after my departure.

1907-08

The Establishment of the Division of Plant Pathology and Botany in the Department of Agriculture.

The Division of "Vegetable Pathology and Botany" was established by the Board of Regents beginning August 1, 1907, when E. W. Randall was Dean of the Department of Agriculture, at University Farm. I was appointed head of this division with a leave of absence until January 1, 1908, in order to wind up my work in the U. S. Department of Agriculture. This arrangement had a financial advantage. It made possible the immediate organization of the new plant pathology division and the closing of the Washington work and left five months' salary added to the small Plant Pathology budget. Incidentally, I expended this thousand dollars for a new high-power Zeiss microscope. To say that this shocked Dean Randall and President Northrop is a gross understatement. I believe the microscope is still a useful instrument in the division. In a sense, it is the symbol of a research quality the division has striven to maintain throughout its history. The Division of Vegetable Pathology and Botany at Minnesota was probably the first Division of Plant Pathology established in this country. See Tables 1, 2, 3.

January 1, 1908, I came to permanent residence at Minnesota. The quarters of the division consisted of one office about 12 x 20 feet in the Administration Building on the first floor. We had the use of the Agronomy lecture and laboratory rooms on the same floor. The Agricultural Botany of the School of Agriculture was not at first connected with this division. It so happened that Mr. W. L. Oswald, who was at that time in charge of the School of Agriculture Botany, became ill, and I took his classes for several weeks immediately upon my coming to Minnesota.

Before the end of the year Mr. Oswald requested that his work in the School be incorporated in the new Division of Vegetable Pathology and Botany and this was approved. In 1908 I started the forestry botanical work in connection with the summer session at Itasca Park.

In this year also, the question was raised before the University Board of Regents as to the relation of this new division to the Botanical Department of the College of Science, Literature, and the Arts. Specifically, the question of the autonomy of the new division was called in question, and it was claimed that it should be a part of the Botanical department of the College of Science, Literature, and the Arts. A hearing was given before a committee of the Board of Regents, consisting of Regent S. M. Owen, President Cyrus Northrop, and Regent E. W. Randall. Professor F. E. Clements and President Northrop presented the matter from the standpoint of the Botanical Department. Professor S. B. Green, Professor of Horticulture, Dean Randall, and I presented the matter from the standpoint of the Department of Agriculture. It was decided by the Regents' Committee that the two departments should be separate and that the Division of Vegetable Pathology and Botany should be an autonomous division in the Department and College of Agriculture.

On April 1, 1908, we removed our offices from the main building to the third floor of the Horticulture building, where we obtained about one-half of that floor through the courtesy of Professor S. B. Green of the Horticultural Department. This arrangement was made possible by the Physics Department, which exchanged quarters with us. In the Horticulture Building we also had the use of a lecture room on the third floor. We lost no time in adapting the new quarters to our use. Through the exchange we obtained a very considerable number of laboratory tables and desks, and much of this equipment is still in use in the various laboratories and offices of the Division.

On April 1, 1908, W. L. Oswald, who occupied the position of Instructor in Botany in the School of Agriculture, was appointed Assistant in the Experiment Station.

Field Work

A small plot about two rods square in a very sandy and sandbur-infested soil was obtained for preliminary experimental use directly back of where Haecker Hall now stands. When I think of that little experimental plot, I can never forget--with I hope a pardonable amusement--Stakman and Alden Potter counting smut heads in oats and barley, arguing endlessly and so vehemently about everything or nothing that they seemed oblivious of the fact they were sitting on and among the barbs of Cenchrus tribuloides.

Cereal disease investigations in cooperation with the U. S. Department of Agriculture were inaugurated at this time.

1908-09

E. W. Randall resigned as Dean of the Department of Agriculture, and J. W. Olson, State Superintendent of Public Instruction, was appointed to succeed him. In this year there was a large increase in registration in the Agricultural and Forestry branches of the College.

1909-10

Dean J. W. Olson resigned about January 1, and Dean A. F. Woods, under whom I had worked in the U. S. Department of Agriculture, came to University Farm. Mr. E. C. Stakman was appointed Instructor in Botany and Assistant in the Experiment

Station beginning July 1, 1909. He had been a student in my classes in the Botanical Department, and after graduation in the College of Science, Literature, and the Arts had been teaching botany and other high school subjects in Minnesota high schools.

Thru the kindness of Professor S. B. Green, head of the Horticultural Division, we came into possession of the Lugger Herbarium. Dr. Otto Lugger had been the head of Entomology and was also an able botanist and diligent collector. We obtained the use of the room in which the Herbarium and cases were located, which gave us the entire third floor of the Horticulture Building.

We obtained this year Lot 1, being one acre of land in the southeast corner of the Experiment Station grounds adjacent to the continuation of Commonwealth Avenue and the Fair Grounds. We removed an old shanty called the "Well House" from its location on exactly the spot where the Inter-Campus terminus on the farm campus is at the present time and hauled it on skids, with the assistance of the Animal Husbandry Department, to the new field. There is a little question as to whether or not we had formal approval for the removal of the old "Well House", but Dean Olson intimated that if the house were moved he would probably not notice it. He happened to pass it on its way to the field, but I assume that his eyesight was poor and his attention diverted. He never mentioned it. The new field was thickly infested with quack grass but was the only field we could obtain. On February 15, an allotment of one and one-half acres north of the existing plot of Lot 1 were added to our experimental field, making three and one-half acres as a permanent Plant Pathology field. The location of the Plant Pathologi field in this particular quarter of University Farm was deemed desirable at that time in order to keep the disease as far as possible from the other experimental fields. The apple trees in the present (1947) poultry yard are relics of a Plant Pathology experiment.

1910-11

In the summer of 1910, Professor Green, one of the most powerful builders of University Farm and a staunch friend and supporter of plant pathology, passed away. He was largely responsible for the establishment of a Plant Pathology Division at University Farm. The College of Forestry, which he had built into a separate college, was again merged with the College of Agriculture in the following year.

1911-12

The most significant event of this year was the arrival of the new University President, Dr. George E. Vincent. In his approximately six years as President he raised the University's educational standards to an exceptionally high degree. He was truly the great educational builder of the University of Minnesota. He was a particularly staunch friend and supporter of all enterprises at University Farm. It was a joy as well as an inspiration to work under and with him. He played an important role in the development of the Division of Plant Pathology and Botany.

1912-13

This was a year of extensive planning. Under the new leadership of President Vincent, large and much-needed increases for legislative appropriations were formulated. That this planning was effective is seen in the following year. An illuminating episode of this year! At the request of the Home Economics Division a new course in General Bacteriology was organized for Home Economics students by Dr. Stakman cooperating with the Divisions of Dairy and Veterinary Medicine. I recall very clearly how, shortly after Stakman--bristling with teaching and disciplinary zeal--started this course, a large group of Home Economics students flooded my office to overflowing, wailing dismally that Mr. Stakman was going to

"flunk" the whole class and that no one could possibly complete his class assignments. I calmed their fears as best I could. When Stakman finished his part of the course another flood of the same students invaded my office. This time they were smiling and full of enthusiasm. "Stakman's Bacteriology was one of the best courses they had ever had -- and couldn't he be retained for the rest of the course?" He could not -- but this episode illustrates how educational standards in any college may and must be raised and improved; viz., by personal courage of each staff member.

1913-14

In this year came an unusually large increase in the appropriations for the division (almost 100%), chiefly through special appropriations by the legislature, and specifically for various kinds of Experiment Station work. Also in this year a special appropriation was obtained from the Board of Regents of $10,000 for the purpose of remodelling the old Drill Hall for the Division of Vegetable Pathology and Botany, and work was begun immediately on the remodelling. For several years an attempt was made to call the building the Industrial Botany Building, but the term could not be popularized, and the building has practically been known as the Plant Pathology Building and to most former denizens (and quite appropriately so) as the Tottering Tower. The name of the division has also been changed from Vegetable Pathology and Botany to Plant Pathology and Botany. I do not recall whether specific action for the change of name was taken by the Board of Regents, but the change was included later in the budgets of the Board of Regents. The first agricultural experiment station bulletin, issued under the name "Division of Plant Pathology and Botany", was Bulletin 133, 1913. In the college curricula the change was first made in the year 1916-17. The year 1913-14 saw the greatest increase in material equipment that the division has experienced in its first two decades. The special legislative appropriations increased very greatly the Experiment Station research in Plant Pathology and Agricultural Botany.

A very significant development began this year in the establishment of State Seed Inspection and a State Seed Laboratory in the Division of Plant Pathology and Botany. Assisted by Mr. Oswald, I had drafted the first State pure seed law (a law requiring the labelling of seed as to purity and germination). After several unsuccessful attempts in preceding legislatures, this was finally passed in 1913. We started a vigorous inspection campaign among seed companies, retailers, and even among farmers, and finally a way was found to curb even out-of-state mail order houses. The Seed 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, since regulation is not compatible with teaching and research. After building a sound inspection system and a very efficient laboratory, the whole setup was transferred to the State Department of Agriculture, when this was established some years later (1919). While operated in this division, the Seed Laboratory and inspection as well as the seed law itself were administered in the direction of education as far as possible.

1914-19 Inclusive

This was the period of the first World War. I had been appointed Assistant Dean of the Department of Agriculture in 1913, and in a reorganization of the Department when Dean R. W. Thatcher became Deanof the Department (1917) I was appointed Dean of the College of Agriculture, Forestry and Home Economics. Added duties made necessary the allocation of much division work to other members of the division. To facilitate this, the sectional organization was adopted in 1913, namely: a Section of Plant Pathology (Mr. Stakman, head), a Section of Agricultural Botany and Seed Laboratory (Mr. Oswald, head), and finally a Section of Plant Physiology. The latter section was organized (1919) in cooperation with the College of S. L. and A. Because of the great need for physiological researches in the Experiment Station, the arrangement was that a joint staff be appointed between the Department of Botany, College of S. L. and A., and the Division of Plant Pathology

and Botany, College of Agriculture. The teaching function of the Section of Plant Physiology was to remain in the College of S. L. and A., and research which was projected in the Experiment Station should be carried on under the direction of the Division of Plant Pathology and Botany. Dr. L. I. Knight was the first physiologist appointed under this organization. He had previously taught in the University of Chicago and at the same time carried on Experiment Station work at the University of West Virginia.

During the war period the division suffered the usual disorganization. I was associated with the National Research Council Committee on Biology and Agriculture in the efforts to increase production, and Dr. E. C. Stakman was a member of the famous Phytopathological War Board which toured the country in the interests of the increase of production of cereal crops. Practically all of the member of the division were either in the army or engaged in an effort toward production increase.

The extension work of the division was (in 1916-17) placed in the hands of a special Extension Pathologist under the Extension Division, Department of Agriculture, and A. G. Tolaas was appointed Extension Pathologist. He resigned in 1919 to take over the Office of Seed Potato Certification, and Mr. Frank Frolik succeeded him as Extension Pathologist. At the end of about a year Mr. Frank Frolik resigned and R. C. Rose became Extension Pathologist and has held the position up to the present.

During this period also, considerable amount of cooperative work especially with the U. S. Department of Agriculture, Office of Cereal Investigations, was developed. The progress and work of the division is discussed in non-chronological order in a later section under enterprises.

The rapid growth and expansion of the division during the war period and in the five succeeding years is well illustrated by statistics compiled for the year 1923-24 -- sixteen years after its founding. The personnel on the regular payroll at that time (1923-24), excluding all miscellaneous labor, included 25 persons as follows: Professors 2, Associate Professors 1, Assistant Professors 2, Instructors 11, Assistants 4, Field Foreman 1, Secretary and Clerical 4. The budget for the Division of Plant Pathology exclusive of the budget of the Dean of the College was $40,440. The division had developed cooperation, as indicated above, and had developed many enterprises with which it was still cooperating or had engaged in cooperative enterprises with other organizations all of which were directly concerned with the field of work of the division, and with funds expended either directly by the division or with the Division of Plant Pathology and Botany in an advisory or other capacity. This list includes the total enterprises in the field of Plant Pathology and Botany in which the division was at that time (1923-24) engaged: U. S. Department of Agriculture part-time agents $4320; U. S. Department Special Agents $6,000; Seed Certification Agents $7,500; Barberry Eradication Agents under the U. S. Department of Agriculture $33,000; Barberry Eradication under the State Department of Agriculture $7,000; Seed Laboratory $5,000. All funds being expended in the state in the field of Plant Pathology and Botany therefore totalled (with agents) $103,260. A very creditable score: 1907-8, $4,175; plus 16 years, $103,260!

Early Enterprises in the Division of Plant Pathology and Botany

The following is a brief account of some of the chief enterprises of the Division of Plant Pathology and their development during the first decade-and-a-half of its history.

(1) Land. The first allotment was a few square rods of sand near the present Dairy Building. The next allotments, obtained from the Poultry Division, made a total of 2½ acres in the southeast corner of the farm. About 1913 or 1914,

approximately 4 acres were obtained in the northern part of the farm adjacent to an old "Russian" apple orchard. By 1924, 7 acres were in use.

An episode in connection with the allotment of land in the north end may be of interest. We had pressed vigorously for more land, since the original 2½ acres were obviously too small for our expanding experiments. Expansion in that area would practically shrink the Poultry land holding still more — so someone had to move. Professor Andrew Boss, then Superintendent of University Farm, then offered the four acres in the north end "on condition that we promise not to ask for more land." We respectfully declined to meet this condition, moreover asserting that as long as we lived we expected to ask for more land if we needed it. The condition was promptly removed.

(2) Buildings. As stated above, the division started in one room in the main building on University Farm, from which it moved to the second floor of the Horticulture building. In 1911, $10,000 was obtained to remodel the old Drill Hall, which became the new Plant Pathology Building, given exclusively to the use of this division. In 1920 a $25,000 two-story addition to the back of the building was constructed. In the field, the little shanty known as the old "Well House" was used in the original field in the southeast part of the farm. When a new allotment of land in the north end of the farm was obtained, a field house costing $2,500 (special appropriation) was constructed about 1913.

A range of greenhouses was obtained in cooperation with the Division of Agronomy and Entomology shortly after 1913. Previous to this time, a small amount of space had been available in the horticulture greenhouses. The new range of greenhouse buildings in connection with the old blacksmith shop in the back of the Tottering Tower cost $10,000. In the early 1920's the coal bunker and store house of the old blacksmith shop were converted into laboratories for experiments on continuous lighting and cold temperatures for Plant Physiology.

(3) Organizations Developed Through the Activity of the Division. In 1913 the Seed Law (mentioned above) was adopted by the state legislature and a laboratory established in the Experiment Station and administered by the Division of Plant Pathology and Botany. The annual appropriations for the testing of seeds and the operation of the laboratory were continued under the supervision of the division until transferred at the recommendation of the Division and the Department of Agriculture to the State Department of Agriculture in 1919. The Seed Laboratory has continued in cooperation with this division, though administrationally a department under the State Department of Agriculture.

In 1919 the work which had been carried on for some years in the Division of Plant Pathology and Botany looking toward certification of seed potatoes was crystallized by the state legislature in the Seed Certification Laws which had been formulated largely by Stakman and Tolaas. The office for the administration of this seed certification was placed in the State Department of Agriculture. A. G. Tolaas, Professor and Extension Pathologist in the Department of Agriculture in the University was placed in charge and has been in charge ever since.[1] This important aid to the seed potato industry in the state was not obtained as simply as the above brief statement might lead the reader to believe. Some years of preliminary maneuvering were needed to bring it about. From the earliest days of the division we realized that the seed-potato business, in which Minnesota held an advantageous position, could never be profitably continued without the control of the numerous diseases to which potatoes are susceptible. We finally decided that the first approach should be through more effective organization. Largely

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1. See history by A. G. Tolaas.

through Tolaas's activities the seed-potato growers were induced to form a State Seed-Potato Association, which promptly elected Tolaas as secretary. It was with the help of this organization that the certification laws and machinery were finally obtained. We learned from this that plant disease control may sometimes require social organization as well as fungicides and insecticides.

Barberry Eradication. The deadly role of barberry in the life of wheat rust had been known since DeBary's classical researches in 1865. But no one in this country could ever summon sufficient courage to attack the problem of barberry eradication. Then came World War I with its demand for maximum production. The time was ripe for any campaign that would increase production. It seemed the golden opportunity to start barberry eradication.

The division cooperated with pathologists from neighboring States in 1918 in a conference to determine the feasibility of barberry eradication. It was decided to push such a campaign throughout the North Central States. Through the activities of this division, the Board of Public Safety of Minnesota was induced to pass an order, which was followed later by a law enacted by the legislature, authorizing the eradication of barberry and establishing quarantines. The first appropriations in the State were for $2,500 for this purpose and were allotted to the State Entomologist's Office. Later the State appropriated $20,000 for the year, and the appropriation in 1924 was $7,000 a year for this purpose. The division was also very active in promoting a campaign throughout the barberry eradication territory of thirteen States (later 18) and has been instrumental in attaining legislation in all these states and in the dissemination of information throughout the country. To Dr. Stakman should go the chief credit for the success, not only of the eradication campaign in Minnesota but in the national campaign as well. His aggressive yet persuasive oratory and indefatigable energy have won, often over overwhelming odds, the support of literally hundreds of conventions, legislatures, congressional committees, and organizations of many kinds all over this country. The division has worked in close contact in this campaign with the Conference for the Prevention of Grain Rust. This Conference was and is a living tribute to the extraordinary debt which the eradication campaign owes to the late Franklin Crosby of General Mills, Minneapolis. He was the prime mover and organizer of this Conference of business men, chiefly of the Twin Cities, for providing financial backing totaling hundreds of thousands of dollars and the staunchest moral support from the business world.

The most vivid picture which I carry of the early days of the campaign took place one night at the Minneapolis Club, where Crosby had assembled the business heads from every kind of business or other activity centering in the Twin Cities. I recall that as I looked the crowd over I wondered how many billions of dollars of invested capital was represented. Presidents of the largest banks, transcontinental railroad presidents, heads of milling and large mercantile establishments, governors of several States, legislators, judges — every kind of business large and small seemed conspicuously represented. Stakman, to most of these dignitaries and wealthy tycoons absolutely unknown, was scheduled to make the only speech. We were sitting in the back of the hall when Mr. Crosby opened the meeting and called immediately on Stakman. "Stak" jumped up and with that semi-belligerent air of eagerness to enter a fray of discussion and wits, strode solidly down the center aisle. Before he reached the speaker's platform he pulled one of his little speaking tricks — he began his speech on the march — and continued on the platform for an hour a veritable verbal barrage that held the intense interest of every man in the audience. He told simply and effectively the story of the rust of wheat and the role of barberry, the complicated problem of barberry eradication, and the need of support not only from public agencies and the farmers but from business men and the urban centers.

The effectiveness of that speech is illustrated by the remark made after the meeting by "Jake" Preus, then Governor of Minnesota, when he personally congratulated Stakman and promised support of his office to the campaign: "Would Dr. Stakman consider

a proposition of 'stumping' the State for the Governor in the next political campaign?" Stakman subsequently "stumped" this and many other States, but not for political campaigns.

The barberry eradication campaign is still (1947) in progress in the North Central States and is probably the greatest campaign in history as far as the eradication of plant diseases is concerned and from the standpoint of territory covered and results obtained.[2]

During the World War I period another eradication problem was administered through the Division of Plant Pathology. This was the fight against blister rust of white pine and involved chiefly the eradication of gooseberries and currants from infested areas into which the disease had been imported on seedling white pines from Europe. I was personally much interested and busily engaged in this campaign. It was part of a national campaign and legally assigned to the Minnesota State Inspection in the Office of State Entomologist. We were deputized, however, to carry on the work and for some years a vigorous campaign of eradication of Ribes, chiefly along the eastern border of the state, was conducted by the Division of Plant Pathology in cooperation with the Blister Rust Eradication Office of the U. S. Department of Agriculture. Because of the administrative allocation in the State Entomologist's Office, the considerable sums of money from State and federal sources do not appear in the Plant Pathology Division budget. Many thousands of dollars became available and were expended during a fairly long period of years by Plant Pathology in this campaign — which was finally taken over and is still continued by the Minnesota Forest Service of the State Department of Agriculture.[2]

The division has been in close cooperation with the Office of Cereal Investigations since the beginning of the division in 1907. An extensive cooperation dealing with the cereal rusts and smuts and many other diseases has been developed. The cooperation has been very effective and has been furthered by the excellent spirit shown by the Office of Cereal Investigations.[3]

I hope the above gives some idea at least of the beginning and first decade of progress and development of the Division of Plant Pathology and Botany. We were indeed fortunate. We had received all that could be reasonably desired from the University administration, the State of Minnesota, and many other cooperating agencies. Yet one ever-present dream remained to be realized — a new, modern and suitable building for the important work of the division. Now in the year 1947 that dream has come true. Do you wonder that I now professionally and personally look back on a life-time effort largely in Plant Pathology with some degree of equanimity and a large degree of satisfaction?

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2. See the write-up by Thain Stewart on the Minnesota office of Barberry Eradication. and by L. D. Ritter on blister rust
3. See section on cooperation with U. S. Department of Agriculture.

Table 1. Division of Plant Pathology and Botany--1907-1917

Curriculum Developments -- Dates When College Courses Were First Offered*

Year	Course No.	Title	Instructor Assistants in Parentheses	
1907-08		No courses offered		
1908-09	1	Plant Pathology	E.M.F.	
	2	Wood Technology	E.M.F.	
1909-10	3	Agricultural Botany	E.M.F. (W.L.O.)	College of
	4	Advanced Plant Pathology (undergrad.)	E.M.F.	Forestry
	5	Advanced Plant Pathology (grad.)	E.M.F.	established
1910-11				
1911-12	4	Advanced Plant Pathology (undergrad.)	E.C.S.	
	6	Advanced Agricultural Botany (undergrad.)	W.L.O.	
	7	Advanced Agricultural Botany (grad.)	E.M.F.	
1912-13	8	General Bacteriology	E.C.S.	
1913-14	1	Plant Pathology	E.M.F., A.G.T.	Dean Ford
	3	Agricultural Botany	W.L.O.	came to
	9	Industrial Mycology	E.C.S.	Minnesota
	10	Seed Testing	W.L.O.	Reorganized
				Grad. School
1914-15	Numbering system revised. Senior College courses numbered 100+. Graduate School numbered 200+			
	101-102	Advanced Plant Pathology	E.C.S.	
	8	Dendropathology (at Lake Itasca)	E.M.F.	
1915-16	7	Weeds and Grasses	W.L.O.	
	9	Seed Testing	W.L.O., R.C.D.	
	12	Seed Problems	W.L.O.	
	14	Plant Disease Control	E.C.S., A.G.T.	
	5	Wood Technology	E.C.S. (last year)	
	10	Forest Pathology	E.M.F., E.C.S.	
	201-202	Graduate Pathology	E.M.F.	
	203-204	Special Problems in Graduate Pathology	E.M.F., E.C.S.	
1916-17	1	Plant Pathology	E.M.F., E.L.J.	
	6	Plant Pest Control	E.C.S., G.R.B., A.G. Ruggles	
	14	Plant Disease Control	E.C.S., G.R.B.	
	103	Bacterial Diseases of Plants	E.C.S.	
	104	Principles of Plant Pathology	E.C.S.	
1917-18	6	Plant Pest Control	E.C.S., G.R.B., A.G. Ruggles	
	9	Weeds and Seed Testing	W.L.O., R.C.D.	
	12	Seed Problems	W.L.O., R.C.D.	
	14	Plant Disease Control	E.C.S., G.R.B.	
	103	Bacterial Diseases	E.C.S.	
	201-202	Graduate Pathology	E.M.F., E.C.S.	
	203-204	Special Problems in Graduate Pathology	E.M.F., E.C.S.	

*School of Agriculture courses are not included. These have included a general course in elementary botany and later elementary courses in weeds and seed testing.

Table 1 continued.

Year	Course No.	Title	Instructor Assistants in Parentheses
1918-19	1	Plant Pathology	E.M.F., J.M.
	6	Plant Pest Control	E.C.S., G.R.B., G.R.H.
	14	Plant Disease Control	G.R.B., G.R.H.
	15	Diseases of Field Crops	E.C.S., J.G.L.
	16	Diseases of Fruit and Vegetable Crops	G.R.B., A.G.N.
	105-106	Mycology	E.C.S., G.R.B., J.M.
	107	Methods	E.C.S., G.R.B.
	203-204	Special Problems	E.M.F., E.C.S.
	205-206	Research in Mycology	E.M.F., E.C.S.
	207	History of Plant Pathology	E.M.F., E.C.S.
	208	Seminar	E.M.F., E.C.S.

An Editorial

Wherein is set forth a plethora of platitudes
But may we take heed of them nevertheless

"By their fruits ye shall know them." Thus sayeth the Good Book. The best fruits of an institution of learning are the men and women who have absorbed knowledge, derived inspiration and developed mental power in it. Trite but true. The Division of Plant Pathology of the University of Minnesota is an institution. It is bigger, more lasting, more important than the individuals in it; but its success is measured by the stream of individuals who make it. It is dynamic, and its power is generated by the composite intellectual stimulus of those who compose it, past, present, and future. The impetus which drives it on comes from without as well as within. Some of us are officially within and some without. But we all have a common interest - progress in an intensely interesting and impellingly important branch of science. The success of the institution reflects credit upon us; our success reflects credit upon the institution. Let's all work together for the highest scientific ideals, for the greatest possible scientific accomplishment and for the richest scientific associations - may Minnesota symbolize all of them! And may the symbol help us keep the scientific faith and find our greatest joy in it. Maybe the Aurora Sporealis will help.

E. C. S.

--From Aurora Sporealis,
Vol. I, No. 1, 1924

The Second Decade 1917-1927

J. G. Leach

That period in the history of Plant Pathology at Minnesota falling between the years 1917-1927 inclusive, might appropriately be called the Premodern Era. It was ushered in during those hectic days of the First World War when, in the words of a popular song of the day, we could have truthfully said, "We don't know where we are going, but we are on our way". The steady growth of the preceding era so effectively initiated and guided by the wisdom of E. M. Freeman, aided and abetted by the rising genius of one E. C. Stakman, was temporarily thrown into confusion by the war emergency. But as is characteristics of the Department, adversity resulted only as a stimulus to new accomplishments, and soon history was being made.

It was during this temporary set-back by the call to arms that the national barberry eradication campaign was born. One of the most vivid recollections of the writer of his early days at Minnesota is that of the Literature Seminar held one cold winter evening in the drafty living room of E. C. Stakman's home on Raymond Avenue, when plans for the campaign were discussed. Little did he realize what far-reaching influence these plans were to have on the plant pathology of the nation in general and at Minnesota in particular.

This Era saw the rise and development of the concept of physiologic specialization within species of pathogenic fungi. Although the famous P. graminis tritici-compacti was discovered in the last hours of the preceding era, the classic "New biologic forms of Puccinia graminis" made its appearance in January, 1919, and the flood of new forms, a la Stakman and Levine, followed closely. And from all reports the flood has not yet completely subsided.

The early days of this period were subject to considerable Hebraic influence as a result of which the Big Chief acquired the honorary title of Rabbi. It is likely that this Hebraic influence would have had a much greater effect on course of history had it not been followed closely by an invasion of Norsemen (or should we say Norsewomen), spearheaded by one Norwegian amazon of the Berg clan (Berg x Levine). This Scandinavian influence resulted in a wholesome and happy union of the two that helped prepare the Department for the Invasion of Brains from Abroad that was to follow.

Another outstanding event of this era was the appearance on the scene of Alfred Eagle, who, in the writer's opinion, has had almost as much influence on the development of the Department as any other one person, with the exception of Freeman and Stakman. The writer can vouch for the fact that when the Eagle flew into the Plant Pathology field plots, all was Chaos. It seemed as if Eagle said "let there be order" and there was order. The writer is proud that he was among the first to recognize Eagle's genius and that he had some part in seeing that he was retained as a permanent fixture.

While the field plots were being Eaglized, an event of equal importance was taking place in the office. The appearance of Laura Hamilton in the office at first brought about almost as much Chaos as there had been in the field before the arrival of Eagle. Traffic in the main office was something terrific. Every male in the building was making all kinds of excuses to go into the office just to get a glimpse of the new stenographer and perhaps to get up courage and ask for a date. They soon learned however, that Laura was as efficient and businesslike as she was good-looking, and that business before play was her motto. Soon the office machinery was running as smoothly as the field machinery. Laura's business efficiency has not prevented her from taking a personal interest in all those who passed through the halls of the Tottering Tower, and it is this historian's humble

opinion that Laura Hamilton must be recognized as one of the major influences of the "Premodern Era" that have helped make the Department what it is today.

No historical account of the "Premodern Era" would be complete without recognition of the rise and development of Potato Seed Certification under the able direction of the genial and Master Punster Arne Tolaas. Those of us who were responsible for research and teaching in the field of potato pathology owe much to Arne and his certification program. His office in the attic was the Mecca of all potato pathologists, and most of the good ideas in this field (if there were any) had their inspiration in the "bull sessions" on potato diseases that were held in that office. The financial support to potato research now coming from his office is a magnificent gesture, but is equalled in every respect by the less tangible cooperative activities that were maintained throughout the "Premodern Era".

It was during the early part of this Era that Stakman, on one of his foraging expeditions, came in contact with that scientific paragon, H. Reginald Buller, and persuaded him to visit the Tottering Tower. Thus was initiated an association that profoundly influenced the thought of all inhabitants of the Tottering Tower and made familiarity with "Researches on Fungi" a prime necessity for all aspirants for the coveted degree.

Reference has been made to the Invasion of Brains from Abroad that followed soon after the Hebraic period. This invasion was initiated by Waterhouse of Australia, soon followed by further infiltration from "Down Under", in the persons of R. J. Noble, H. J. Hynes and others. While we were busy trying to hold our own with the invaders from down under, we were attacked from the north by a hoard of mental giants.

Among the early invaders from the north were Guthrie Sanford, A. Henry, J. H. Craigie, Margaret Newton, D. L. Bailey, T. Johnson, I. L. Conners, Bill Broadfoot, and W. F. Hanna, all of whom left an indelible Bulleresque impression on the spirit of the department and who, after having drunk at the foaming fount, have moved on to spread the fame of the Department far and wide.

Having withstood these early invasions, the Department had no difficulty in coping with similar invasions from all corners of the globe, including W. L. Waterhouse, R. J. Noble, and H. J. Hynes from Australia, Olaf Tedin from Sweden, Bela Husz from Hungary, Chi Tu from China, PeeWee Wallace from Mississippi, and Herman Rodenhiser from New Hampshire. All invaders were successfully converted to belief in the infinite power and supreme importance of physiologic specialization and were sent out as ardent disciples of Aurora Sporealis.

While all this mental and spiritual development was taking place, due attention was being paid to physical welfare. Unless my memory fails me, the first official Plant Pathology Kittenball Team made its appearance shortly after the beginning of the Premodern Era and held the Ag Campus Championship throughout the period. From the records of early sports reporters, it seems that Stakman was the star of the team the first year, managing to win all games merely by force of argument and clarity of logic in expounding the rules of the game to the umpires.

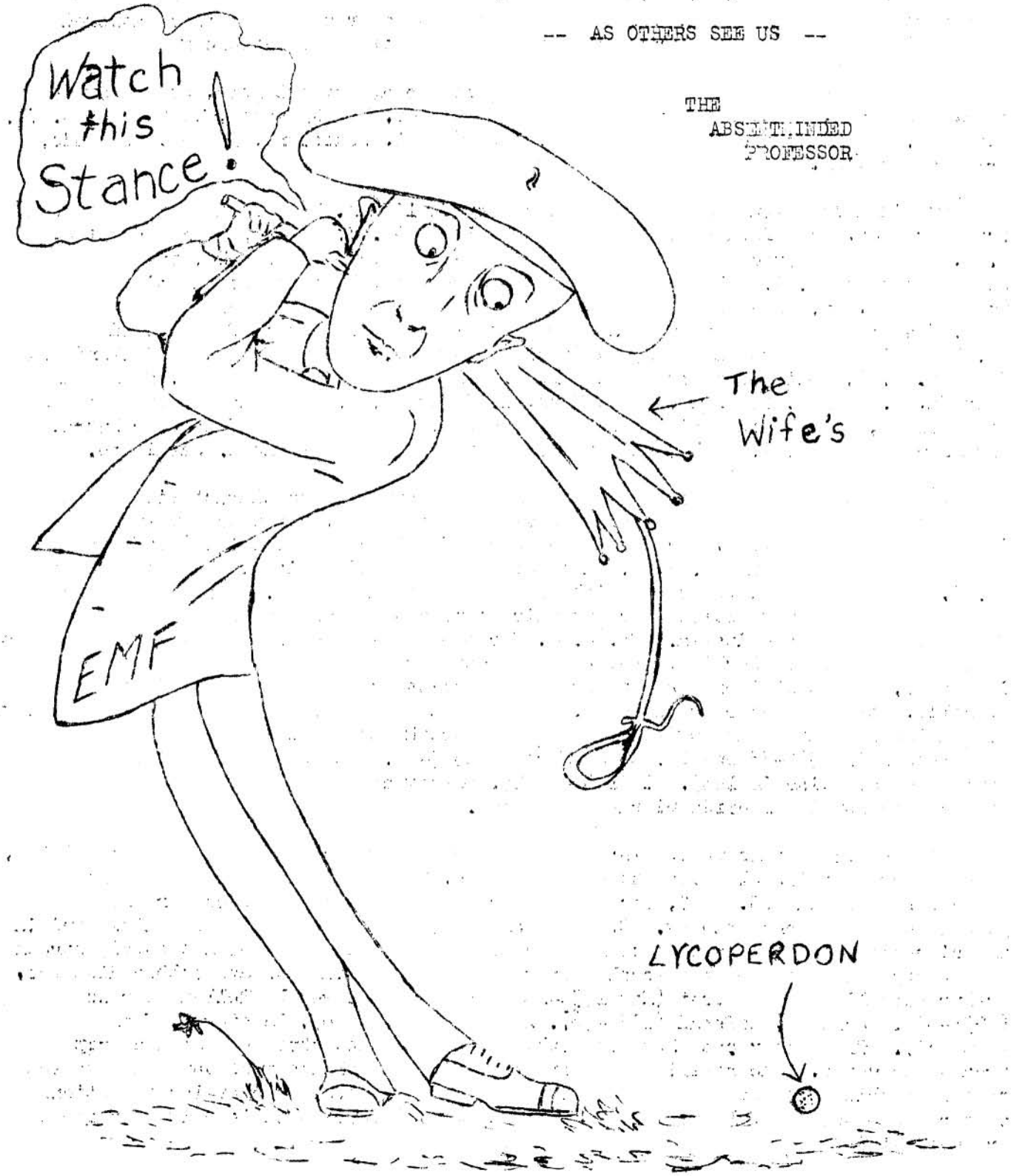
The Premodern Era also can claim the honor of having conceived and brought forth the official publication of our patron Saint, Aurora Sporealis, in which these chronicles are recorded. The first Aurora, dated August 1, 1924, was issued by a committee consisting of Helen Hart, H. A. Rodenhiser, and A. W. Henry, chairman. This publication is proof in itself that the Premodern Era was one of high attainments in the field of Literature and Art. A perusal of the first 4 volumes of Aurora, ending in July, 1928, reveals 17 poems, some of epic length, and one 4-act play. How deeply poetic were the pathologists of the Premodern Era is revealed by this gem of metered composition: "Peridermium kurilense on Pinus pumila Fall. and Peridermium indicum n.sp.on Pinus exelsa Wall."

That these desciples of Aurora were also ardent patrons of fine art is witnessed by the fact that each number of these four volumes is illustrated by a fullpage reproduction of one of the masterpieces of Old Timer "Gil" G. D. George.

Compare this with the products of the present Era. Is it possible that we are becoming materialistic? All in all, the Premodern Era has quite a record of accomplishment to its credit.

-- AS OTHERS SEE US --

THE
ABSENT-MINDED
PROFESSOR



--From AURORA SPORALIS, Vol. I, No. 1, 1924

The Third Decade - 1927 - 1937

Louise Dosdall

The period between September 1, 1927, and September 1, 1937, marked an interlude between wars in which the division continued its rapid growth and developed more thoroughly into an international center where persons from near and far gathered for the interchange of ideas regarding the problems of plant pathology.

Among those studying were persons from Minnesota, North Dakota, South Dakota, Iowa, Wisconsin, Ohio, Michigan, Kentucky, Tennessee, Pennsylvania, Washington D. C., Virginia, New Hampshire, Maine, Florida, Mississippi, Louisiana, Kansas, Colorado, Arizona and Utah.

The invasion from Canada was continued by William F. Hanna, Thorvaldur Johnson, Frank Greaney, BjornPeturson, Dean C. C. Neufield, Dr. J. Levitt, Eric Sharvelle, M. W. Cormack and Fred Davies. From Belgium came Germain Verplancke, from Czeckoslovakia Dr. J. Peklo, from Germany Leo Ostrach, Kurt Hubert, Martin Schlegtendal, Dr. Karl Isenbeck and Dr. Hanna Becker; from Great Britain came J. H. Western, Sydney Dickinson, Alan R. Gemmell and Ian Tervet, from Poland Dr. Karol Zaleski, from Arizona and Russia Nicholas V. Ponomareff, from Holland and Java Dr. S. J. Wellensiek, from India M. W. Kamat and Syed Vaheeduddin, from China Chih Tu, T. C. Loh, Lee Ling, C. S. Wang, L. Hwang, C. T. Wei, Shan M. Chen and Chen Tong Tsiang, from South Africa Dr. Len Verwoerdt, from Australia John Churchward, from New Zealand J. G. Gibbs, and from the Phillipines Valeriano M. Sarmiento.

The third decade in the history of the division was also characterized by a steady stream of staff members to distant parts for study, consultation and investigation. Dr. J. G. Leach spent a year (August 1927-August 1928) studying bacterial diseases with Dr. S. G. Paine at Cambridge University in England and with Dr. C. Stapp at the Biologische Reichsanstalt in Berlin-Dahlem. During the same year Dr. R. B. Harvey visited various universities and research institutions in England, Germany, and Russia. Dr. J. J. Christensen studied smuts with Dr. Hans Kniep at the University of Berlin (October 1929 - October 1930) and visited various places in Europe. Clyde Allison was the first in a series of exchanges at the University of Halle, Germany, under Professor T. H. Roemer in Plant Breeding and Plant Pathology, during the academic year 1928-29, followed by Frank Kaufert in 1930-31, Clyde Christensen in 1932-33 and Dr. Helen Hart in 1937-38. The Levines spent three months in Palestine in 1935. In 1936-37 Dr. Harvey again was on leave of absence to do research for the Florida Citrus Commission.

It was during this period that Dr. Stakman really became a world-wide traveller. After frequent trips all over the United States, Canada and Mexico, he and Arthur Verrall set out May 15, 1930, for Liberia to study plantation rubber for the Firestone Plantations Company. Dr. Stakman spent approximately three months studying the situation, and as a result of his recommendations there has been a steady stream of research workers from the local center to Liberia to investigate rubber diseases. Arthur Verrall was the first (May 1930-March 1931), followed by Rolland Lorenz (1931-33), George E. Hafstad (1934-36), Lee Hines (1934-36), Chester A. Wismer (1934-37). The latter came home the other way around and thus completed a trip around the world. The affiliations with the Firestone Plantations Company also led to the establishment of a research fellowship at Minnesota, so that investigations on certain phases of rubber diseases have since been carried on locally by various graduate students.

On the way home from Liberia in 1930, Dr. Stakman attended the International Botanical Congress at Cambridge and then spent approximately five weeks visiting various institutions in Great Britain. J. J. Christensen also was at the Congress. Having barely returned home, Dr. Stakman left again in November 1930 for Germany to

become guest professor at the University of Halle. Besides travelling in Germany, Czeckoslovakia, Austria, Switzerland, France, Belgium, Italy, and Egypt in the spring of 1931, he made stops in Ceylon, Malaya, Java and Sumatra to study the status and needs for production of natural rubber. On the way home short visits were made in China, Japan and Hawaii. In 1935 he attended the International Botanical Congress at Amsterdam, serving as vice president of the Phytopathological Section, and then spent the months of August to November visiting institutions in Great Britain, Holland, Germany, Belgium, France, Czeckoslovakia and Austria.

As a result of these sojourns with us by persons from many parts of the world, visits from many others, and travels of the various members of our own group to distant lands, many a Thursday-night seminar became highlighted by tales of foreign lands and foreign plant disease problems.

The ever increasing number of graduate students and visiting research fellows, and the increasing staffs of the various services offered, put a severe strain on the physical capacities of the Tottering Tower, which had been built in 1893 as a gymnasium but had been modified and renovated at various times to fit various and sundry needs at different periods. The constant cry was for more laboratories, more greenhouse space! As early as 1921 a plea was made to Dean Coffey for new greenhouses for the plant science groups. But materialization of the dreams of more adequate space was slow in coming. Greenhouses 9 and 10 of Ag Botany were built from funds given by Washburn-Crosby Company in 1922 to the Agronomy Division. Houses 13 and 14 were built in 1927 from funds of the State Department of Agriculture appropriated to furnish space for tuber indexing of the Seed Potato Certification office. The location of these houses deprived Dr. Harvey of a basement room where he was studying the effect of light on plants, leading to another appeal for more space. In 1927 a special appropriation permitted the construction of a new headhouse, which included four constant temperature rooms and eight greenhouse units wired for powerful lights for growing plants in winter; of these, Plant Pathology got houses 15, 16, and 20, and Plant Physiology houses 17 and 18. This completed the series now south of the Tottering Tower.

The drafty Tottering Tower was weather-stripped in 1927 and equipped with thermostatic controls; the following year the first-floor lecture room in the northwest corner was divided vertically to make a forest pathology laboratory, which housed Arthur Verrall, Frank Kaufert, and Dale Chapman, and an ante-room for storing class material. In 1930 the ante-room was yielded to E. L. LeClerg, U.S.D.A. collaborator, for a sugarbeet disease laboratory.

An energy-and time-saving improvement came in 1929, when phones were installed in individual offices, making it no longer necessary to buzz or shout from the main office on the third floor to floor 1, 1½, 2, 2½, 3½, or 4 so that the public could be informed how to save potatoes, petunias, oak tree, or what have you, from the ravages of disease.

Disaster nearly befell the old T. T. in 1931, when, at 6:15 p.m. on May 8, flames burst from the headhouse. Some one had left the gas burning under the paraffin pot. Prompt action by late workers brought the fire department, and damage was slight. The hero of the occasion was Reiner Bonde, now Old Timer in Maine: He glanced up from his work in the Herbarium, spied smoke, and without an instant's delay packed into a box 24 volumes of Saccardo and ran with it down three flights of stairs and outside to safety! From that day, paraffin has been melted by steam in the Tottering Tower.

In 1932 the interior walls of the building were painted light buff, giving an illusion of more space. But the pinch of the extra coat of paint was felt at times. In 1934 the high-ceilinged northeast lecture room was divided horizontally; this left the seating capacity undiminished and provided on the new floor 1½ three laboratory-offices and a long narrow room which served as laboratory, incubator,

room, and hall. The physiology lab on the second floor back was then divided to provide private offices for Dr. Harvey and Dean Freeman. Maple floors replaced many of the old fir floors. With all of these changes the building became a maze in which strangers had difficulty in finding their way about. To find Mr. Tolaas, for instance, one climbed a narrow and steep staircase from the center of the third floor hall to the Fourth Floor Front, and in order then to find Mr. Rose he had to descend the same staircase to the third floor, proceed to east end of the hall and mount another stairway to the Fourth Floor Back! In a small way it was a forerunner of the Capitol's Pentagon.

By 1937, expansion and subdivision seemed to have reached their limits, and request was made of the legislature for funds for a new building to house Agronomy-Plant Genetics and Plant Pathology-Botany. The bill, however, was not passed.

Special Events

A few special events occurring during the third decade should not be left unmentioned. In 1928 Dr. E. C. Stakman was awarded the Emil Christian Hansen Gold Medal and Prize in Denmark for his outstanding researches on the black stem rust of wheat. As pointed out in the Report of the President of the University for the biennium "-- this signifies that Dr. Stakman has a world-wide standing as an eminent scientist in the field of Plant Pathology".

In 1933 the division celebrated the 25th anniversary of its founding with a commemoration service and celebration in the Fireplace Room of the Home Economics Building on the evening of June 1. The Division was host to all plant science groups from both campuses. The program was planned to honor Dr. Freeman as founder, but he was unable to attend because of a severe bronchial cold. Arrangements were made, however, whereby he was able to hear all that was said and to send back his message over a loud speaker. Dr. Stakman served as chairman, giving a short account of the early days of the division, and members of the various plant science groups presented congratulations, praise and blame: Dr. H. K. Wilson represented Agronomy, Dr. R. A. Gortner Biochemistry, Dr. C. O. Rosendahl Botany, Prof. W. H. Alderman Horticulture, Dr. F. J. Alway Soils and Professor Andrew Boss, Vice Director of the Experiment Station, the Administration.1/

As a tribute, Dr. Freeman was presented with 9 bound volumes of the publications of the Division, including about 300 papers, some dating back to 1911. He was also presented with a volume of "Talking Leaves", illustrating the growth of the Division with photographs, drawings and snapshots. The first leaf was inscribed as follows:

> "For 25 years the genius of your leadership has helped men and women to learn and live. They present you with these talking leaves that you may know something of their respect, admiration, affection and gratitude."

In 1938 summer meetingsof the A.A.A.S. were held in Minneapolis on June 25-27; and the American Phytopathological Society met at University Farm. Some joint sessions were held, with about 500 in attendance, including symposia in which Old Timers Olaf S. Aamodt and Dean Freeman took part. There were field trips, inspection of field, greenhouse, and lab exhibits--accompanied by the usual lemonade; there was a chicken dinner furnished by Northrup King and Co. at their seedhouse; a classic kittenball game between visitors and locals, with presentation of a tin loving cup, fashioned by Earle Hanson, to Professor H. L. Bolley as the most valuable player; and a banquet at University Farm. Entertainment at the banquet included a drama in three episodes from 200 years of phytopathological history--

1/ Dr. Freeman's response is recorded in full and a more detailed description of the event is given in Aurora Sporealis, Vol. IX, No. 2 and 3, 1933.

1835, presented by Henry Darling and Clyde Christensen; 1935 by Carl J. Eide and Matt Moore; and 2035 by P. D. Peterson and Howard Johnson.[2/]

During this decade the habit of having a get-acquainted picnic in the fall became traditional. The first of an annual series--although not the first group excursion--was held in 1935 at Battle Creek Park on a Thursday evening in October. To quote from Aurora,

> "Fifty phytopathologists ranging from Bobby LeClerg, age 5 years, to ... Stakman, age (mental) 3000 yrs., made merry and ate 25 pounds of meat...20 dozen buns, a bushel of apples, 6 dozen doughnuts, etc. It cost the single men $.39 and the married men (including Matt Moore, Earle Hanson, and Fred Davies) $.78 ..."

Course Work

In the fall of 1927--the beginning of this decade--the following courses were offered in the Division:

Plant pathology 1	Stakman, J. J. Christensen, Peterson
Weeds and grasses 7-8	Larson
Weeds and seed testing 9	Larson
Forest pathology 10	Stakman, Lindgren
Plant disease control 14	J. J. Christensen
Mycology 105-6-7	Freeman, Dosdall
Methods 108	Leach
Principles of plant pathology 110	Stakman, Henry
Diseases of field crops 111	Stakman, J. J. Christensen
Diseases of fruit crops 112	Leach
Diseases of vegetables 113	Leach
Advanced forest pathology 114	Stakman, Lindgren
Pathological histology 116	Leach
Special problems 203-4-5	Freeman, Stakman
Research in mycology 207-8-9	Freeman, Dosdall, Stakman
Seminar 213	Stakman

In 1929, Principles 110 was dropped, and four courses were added:

Principles of plant disease control 119	Rodenhiser
Principles of plant pathology 214	Stakman, Rodenhiser
Diseases of forage and fiber crops 117	Rodenhiser
Bacterial diseases of plants 118	Leach

The title of 203-5 was also changed to "Research in plant pathology" with the following as instructors: Freeman, Stakman, Leach, J. J. Christensen, Rodenhiser, and Louise Dosdall.

"Insects in relation to plant disease" was the Seminar topic in 1930-31, and in the fall of 1931 a course in Insects in Relation to Plant Disease 141-2 was introduced (Leach, Granovsky). In the same year, Dr. Harvey's courses in plant physiology were transferred from the Department of Botany on the main campus to the Division of Plant Pathology and Botany at University Farm.

In the Graduate School Announcement for 1931-32, courses were listed under two sections: 1. Plant Pathology, 2. Plant Physiology and Agricultural Botany. In

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2/ Details of the sessions, including a description of the drama, the names of the 36 visiting plant pathologists, and the line-up of the kittenball teams can be found in Aurora Sporealis, vol. XI, No. 3.

the latter section the following were taught by Dr. Harvey:

Plant microchemistry 160
Transport, storage and ripening of fruits and vegetables 161
Physiological relations of crop plants to temperature 162
Research methods in applied plant physiology 250
Seminar in applied plant physiology 251-52-53
Research problems in applied plant physiology 254-55-56-57
Growth factors in crop plants 258-59

In 1933, Diseases of Fruits 112 and Diseases of Vegetables 113, which had been taught in alternate years, were combined into Diseases of Fruits and Vegetables 112 (Leach, Eide), given for the first time in 1934-35. Also listed for the first time in 1933 was Genetics of Plant Pathogens 215 (Stakman and J. J. Christensen). Methods 108 was dropped in 1929, and Methods 143--described as "theoretical and practical methods used in mycological and pathological research" was introduced in 1935 (Eide, Hart). Applied Plant Physiology 163 (Harvey, Landon) was oppered for the first time in 1935....In 1936 Dr. Freeman gave up an active part in teaching.

Researches in Progress

The real center of interest during the decade lay in the varied projects underway and the manifold ramifications of the problems being investigated. Inquiries into physiologic specialization were no longer confined to Puccinia graminis but were being made also in other fungi:

P. coronata	H. E. Parsons
P. sorghi	J. J. Christensen and H. E. Brewbaker
Cereal smuts.....	H. A. Rodenhiser, L. J. Tyler, George Hafstad, E. G. Sharvelle, M. B. Moore, K. Isenbeck, J. G. Churchward, C. S. Wang, Lee Ling
Phlyctaena linicola.....	H. A. Rodenhiser
Fusarium spp.....	Chi Tu (cereal head blights), J. G. Leach (muskmelon wilt), C. J. Eide, J. J. Christensen
Pestalozzia funerea.....	C. M. Christensen
Helminthosporium gramineum.	J. J. Christensen, T. Johnson, Thomas Graham

Implications of heterothallism and mutation were being explored by E. C. Stakman and J. J. Christensen in Ustilago zeae. Mutation and saltation in Helminthosporium sativum kept J. J. Christensen, Fred Davies, and Thomas Graham busy for many years; while Sydney Dickinson concerned himself with the mechanism of saltation in species of Fusarium and Helminthosporium. Single-spore isolations had become of fundamental importance, and W. F. Hanna devised a simple apparatus for picking up spores, while Dickinson contributed further to the technique of isolation.

These problems evolved directly into the field of genetics of fungi, with ramifications into the physiology and cytology of the organisms concerned. Researches in this field included the ff.:

U. zeae	J. J. Christensen, W. F. Hanna, S. P. Chilton, J. M. Walter, Milton Kernkamp.
Sorghum smuts...	W. F. Hanna, K. Isenbeck, and C. S. Wang
Hybridization	
U. avenae X U. levis	C. S. Holton
U. hordei X U. medians	C. C. Allison
Sphacelotheca sorghi X Sorosporium reilianum.....	L. J. Tyler and C. P. Shumway
S. reilianum X Sphacelotheca cruenta.	Vaheeduddin Syed

C. H. Western was interested in sexual fusions in U. avenae under natural conditions; and C. M. Christensen, while at Halle, Germany, devised a technique for securing haploid lines of U. tritici. Ingenious Matt Moore invented a simple partial-vacuum apparatus for inoculating loose smuts.

Rust epidemiology studies were being continued, as is indicated in the section on cooperation with the U. S. Department, including population trends of physiologic races and distribution of spores in the air. Studies on disease resistance also were being made along various lines:

P. graminis tritici

Stomatal behavior in wheat.....	Helen Hart
Effect of light	Hart, I. L. Forbes, L. W. Melander, Karol Zaleski, L. Hwang
Physiologic resistance.....	W. N. Ezekiel
Melampsora lini	Eric G. Sharvelle
Actinomyces scabies.....	J. G. Leach, F. Krantz, Henry Darling

Insects in relation to disease were being investigated: Maggots in relation to blackleg of potatoes and heart rot of celery, and bark beetles in relation to Ceratostomella blue stain in Norway pine by J. G. Leach; insects in relation to black rot of crucifers by Delia Johnson. Microorganisms antibiotic to smuts, rust, and other fungi were being studied by Miss Johnson, R. H. Bamberg, M. N. Levine, Robert Atkinson, J. J. Christensen, and Fred Davies. Interrelationships of winter killing and root-rotting organisms in alfalfa also were being studied by M. W. Cormack.

Investigations on diseases of ornamental plants, especially gladiolus and iris, were being made by Louise Dosdall.

Special mention should be made of Matt Moore's seed grain treater, which had its birth toward the end of the decade. No one thing emanating from the division has become, probably, so widely known and popularly used. Described in at least two mimeographed editions by the Entension Division--with 6000 copies issued in 1936--a total of 171,700 copies of The Minnesota Seed Grain Treater were issued in printed form at Minnesota or by the U. S. Department and circulated by the extension services of many other States and in Canada. Adding thereto 445,770 copies of USDA Miscel. Pub. 219, in which the treater was described, the grand total (up to 1944) becomes 633, 470!

Various phases of forest pathology also were receiving attention:

Elm die-back; Fomes igniarius	A. F. Verrall
Wood decay and tree rusts.....	Ralph Lindgren; with Dale Chapman on the latter study
Heart rot of balsam fir; biology of Pleurotus corticatus	Frank Kaufert
Insects in relation to blue stain	J. G. Leach, L. W. Orr (Entom.), C. M. Christensen, Ralph Nelson
Survey of forest diseases of area...	C. M. Christensen, Rolland Lorenz

E. L. LeClerg became our statistical expert, and, in addition to his work on sugar beet diseases, he demonstrated how experimental designs could be improved. Toward the end of the decade Dr. Stakman became interested in grain smuts as allergenic fungi, in cooperation with Dr. W. F. Wittich of the American College of Allergists.

In Plant Physiology, Dr. R. B. Harvey was investigating cold resistance and winter hardiness in plants, the role of ethylene in the ripening process, and the use of toxic agents in eradication of noxious plants. His experimentations in

coloring, waxing and sterilizing of fruits and vegetables, their quick freezing and storage at low temperatures, the use of ethylene in fruit and vegetable ripening and in the blanching of celery led to many widely used practical applications. In 1936 he became interested in the X-ray detection of internal defects in fruits and vegetables. With Dr. Harvey, others made the following studies:

Effect of light on growth of tree seedlings	G. P. Steinbauer
Iodine in plant nutrition	L. O. Regeimbal
Hydrophilic colloids and hardiness	S. J. Dunn
Influence of light, temperature, and moisture on hardening	H. M. Tysdal
Maximum temperatures tolerated by forest trees	Ralph Lorenz
Gases in tree stems	Warren Chase
Environment and coloring of fruits	A. C. Vogele
Production and function of ethylene in ripening process	R. C. Nelson

In mentioning these investigations it is realized that problems can not be divided strictly into chronological time periods, since those of the moment are but outgrowths of previous investigations and form the beginning points for those of the future. The third decade in the growth of the Division was one of great investigative activity.

Remember Dr. Stakman's Classes in Scientific German?

Last October most of diese deutsche Studenten knew kein Wort von Deutsch: non kommen Sie alle from the main campus back with Stück Papier to show they read German! But Himmel, they ar so gut at guessing, is it any vonder? When die Frage is asked, "Was ist Ziegenbock?" --somebody quick remembers that "ziehen" is to draw, so Mr. Johnson says drawing book, Mr. Nelson hazards ox, Miss Hart says drawbridge. So many good guess! Such intelligence! These Studenten should go far. They should be able a language from one Wort to build. One of the dumm members der Klasse looks up Ziegenbock and finds out it is a billy goat! So der Lehrer had not one Ziegenbock, sondern drei goats!"

---From Aurora Sporealis Vol. III, no. 2, 1927

Echoes From the "Prelims"

Melander has accomplished something which defied the combined talent of the mycological denomination for many years. He got the red seaweeds out of the sea onto the land. Not only that, but he made parasities out of them. He got a big but torpid seaweed onto a small but active water beetle; the beetle flew from the sea to the land, and, hocus pocus presto chango, with one wave of Melander's wandlike hand the Rhodophyceae became the Laboulbeniales.

---From Aurora Sporealis Vol. III, No. 3, 1927

Stakman: How long will it take you to give your Seminar Paper, Bamberg?

Bam: Oh, I reckon about 10 or 15 minutes--if there are no interruptions; But I can stop in the middle if it 'cause part of it has no relation whatever to the rest of it.

---From Aurora Sporealis, Vol IV, No. 1, 1928

Fourth Decade - 1937 - 1947

E. C. Stakman

The decade 1937 to 1947 was a period of uncertainty and change. Economic depression, war, and post-war readjustments made it difficult even to carry on some of the long-time programmatic investigations and necessitated complete suspension of certain basic research projects. Recovery is still underway. But the retirement, in 1943, of Dr. E. M. Freeman, founder and Chief of the Division and long Dean of the College of Agriculture, Forestry, and Home Economics, was an event from which there can be no recovery.

Doc Freeman founded the Division with the idea that botany could and should function in improving and insuring agricultural production. With extraordinarily clear vision, he 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. This may be axiomatic in 1948, but it was not axiomatic in 1908. Doc Freeman was eminent among a small group of pioneers in plant pathology and applied botany. He charted the course of basic investigations for decades to come. But he was eternally curious, also; research was not only a practical service but also an intellectual adventure. Doc Freeman's science solved problems and enriched life. He had the genius to take students with him on his scientific, speculative, and philosophic excursions. He was a great teacher. His lectures on evolution were a morphogenic stimulus in the expansion and evolution of hundreds of minds toward maturity. Even when the burden of administrative duties was heaviest, the Dean retained his glowing zeal for science. He expected interest, effort, and attainment of students, teachers, and investigators; and it is a tribute to his genius that they tried to fulfill his expectations. He was a genuine naturalist and he was naturally genuine. Troubles simply faded into oblivion under Doc's treatment. His analytic and synthetic powers, his human understanding and warm sympathy, his contagious enthusiasm, his strong sense of justice, his inexhaustible store of common sense, his optimism and resourcefulness, and his devotion to duty have made him a great leader in science, education, and administration. He has been wise, he was stimulating, and he was human; he still is, and watches us from his pictures in the Library and in the Seminar room and occasionally in person, and expects us to carry on.

The Division is trying to carry on, even under conditions that were trying during at least half of the decade. Despite the depression, the war, and changes in personnel, there has been some progress. A total of 280 publications, with many more manuscripts ready for the final polishing, is evidence of productive scholarship. During the decade, 33 M.S. degrees and 45 Ph.D. degrees were earned and conferred, a considerable number to students from other countries. There have been 39 graduate students from 13 countries. And many of our own students visited foreign parts as members of the armed forces, then returned after an enforced absence of several years and pitched in as if they never had been away. More power to them!

On October 15, 1941, most of the Division moved from the Tottering Tower (Phytobrickhaus tremuloides Graham) to Phytobrickhaus elegans or erectus, depending on the nomenclatorial system. Adjustment to the new building was not particularly easy, at least for some of the older members of the staff. Phytobrickhaus tremuloides was by nature and art a maze of dark and devious passages, of oscillating floors, quaking walls, rattling windows, and, in the winter time, drafts of hurricane intensity. It was the hallowed home of generations of mice, cockroaches, and other friendly if somewhat annoying and occasionally offensive biological entities. And yet its snugness, intimacy and heterodoxy conduced to productive scholarship. People from various parts of the world congregated there and had to associate with each other so closely that they had to fight or become friends. Fortunately, most of them became friends. The traditions of the Q. C. F., the Canyon, the Blue Room,

the Better 'Ole, and diverse and sundry other cubicles and labyrinths, contributed to the educational progress that was made in the T. Tower which appeared to have been designed by a series of architects aided by Delerium tremens. In reality, however, the jig-saw complex resulted from numerous attempts to adapt an armory-carpenter shop-gymnasium-agricultural engineering conglomerate to the expanding needs of our division.

With all of its quirks and squeaks, the walls of the old Tottering Tower must still echo with the sounds of the discussions and arguments; they must still quiver with the zeal of graduate students who were trying to contribute to science rather than merely to satisfy the requirements for a degree. The enforced closeness of association probably actually did have a stimulatory effect. The problem usually was to keep graduate students from talking all day about their own work rather than to find a graduate student who had some work to show.

But now the Division is in Phytobrickhaus elegans. If the old building was the Tottering Tower, the present one should be the Skycutter! The two buildings have one thing in common: Both have been the campus lighthouse. Hundreds of inquries were made about the amount of electric current that was consumed for lighting purposes in the old T. T. The beautiful new Skycutter also has the reputation of using large amounts of electric current for lighting purposes during long periods day and night.

The new building of course has decided advantages over the old one. Organized instruction is given principally on the ground floor; the second floor houses common facilities such as the library and herbarium, plus a number of offices and one good laboratory. The third floor is devoted principally to office and laboratory space for experiment station work, and the fourth floor is sacred to graduate students and is sanctified by some. The Seminar Room is one of the most attractive in the University. The furniture that the Old Timers gave for the room in 1941 is one of its great charms. The old family tradition has been maintained by the institution of the Kaffe Klatsch, which klatsches daily in the Seminar Romm at about 3:30 in the afternoon and about 9:30 at night.

Bricks and mortar do not make a University, but they can help. The present building is less hazardous to life, limb, and equilibrium. It is at least possible to offer laboratory work in advanced courses and to offer a few more square feet of space for the research of graduate students. There also is more greenhouse space and somewhat better equipment. And despite the physical separation of applied plant physiology and agricultural botany, still housed in the Tottering Tower, the sections have coalesced into a homogeneous unit. There is more space and a far more logical arrangement of facilities, but possibly some of the old intimacy is gone. Time was when one person almost had to sit in another's lap and use the same microscope. Very rarely someone still treads on another's toes but not necessarily because of crowding. Coffee hours and informal seminars still provide opportunities for group effort. The contrast between the No. 3 pine tables in the Old Seminar room and the beautiful "Old Timer" tables in the present Seminar room typify the generally well-groomed appearance of P. elegans as contrasted with the rather informal garb of P. tremuloides.

The growth and evolution of the Seminar library, although possible not of prime importance, is noteworthy historically. The library was started on the theory that graduate students in applied science might partially satisfy their hunger for general education if the intellectual victuals were easily accessible. Some graduate students have given themselves the elements of a liberal education by judicious reading in the library, while others have at least looked at a lot of pictures. One of the very gratifying features is the degree to which the library has become self-perpetuating. It has become more or less traditional for individuals to present the library with one or more books when the degree of Old Timer is about to be conferred. There seems to be a more or less spontaneous request on the part of the Seminar that the books

presented be properly inscribed. This means that the members of the Seminar want to know why the donor considers the book a valuable one. The custom has had a tendency to provoke mirth and also thought regarding the relative values of books. It should be the ideal of every one doing graduate work to educate himself as completely as possible. The Seminar library has helped some people in the past, and it is hoped that it may help still more in the future.

Whether or not the quality of teaching has improved in the last decade, the quantity definitely has increased. In 1937, 22 courses were offered; and in 1947, the number was 39. Attempt has been made to meet the needs of students. As an example, a course in Physiology of Seeds and another in Special Agricultural Botany have been added to give students in agricultural botany an opportunity to learn more about the basic factors affecting seed germination and to study economic plants regardless of the part of the world in which they are grown. Likewise, the inclusion of courses in Elementary Mycology, Advanced Study of Fungi, and Industrial Mycology give opportunity for students to learn more about fungi if they do not want to take the classical 3-quarter course.

In the field of plant pathology, there is a new course in Virus Diseases of Plants; and the courses in Genetics of Plant Pathogens, Physiology of Plant Pathogens, and Ecology of Plant Pathogens have been added so that the subject matter may be approached still more from the standpoint of basic principles. The course in Principles of Plant Disease Control is in the same general category, as attempt is made to classify control measures and give at least some of the basic factors involved. There has been a tendency also to increase the number of credits in basic courses, on the theory that it is better for advanced students to concentrate on a few subjects at a time, thus giving greater opportunity for intensive study. As concerns methods of teaching, each teacher naturally is independent. There has been a growing tendency, however, to try to combine the need for organized learning with opportunity for individual learning. This method has been very successful, even in the elementary courses, in which all students do a certain amount of prescribed work but also have opportunity to investigate a problem of their own choosing. There is nothing new in this concept, but the outstanding success of the method is due to the teaching skills of those who have made it work. Wider opportunity also has been given for research and teaching assistants to help with the teaching, and there now are at least half a dozen young men who have become enthusiastic and successful teachers.

Whatever progressive evolution there may have been in the scope and effectiveness of the work of the Division has been due to group effort. Many people have contributed, including full-time staff members, research assistants, clerical force, field administration, Federal Collaborators, and graduate students.

Fortunately, a nucleus of permanent staff members has remained in the Division; unfortunately, some went elsewhere. To chronicle all of the changes would require too much space; hence, changes in full-time staff members only are therefore recorded. The unexpected and untimely death of Dr. R. B. Harvey was a severe blow, as Harvey was exceptionally prolific of ideas, was very inventive, and knew techniques remarkably well, in addition to having had a wide experience in many phases of basic and applied botany. During this period, Dr. E. G. Sharvelle resigned to accept a position at Purdue University in the spring of 1946; and Dr. Ian W. Tervet left for Nebraska during the summer of the same year. Of the full-time Federal collaborators, Dr. Erwin L. LeClerg left in 1939 to go to Louisiana State University; and Dr. Andrew Downie, who replaced him here, left in 1944 to take a position in Colorado. Dr. R. H. Bamberg left for Montana in 1937; and Dr. Earl W. Hanson, who took over his work, left Minnesota for Wisconsin in 1946. Dr. Robert C. Cassell also left in 1938 to go to Illinois. Replacements for those who left include Dr. Eric O. Mader for Dr. Sharvelle, former-Minnesotan Dr. Milton F. Kernkamp for Dr. Tervet; William Q. Loegering for Dr. Cassell; and H. W. Bockstahler in place of Dr. Downie,

History of the past does not include prophecy for the future. Nevertheless, future prospects must be predicated partly on past development. A new and vigorous generation is beginning to assume responsibility. This is as it should be. Many Old Timers have attained eminence here or elsewhere; some of them are on the way to the heights now. If the past is any indication of the future, the traditions of the Department will be carried on, and it will become more useful and productive than it has been in the past. Fortunately, a considerable number of all ages realize that the science of plant pathology and the various phases of applied botany are progressing, that many pioneer investigations were necessarily superficial, and that future progress depends on progressive emancipation from empiricism.

Clarence C. Bausman Establishes a Memorial Fund for Research in Plant Pathology

The Regents of the University of Minnesota accepted for the Department of Plant Pathology and Botany on May 10, 1946, the sum of $20,000 from the estate of Clarence C. Bausman. The income from the fund shall be used for the purpose of research in plant pathology in the State of Minnesota.

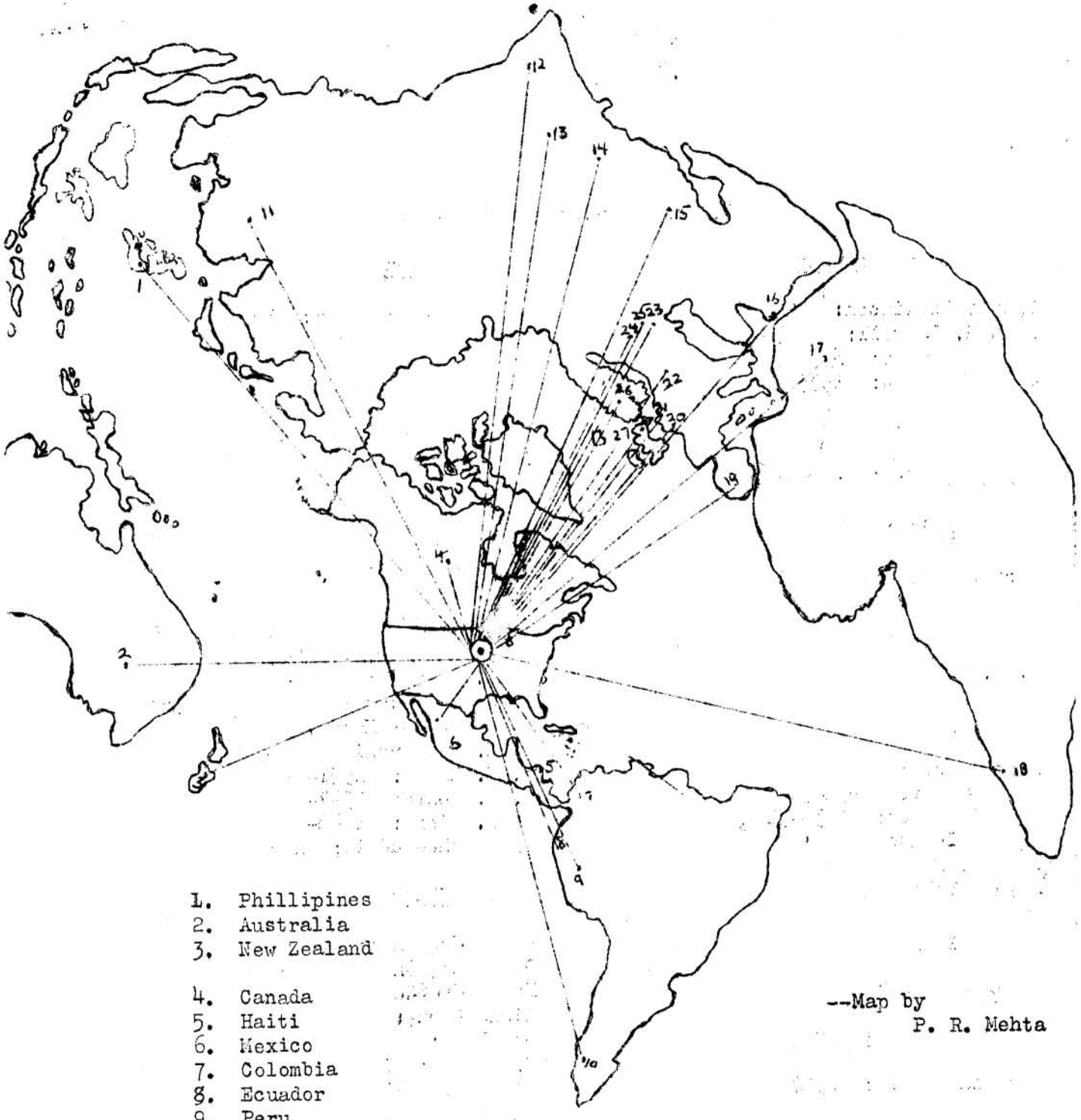
Dr. Bausman obtained his Ph.D. from Minnesota in 1919, majoring in botany and minoring in plant pathology. His thesis was entitled "Studies on the Morphology of Some Australian Algae."

---From Aurora Sporealis, Vol. 22, No. 3, 1946

All through October the Tottering Tower rumbled and shook with preparations... Pictures were taken from the walls, with many a sigh and tear, leaving relatively clean patches that paint or patina eventually will conceal; sinks, autoclaves, chemical benches, and cabinets through which untold generations of cockroaches had happily scurried since the time of the oldest Old Timer were torn by brute force from their respective fastenings and shoved out into the hallways. Dust, debris, and a feeling of anticipation and fear filled the air...Eight o'clock on the morning of November 3...The move was on... furniture and equipment of all kinds flowed in an uninterrupted stream from all the windows and doors of all floors, lowered by rope, ladder, and human chain; huge refrigerators swung back and forth in the stair wells, shouts and curses filled the air...it was each man for himself and let the weak perish...each juggled his or her own goods...Eide carried up two graduate assistants one morning under the impression they were immobile fixtures, then smoked a cigarette and was incapacitated the rest of the day...Lieutenant Sharvelle was everywhere at once, pockets bulging with plans, specifications, samples of flooring and cigars from the contractors. Moore quickly locked all equipment and supplies and disappeared. The process described above in only the barest outline went on for weeks, day and night. It was hell.

---From Aurora Sporealis Vol. 17, No. 6, 1941

TO THE FOAMING FOUNT



1. Phillipines
2. Australia
3. New Zealand

4. Canada
5. Haiti
6. Mexico
7. Colombia
8. Ecuador
9. Peru
10. Argentina

11. China
12. Hyderabad
13. India
14. Pakistan

15. Russia

16. Palestine
17. Egypt
18. South Africa

19. Spain
20. Belgium
21. Holland
22. Germany
23. Hungary
24. Poland
26. Sweden

27. Great Britain

--Map by
P. R. Mehta

Students from Other Countries

Great Britain

Sydney Dickinson: 1931-32
Alan R. Gemmell; 1935-37
Ian W. Tervet; 1933-35, 1937-46
J. H. Western; 1935-36

Spain

Manuel de Urries; 1947

Belgium

Germain Verplancke; 1928-29

Holland

S. J. Wellensiek; 1926-27, 1936, 1947

Germany

Hanna Becker; 1936
Kurt Hubert; 1932-33
Karl Isenbeck; 1930-31
Albert Isaksson; 1940
Leo Ostrach; 1929
Martin Schlegtendal; 1937

Poland

Karol Zaleski; 1931

Czechoslovakia

Jaroslav Peklo; 1927

Hungary

Bela Husz; 1925

Russia

Nicholas V. Ponomareff; 1936-38

Sweden

Olaf Tedin, 1926-27, 1947

Egypt

Ismail Aly Ibrahim; 1947-
Tewfik Abdel-Hak; 1946-

South Africa

G. F. Puttick; 1919-1920
Len Verwoerdt; 1930

Palestine

Izaak Wal; 1947-

India

Ahmed Ali Anvar; 1946-
M. L. Gattani; 1944-46
Syed Zulfiquarul Hasanain; 1946-
Syed Fakhrul Hasan; 1946-
M. K. Hingorani; 1945-47
M. N. Kamat; 1931-32
P. R. Mehta; 1947-
A. P. Misra; 1946-
Syed Vaheeduddin; 1934-36

China

Tsung-Jen Chen; 1946-47
Shan Ming Chen; 1936-43
Nancy Ju-Shen Hsü; 1945-46
Liang Hwang; 1937-39
Lee Ling; 1934-37
T. C. Loh; 1931-33
Dick Pon; 1947-
Mu-Hwa Pu; 1946
C. L. Shen; 1939
Yu-Tien Hsia; 1947-
Chen Tong Tsiang; 1936-47
Chih Tu; 1924-29
Huan-Ru Wang; 1945-46
C. S. Wang; 1934-37
C. C. T. Wei; 1935

Philippines

Valeriano M. Sarmiento; 1928

Australia

J. G. Churchward; 1932-33
H. J. Hynes; 1924-25
R. J. Noble; 1922-23
W. L. Waterhouse; 1920-21
I. A. Watson; 1938-41

New Zealand

J. G. Gibbs; 1935-37

Canada

D. L. Bailey; 1920-24
W. C. Broadfoot; 1923-28
Wm. J. Cherewick; 1937-38, 1939-40
I. L. Conners; 1922-23
M. W. Cormack; 1934-36
J. H. Craigie; 1923-25
F. R. Davies; 1935-38
J. J. Goodman; 1947-
F. J. Greaney; 1928-30
W. F. Hanna; 1924, 1927-28
A. W. Henry; 1920-23
Thorwaldur Johnson; 1924-25, 1927-30
Margaret Newton; 1919-22
Bjorn Peturson, 1928-29
W. E. Sackston; 1940-41, 1943, 1946
G. B. Sanford; 1922-25
Eric G. Sharvelle; 1932-34, 1939-46
F. S. Thatcher; 1939-40
L. E. Tyner; 1937-39
H. A. H. Wallace; 1947-

Haiti

Felix Pierre-Louis; 1942-43

Mexico

Carlos Barbosa Gomez; 1946-
Luis Carlos Felix; 1946-47
Maria de los Angeles Melendez; 1946-47
Benjamin Ortega Cantero; 1945-46
Leonel H. Robles G.; 1945-46
José Rodriguez Vallejo; 1944-45

Colombia

Daniel Mesa B.; 1947-
Juan E. Orjuela N.; 1947-

Ecuador

Rodrigo Orellana; 1943-
Luis Rodriguez; 1946

Peru

German Garcia Rada; 1937

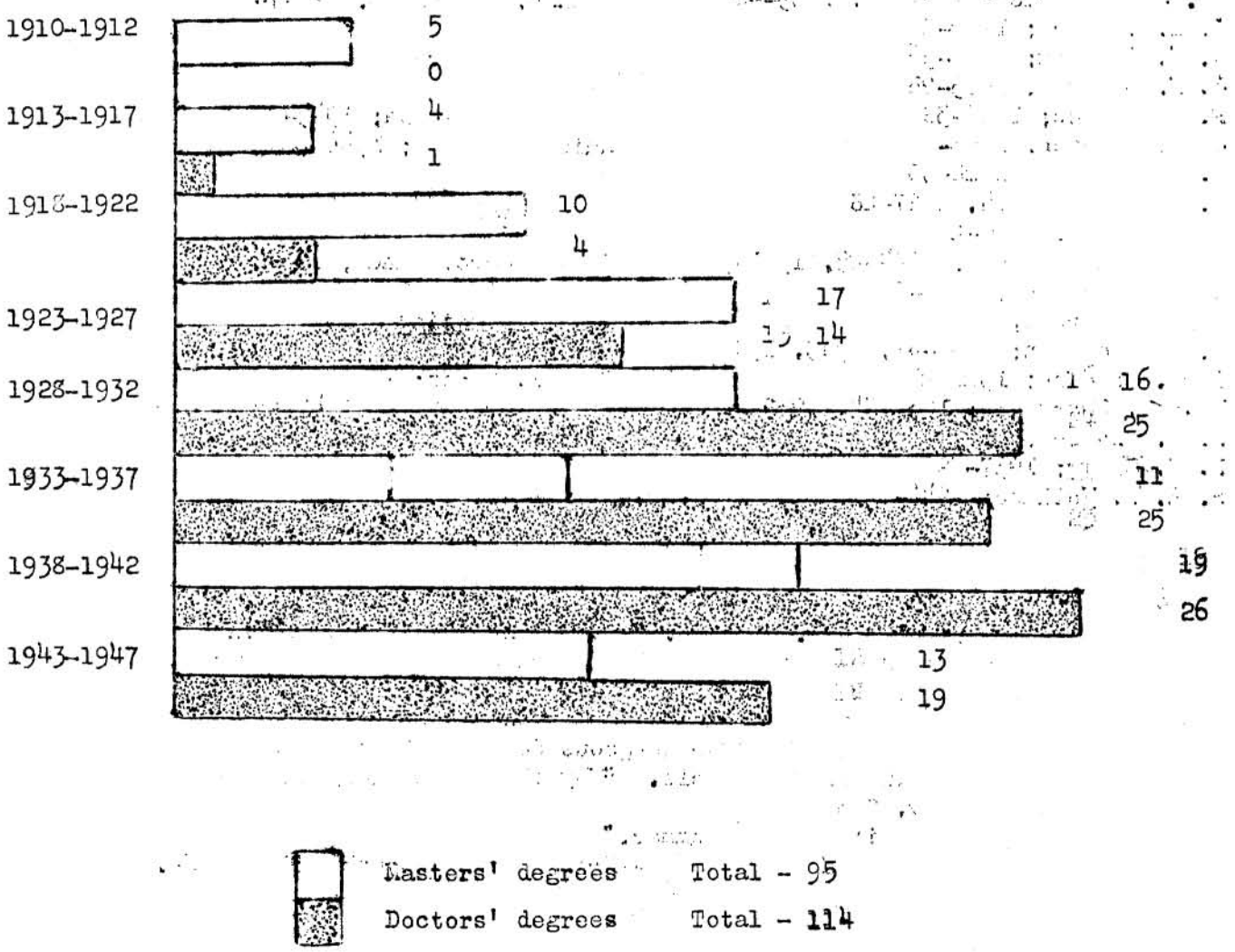
Argentina

Hugo P. Cenoz; 1946
Elisa Hirschhorn; 1944-45
José Vallega; 1939

Old Timers would hardly recognize the "Grand" Canyon, as the Graduate Lab, of yore. Time changes all things. In the seat of the mighty, formerly occupied by such personages as T. C. Loh, Jimmy Walter, and E. G. Sharvelle, benignly sits Syed Vaheeduddin, one of Mahatma Ghandi's followers. He appeared, by the by, one gorgeous day late this fall, resplendent in white flannels. "Why all the doggery in your toggery, Syed?"

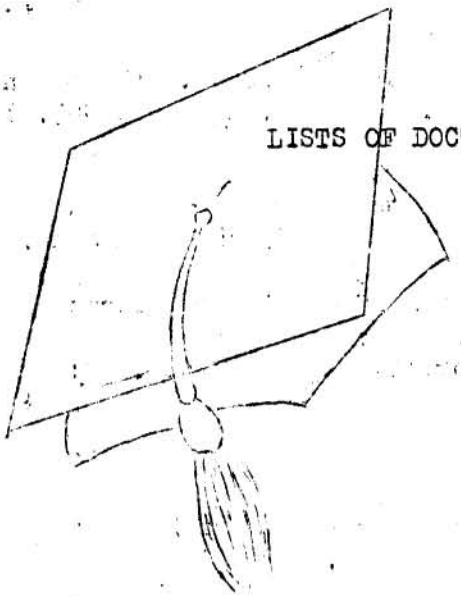
"Because its Indian summer."

---From Aurora Sporealis Vol X, No. 5, 1934



Degrees granted in the Division of Plant Pathology and Botany during five-year periods from 1907-1947 (including joint majors).

--Donald E. Munnecke



LISTS OF DOCTOR'S AND MASTER'S THESES
1907-1947

95 Ph.D. degrees granted in plant pathology
19 Ph.D. degrees granted in plant physiology
(including joint majors)

88 M.S. or M.A. degrees granted in plant pathology
7 M.S. degrees granted in plant physiology

Ph.D. Degrees Granted in Plant Pathology in the Division of Plant Pathology and Botany

1913

1. Stakman, E. C. A study in cereal rusts: Physiological races. Minn. Agr. Exp. Sta. Bull. 138. 56 pp. 1914

1919

2. Bisby, G. R. Studies on some Fusarium diseases of potato and truck crops in Minnesota. Minn. Agr. Exp. Sta. Bul. 181. 44 pp. 1919

1922

3. Dosdall, Louise. Factors influencing the pathogenicity of Helminthosporium sativum. Minn. Agr. Exp. Sta. Tech. Bul. 17. 47 pp. 1923

4. Leach, J. G. The parasitism of Colletotrichum lindemuthianum. Minn. Agr. Exp. Sta. Tech. Bul. 14. 41 pp. 1923

5. Newton, Margaret. Studies in wheat stem rust (Puccinia graminis tritici). Trans. Royal Soc. Canada. Section V. Series 3. 16: 153-210. 1922.

1923

6. Barker, H. D. A study of wilt resistance in flax. Minn. Agr. Exp. Sta. Tech. Bul. 20. 42 pp. 1923

7. Henry, A. W. Root rots of wheat. Minn. Agr. Exp. Sta. Tech. Bul. 22. 71 pp. 1924

8. Hursh, C. R. Morphological and physiological studies on the resistance of wheat to Puccinia graminis tritici (Pers.) Erikss. and Henn. Journ. Agr. Res. 27: 381-411. 1924.

9. Noble, R. J. Studies on the parasitism of Ustilago tritici Koern., the organism causing flag smut of wheat. Journ. Agr. Res. 27: 451-489. 1924

1924

10. Bailey, D. L. Specialization in Puccinia graminis avenae Erikss. and Henn. Minn. Agr. Exp. Sta. Tech. Bul. 35: 33 pp. 1925

11. Levine, M. N. Biometrical studies on the variation of physiologic forms of Puccinia graminis tritici and the effects of ecological factors on the susceptibility of wheat varieties. Phytopath. 18: 7-123. 1928

1925

12. Christensen, J. J. Physiologic specialization and parasitism of Helminthosporium sativum. Minn. Agr. Exp. Sta. Tech. Bul. 37. 99 pp. 1926

13. Sanford, G. B. Some factors relative to the pathogenicity of Actinomyces scabies. Phytopath. 16: 525-547. 1926

1927

14. Lambert, E. B. The relation of weather to the development of stem rust in the Mississippi Valley. Phytopath. 19: 1-71. 1929.

15. Seal, J. L. Cocoanut bud rot in Florida. Florida Agr. Exp. Sta. Bul. 199. 87 pp. 1928

1928

16. Johnson, H. W. Storage rots of the Jerusalem artichoke. Journ. Agr. Res. 43: 337-352. 1931.

17. Rodenhiser, H. A. Physiologic specialization in some cereal smuts. Phytopath. 18: 955-1003. 1928.

1929

18. Cotter, R. U. Factors affecting the development of the aecial stage of Puccinia graminis. U.S.D.A. Tech. Bul. 314. 37 pp. 1932.

19. Flor, H. H. Factors affecting the severity of root rot complex of sugar cane. Louisiana Agr. Exp. Bul. 212. 40 pp. 1930

20. Hart, Helen. Morphological and physiological studies on stem rust resistance in wheat. U.S.D.A. Tech. Bul. 266. 75 pp. 1931

21. Peterson, P. D. Reactions of selfed lines of corn to seedling blight caused by Gibberella saubinettii (Mont.) Sacc. and Fusarium moniliforme Sheldon. Not published.

22. Tu, Chih. Physiologic specialization in Fusarium spp. causing head blight of small grains. Minn. Agr. Exp. Sta. Bul. 74. 27 pp. 1930, and Phytopath. 19: 145-154. 1929.

23. Wallace, J. M. Physiologic specialization as a factor in the epiphytology of Puccinia graminis tritici. Phytopath. 22: 105-142. 1932.

1930

24. Johnson, D. E. The relation of the cabbage maggot and other insects to the spread and development of soft rot of cruciferae. Phytopath. 20: 857-872. 1930.

25. Johnson, E. M. Virus diseases of tobacco in Kentucky. Kentucky Agr. Exp. Sta. Bul. 306. pp 289-415. 1930.

26. Johnson, T. A study of the effect of environmental factors on the variability of physiologic forms of Puccinia graminis tritici. Canadian Dept. Agr. Bul. 140. 76 pp. 1931

27. Melander, L. W. Effect of temperature and light on development of the uredial stage of Puccinia graminis. Journ. Agr. Res. 50: 861-880. 1935

28. Nelson, R. M. Effect of blue stain fungi on southern pines attacked by bark beetles. Phytopath. Zeit. 7: 327-353. 1934.

1931

29. Greaney, F. J. The prevention of cereal rusts by the use of fungicidal dusts. Canadian Dept. of Agr. Bul. 171. n.s. 89 pp. 1934.

1932

30. Broadfoot, W. C. Studies on foot- and root-rot of wheat in western Canada. Canadian Journ. Research Sec. C, 8: 483-491, 545-552. 1933; 10: 95-114, 115-124. 1934

31. Dickinson, Sydney. The genetic implications of hyphal fusions in certain fungi. Published as: The nature of saltation in Fusarium and Helminthosporium. Minn. Agr. Exp. Sta. Tech. Bul. 88. 42 pp. 1932.

32. Holton, C. S. Studies in the genetics and cytology of Ustilago avenae and Ustilago levis. Minn. Agr. Exp. Sta. Tech. Bul. 87. 34 pp. 1932.

33. Le Clerg, E. L. Parasitism of Rhizoctonia solani on the sugar beet. Journ. Agr. Res. 49: 407-431. 1934.

34. Starr, G. H. The study of diseases of canning crops (peas and corn) in Minnesota. Minn. Agr. Exp. Sta. Tech. Bul. 89. 51 pp. 1932.

1933

35. Loh, T. C. A study of the pathogenicity and physiology of certain organisms of rice. Not published.

36. Bamberg, R. H. The black chaff disease of wheat. Journ. Agr. Res. 52: 397-417. 1936

37. Walter, J. M. Factors influencing the development of corn smut, Ustilago zeae (Beckm.) Unger. Minn. Agr. Exp. Sta. Tech. Bul. 111. 67 pp. 1935

1934

38. Eide, Carl J. The pathogenicity and genetics of Gibberella saubinetii (Mont.) Sacc. Minn. Agr. Exp. Sta. Tech. Bul. 106. 55 pp. 1935

39. Thornberry, H. H. Quantitative studies on the filtration of tobacco-mosaic virus. Phytopath. 25: 601-617, and Effect of phosphate buffers on infectivity of tobacco-mosaic virus. 618-627. 1935

40. Tyler, L. J. Variation in Sphacelotheca sorghi (Link) Clinton. Minn. Agr. Exp. Sta. Tech. Bul. 133. 48 pp. 1938.

41. Verrall, A. F. Variation in Fomes igniarius L. Gill. Minn. Agr. Exp. Sta. Tech. Bul. 117. 41 pp. 1937

42. Sharvelle, E. G. The nature of resistance of flax to Melampsora lini. Journ. Agr. Res. 53: 81-127. 1936.

43. Allison, C. C. Studies on the genetics and cytology of smuts of barley and oats in relation to their pathogenicity. Minn. Agr. Exp. Sta. Tech. Bul. 119. 34 pp. 1937

44. Forbes, Irvin L. Factors affecting the development of Puccinia coronata in Louisiana. Phytopath. 29: 659-684. 1939.

45. Harrar, J. G. Factors affecting the pathogenicity of Fomes lignosus Klotzsch. Minn. Agr. Exp. Sta. Tech. Bul. 123. 28 pp. 1937.

46. Kaufert, F. H. The biology of Pleurotus corticatus Fries. Minn. Agr. Exp. Sta. Bul. 114. 35 pp. 1936.

1936

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51. Ling. Lee. The physiology and parasitism of Urocystis occulta (Wallr.) Rab. Published as: Factors affecting spore germination and growth of Urocystis occulta in culture. Phytopath. 30: 579-591; The histology of infection of susceptible and resistant selfed lines of rye by the rye smut fungus, Urocystis occulta, 926-935; Factors affecting infection in rye smut and subsequent development of the fungus in the host, 31: 617-633. 1941.

52. Lindgren, Ralph M. Some relations and effects of fungi causing blue-stain of wood. Published as: Temperature, moisture, and penetration

studies of wood-staining Ceratostomellae in relation to their control. U.S. Dept. Agr. Tech. Bul. 807. 35 pp. 1942

53. Wang, Chi Shi. The cytology and pathogenicity of Ustilago crameri. Published as: Studies on cytology of Ustilago crameri. Phytopath. 33: 1122-1133. 1943. Physiological specialization and control of millet smut. Phytopath: 34: 1050-1055. 1944.

54. Person, Lee H. Rhizoctonia stem and root rot of beans. Published as: Parasitism of Rhizoctonia solani on beans. Phytopath. 34: 1056-1068. 1944

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1938

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60. Hwang, Liang. The effect of light and temperature on the viability of uredio-spores of certain cereal rusts. Phytopath. 32: 699-711. 1942.

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1940

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1941

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1942

71. Borlaug, Norman E. Variation and variability of Fusarium lini. Minn. Agr. Exp. Sta. Tech. Bul. 168. 40 pp. 1945

72. Graham, Thomas. Variation and variability in Helminthosporium gramineum.

73. Martin, W. J. A study of the genetics of Sorosporium syntherismae and Sphacelotheca Panici-miliacei. Phytopath. 33: 569-585. 1943

74. Downie, Andrew. Damping off and root rot of sugar beets caused by Aphanomyces cochlioides Drechs.

75. Gottlieb, David. Studies on the nature of wilting due to vascular parasites. Published as: The mechanism of wilting caused by Fusarium bulbigenum var. lycopersici. Phytopath. 34: 41-59. 1944

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1943

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79. Chen, Shan Ming. Studies on Rhizoctonia solani Kuhn.

80. Darling, Henry M. 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.

1945

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1946

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83. King, Thomas H. Studies on the relationship of Fomes lignosus Klotsch and Polyporus zonalis Berkeley and on the factors affecting the pathogenicity of Fomes lignosus.

84. Gattani, Mohan Lal. Studies on the behavior of diploid lines of Ustilago zeae (Beck.) Ung.

1947

85. Davidson, Richard S. Factors affecting the development of bacterial soft rot of potato tuber initials. Phytopath. 38: 673-687. 1948

86. Vaughn, John R. The nature of resistance of potatoes to scab and some factors affecting the type of pustules.

87. Tsiang, Chen Tong. Root rot of flax.

88. Presley, John T. Verticillium wilt of cotton with particular emphasis on variation of the causal organism.

89. Preston, Dudley A. Bacterial canker of cowpeas in Oklahoma.

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91. Feldman, Albert W. Studies on the physiological aspects of Ustilago zeae (Beckm.) Ung.

92. Silberberg, Savel B. Factors affecting the growth and survival of Phytophthora palmivora.

93. Borders, Huey I. Studies on the development and control of Sclerotinia sclerotiorum (Lib.) de Bary.

94. Hingorani, Monohar Karamchand. Physiologic and pathologic studies of certain physiologic races of Puccinia graminis avenae.

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FAMOUS TRUTHS ----------

"I never ran out of gas in my life." - P. D. Peterson.

--From Aurora Sporealis Vol. VIII, No. 4, 1931

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

1910

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2. Nisbit, Jane. A study in the identification of quack grass. Not published.

3. Stakman, E. C. (M.A.). A study in cereal smuts in Minnesota. Published as: Spore germination of cereal smuts. Minn. Agr. Exp. Sta. Bul. 133 77 pp. 1913

1912

4. Evans, Nevada S. (M.A.) Studies on the life history of Sclerotinia fructigena (Persoon) Schroeter. Not published.

5. Tolaas, A. G. Bacteriosis of cultivated mushrooms. Phytopath. 5: 51-54. 1915

1915

6. Piemeisel, F. J. Life history and parasitism of Ustilago zeae (Beckm.) Unger. Phytopath. 7: 294-307. 1917

7. Rose, R. C. A fruit spot of the wealthy apple. Not published.

8. Schneiderhan, F. J. A histological investigation of the infection phenomena of loose smuts of wheat and barley. Not published.

1916

9. Levine, M. N. The effect of ecological factors on the morphology and physiology of Puccinia graminis and P. phlcipratensis urediniospores. Published as: Effect of certain ecological factors on the morphology of the urediniospores of Puccinia graminis. Journ. Agr. Res. 16: 43-77. 1919. (with E. C. Stakman)

1918

10. Hoerner, G. R. Infection capabilities of crown rust of oats. Published as: Miscellaneous studies on the crown rust of oats. Am. Journ. Bot. 8: 452-457. 1921.

11. Leach, J. G. The parasitism of Puccinia graminis tritici Erikss. and Henn. and P. graminis tritici-compacti Stak. and Piem. Phytopath. 9: 59-88 1919

1919

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1920

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14. Puttick, G. F. The reaction of the F_2 generation of a gross between a common and a durum wheat to two biologic forms of Puccinia graminis. Phytopath. 11: 205-213. 1921

1921

15. Bailey, D. L. Sunflower rust. Minn. Agr. Exp. Sta. Tech. Bul. 16. 30 pp. 1923

1922

16. Brierley, Philip. Some factors affecting the development of the blackleg disease of the Irish potato. Not published.

17. Christensen, J. J. Studies on the parasitism of Helminthosporium sativum. Minn. Agr. Exp. Sta. Tech. Bul. 11. 39 pp. 1922

18. Lambert, E. B. The effect of chemical dusts on cereal smuts. Published as: The effectiveness of various fungicides in controlling the covered smuts of small grains. Phytopath. 16: 393-411. 1926. (with H. A. Rodenhiser and H. H. Flor).

19. Noble, R. J. Studies on Urocystis tritici Koern., the organism causing flag smut of wheat. Phytopath. 13: 127-139. 1923

1923

20. Sanford, G. B. The relation of soil moisture to the development of potato scab. Phytopath. 13: 231-236. 1923

1924

21. Cotter, R. U. Specialization of Puccinia graminis tritici in the Hordeae. Not published.

22. Flor, H. H. (H.A.) Investigations on the control of covered smuts of small grains. Published as: The effectiveness of various fungicides in controlling the covered smuts of small grains. Phytopath. 16: 393-411. 1926. (with E. B. Lambert and H. A. Rodenhiser).

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24. Melander, L. W. Studies on the relation of Berberis species to Puccinia graminis. Published as: Nature of resistance of Berberis spp. to Puccinia graminis. Phytopath. 17: 95-114. 1927. (with J. H. Craigie).

25. Nelson, R. M. A study of the rots of coniferous timber under varying degrees of artificial shade. Not published.

1925

26. Broadfoot, W. C. Studies on the parasitism of Fusarium lini Bolley. Phytopath. 16: 951-978. 1926

27. Craigie, J. H. The liberation, germination, and vitality of aeciospores of Puccinia graminis. Not published.

28. Hynes, H. J. The inheritance of resistance and susceptibility to Puccinia graminis tritici in a cross between Federation wheat and Khapli emmer. Phytopath. 16: 809-827. 1926

29. Johnson, T. Factors affecting the growth, reproduction, and pathogenicity of Helminthosporium gramineum Rab. Phytopath. 15: 797-804. 1925

30. Rodenhiser, H. A. Experiments on the control of smuts of small grains. Published as: The effectiveness of various fungicides in controlling the covered smuts of small grains. Phytopath. 16: 393-411. 1926 (with E. B. Lambert and H. H. Flor).

31. Schall, L. A. Studies on the parasitism of orange leaf rust of wheat (Puccinia triticina). Not published.

1926

32. Greaney, F. J. Root and foot rots of wheat in Manitoba. Published as: Studies in cereal diseases. II. Root rots and foot rots of wheat in Manitoba. Canada Dept. Agr. Bul. 85. 32 pp. 1927. (with D. L. Bailey).

33. Peterson, P. D. Reactions of selfed lines of corn to root rots caused by Gibberella saubinettii (Sacc.) Mont. and Fusarium moniliforme Sheldon. Not published.

1927

34. Jackson, Lyle W. R. A study of the heart rot of aspen (Populus tremuloides Michx.) in Minnesota. Incorporated in: Heart rot of aspen with special reference to forest management in Minnesota. Minn. Agr. Exp. Sta. Tech. Bul. 50. 43 pp. 1927. (with Henry Schmitz).

35. Wallace, J. M. Physiologic specialization as a factor in the epidemiology of Puccinia graminis tritici Erikss. and Henn. Incorporated in: The value of physiologic form surveys in the study of the epidemiology of stem rust. Phytopath. 19: 951-959. 1929. (with E. C. Stakman and M. N. Levine).

1928

36. Anderson, C. George. The value of disinfecting seed of sweet corn. Not published.

37. Lindgren, R. M. The effect of wood rotting fungi on some mechanical properties of wood. Published in part as: Decay of wood and growth of some Hymenomycetes as affected by temperature. Phytopath. 23: 73-81 1933

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1929

39. Bamberg, R. H. A bacterium antibiotic to Ustilago zeae (Beckm.) Unger. Phytopath. 21: 881-890. 1931

40. Eide, C. J. A study of the physiology of different strains of Ustilago zeae. Published as a part of: Mutation and hybridization in Ustilago zeae. E. C. Stakman, J. J. Christensen, C. J. Eide and Bjorn Peturson. Minn. Agr. Exp. Sta. Bul. 65. 108 pp. 1929

41. Holton, C. S. Studies in the genetics and physiology of Ustilago avenae and Ustilago levis. Published as: Hybridization and segregation in the oat smuts. Phytopath. 21: 835-842. 1931

42. Person, Lee. Studies in the control of cereal rust by dusting with sulphur. Published in part as: Wheat protected from black stem rust by dusting with sulphur. U.S. Dept. Agr. Yearbook 1930: 547-48.

43. Peturson, Bjorn. Physiologic specialization in Puccinia coronata avenae. Not published.

1930

44. Allison, Clyde C. Sex relationships in some of the cereal smuts. Not published.

45. Christensen, Clyde. Physiologic specialization and saltation in Pestalozzia funerea Desm. Bul. Torrey Bot. Club 59: 525-544. 1932.

46. Hines, Lee. Physiologic specialization of Puccinia graminis tritici Erikss. and Henn. in relation to the development of epidemics of stem rust on wheat. Published in part as: Distribution of physiologic forms of Puccinia graminis tritici in the United States and Mexico in relation to rust epidemiology. (Abs.) Phytopath. 22: 35. 1932 (with E. C. Stakman, H. G. Ukkelberg and Wallace Butler).

47. Kaufert, Frank H. Experiments on the control of damping-off of conifers. Not published.

1931

48. Shumway, C. P. Studies in the cytology and genetics of Sorosporium reilianum (Kuhn) McAlpine. Not published.

49. Walter, J. M. Some factors influencing infection of corn by Ustilago zeae. Published as: The mode of entrance of Ustilago zeae into corn, Phytopath. 24: 1012-1020. 1934

1932

50. Kamat, M. N. Some factors influencing the pathogenicity of Puccinia sorghi. Not published.

51. Ukkelberg, H. G. Some factors affecting the dissemination of Puccinia graminis Pers. Published as: The rate of fall of spores in relation to the epidemiology of black stem rust of wheat. Bull. Torrey Bot. Club 60: 211-228. 1933

1933

52. Churchward, J. G. Pathologic and genetic studies on Tilletia tritici (Bjerk.) Winter. Incorporated in Ph.D. thesis. 1936

53. Graham, T. W. The parasitism of Helminthosporium gramineum Rab. Incorporated in: Physiologic specialization and variation in Helminthosporium gramineum Rab. Minn. Agr. Exp. Sta. Tech. Bul. 95. 40 pp. 1934. (with J. J. Christensen)

54. Hafstad, G. E. The probable relation of delayed segregation to variation in Ustilago zeae. Incorporated in part in: The constancy of cultural characters and pathogenicity in variant lines of Ustilago zeae. Bull. Torrey Bot. Club 60: 565-572. 1933

55. Haglund, Frances E. The microflora of sweet-corn seed in relation to quality. Not published.

55a. Hubert, Kurt. Some studies on Ustilago nuda (Jens.) Kell. and Sw., Ustilago tritici (Pers.) Rostr., the loose smuts of barley and wheat, and on an intermediate type of loose smut of barley. Not published.

1934

56. Moore, M. B. Studies in the genetics and cytology of Ustilago zeae (Beckm.) Ung. Not published.

1935

57. Darling, Henry M. A study of scab resistance in the potato. Journ. Agr. Res. 54: 305-317. 1935

58. Syed, Vaheeduddin. Hybridization and segregation in crosses between Sphacelotheca sorghi and Sorosporium reilianum. Incorporated in Ph.D. thesis, 1936.

1936

59. Ling, Lee. Factors affecting the development of Urocystis occulta (Wallr.) Rab. Incorporated in part in: Influenced of soil temperature and soil moisture on infection of stem smut of rye. Phytopath. 27: 633-636. 1937. (with M. B. Moore).

60. Wang, Chi Shi. Development and cytology of Ustilago cranori Kcke. Published in part as: Viability and longevity of chlamydospores of Ustilago cranori. Phytopath. 26: 1086-1087. 1936; The formation of chlamydospores of Ustilago cranori on artificial media. Phytopath. 28: 860-861. 1938

1937

61. Gonnell, Alan R. A study of the interaction of two fruit-rotting fungi. Published as: Synergism in fruit-rotting fungi. Chron. Bot. 5: 41-42. 1939

1938

62. Kernkamp, Milton F. The relative effect of genetic and environmental factors on growth types of Ustilago zeae. Phytopath. 29: 473-484. 1939

63. Borders, Huey I. A study of bacteria pathogenic to cereal rusts. Not published.

1939

64. Hanson, Earle W. Factors affecting the development and virulence of Fomes lignosus.

65. King, Thomas H. Studies on factors affecting the growth and pathogenicity of Fomes lignosus Klotsch. Published in part as: Physiological specialization in Fomes lignosus. (Abs.) Phytopath. 29: 14. 1939

66. Laskaris, Thomas. Studies on peridial color and lysis in Spacelotheca sorghi (Link) Clinton. Published as: A heritable lysis in germinating chlamydospores of Sphacelotheca sorghi. Phytopath. 31: 254-263. 1941

1940

67. Cherewick, W. J. Rhizoctonia root-rot of sweet clover. Phytopath. 31: 673-674. 1941

68. Chen, Shan-Ming. Induced variation in Rhizoctonia solani Kuehn.

69. DeZeeuw, D. J. Pathological and cultural differences in isolates of Rhizoctonia solani Kuehn.

70. Preston, D. Seasonal trends of air borne fungus spores in the vicinity of St. Paul, Minnesota.

71. Vaughn, J. R. Factors affecting the nature of resistance of potatoes to scab.

1941

72. Borlaug, N. E. Red stains of box elder trees.

73. Downie, A. R. Root rot and damping off of oats.

74. Lachmund, H. G. Observations relative to the behavior and control of white pine blister rust in California.

1942

75. Lorenz, R. C. Discolorations and decay resulting from increment borings in hardwoods. Journ. For. 42: 37-45. 1944

1943

76. Andrews, E. A. Root rots and seedling blight of grasses in Minnesota. Phytopath. 33: 234-239. 1943

77. Thomas, W. D. Stability and variation in six physiologic races of Actinomyces scabies. Phytopath. 37: 319-331. 1947

78. Young, Harry C., Jr. The pathogenicity of certain fungi, singly and in combination, on various inbred lines and crosses of corn.

1944

79. Pierre-Louis, Felix. Plan B without thesis.

1945

80. Rodriguez, J. Effect of light intensity and temperature on the infection types of some physiologic races of Puccinia graminis tritici on certain wheat varieties and the relation to wheat production in Southern Mexico. Published in part as: Effect of light intensity on infection types produced by races 19, 38, 59, 59A of Puccinia graminis tritici on susceptible and resistant wheats. (Abs.) Phytopath. 34: 1010-1011. 1944

1946

81. Hsü, Nancy Ju-Shen. Studies on bacterial soft rot of potato tubers. (Mrs. Lee Ling)

82. Robles, Leonel E. The pathogenicity of Helminthosporium spp.

83. Kotila, Martha A. Studies on the potato late blight fungus, Phytophthora infestans.

84. Ortega C., Benjamin. Physiologic specialization in Rhizoctonia Sp. on vegetable crops.

85. Teller, Morris N. A study of variation in Sclerotinias isolated from stone fruits. Published in part as: Differentiation of cultural types of Sclerotinia spp. by means of hydrogen-ion concentration. (Abs.) Phytopath. 37: 15. 1947. (with E. O. Mader). Changes in pectin produced by isolates of Sclerotinia species. (Abs.) Phytopath. 37: 21. 1947. (with E. O. Mader).

1947

86. Daly, J. M. Utilization of nutrients by rust fungi. Published in part as: The effect of temperature and nitrogen source on the development of stem rust of wheat. (Abs.) Phytopath. 38: 7. 1948

87. Kommedahl, Thor. Studies on late wilt of flax. Published in part as: Late wilt of flax. (Abs.) Phytopath. 37: 13. 1947. (with J. J. Christensen).

The fungi that bloom in the spring tra la,
Give rise to a spirit that's keen,
Our mycological crew tra la; go forth with
A vasculum clean tra la, go forth with a vasculum clean
But when they return from the woods near and far,
You hear them rejoicing their glee's above par,
Tra la la la la, Tra la la la la, their glee is away abour par.

The specimens gathered are many, tra la
No wonder their glee's above par.
Oh what a collection they've made, tra la
Oh what a collection they've made,
The vascula filled so the covers won't fit, while
The champion collector just knows that he's it,
And he sings Tra la la, tra la la la la, the champion collector is it.

(With apologies to Gilbert and Sullivan)

--From Aurora Sporealis Vol. VIII, No. 2
1932

Ph.D. Degrees granted in Plant Physiology in
the Division of Plant Pathology and Botany

1926

*1. Eaton, Frank M. The water requirement and cell sap concentration of Australian saltbush, wheat and cotton. Am. Journ. Bot. 14: 212-216. 1927

*
**2. Hildreth, Aubrey C. (Joint major advisors: Horticulture and Plant Physiology) Determination of hardiness in apple varieties and the relation of some factors to cold resistance. Minn. Agr. Exp. Sta. Tech. Bul. 42. 37 pp. 1926.

*3. Steinmetz, Ferdinand H. Winter hardiness in alfalfa varieties, Minn. Agr. Exp. Sta. Tech. Bul. 38. 33 pp. 1926

1927

*
**4. Traub, Hamilton P. (Joint major advisors: Horticulture and Plant Physiology), The regional and seasonal distribution of moisture, carbohydrates, nitrogen and ash in 2 to 3 year portions of apple twigs. Minn. Agr. Exp. Sta. Tech. Bul. 53. 68 pp. 1927

1929

5. Steinbauer, George P. Light as a factor in the growth and metabolism of tree seedlings. Printed privately, Sc. Press. Prtg. Co., Lancaster, Pa. 1932. Published in part as: Growth of tree seedlings in relation to light intensity and concentration of nutrient solution. Plant Physiology 7: 742-745. 1932

**6. Wilcox, Arthur N. (Joint thesis advisors: Plant Genetics and Plant Physiology) Some factors influencing the longevity and viability of pollen. Not published.

1930

7. Regeimbal, Louis O. The role of iodine in plant nutrition. Not published.

1931

8. Dunn, Stuart J. R. The relation of hydrophilic colloids to hardiness in cabbage, brussels sprouts, and alfalfa plants as shown by dye adsorption test. Plant Physiology 8: 275-286. 1933.

**9. Tysdal, Hewitt M. (Joint major advisors: Agronomy and Plant Physiology). The influence of light, temperature and moisture on the hardening process in alfalfa. Journ. Agr. Res. 46: 483-515. 1933

1932

10. Landon, Raymond H. The effect of certain chemicals on the rate of catalase activity in plants. Am. Jour. Bot. 21: 583-591. 1934

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* Dr. Harvey's teaching was carried on in the Botany Department on the Main Campus until July 1, 1929, and the degrees granted prior to this date are technically listed in that department; after July 1, 1929, he taught part time in the Department of Horticulture, University Farm.

** Joint major or joint major advisors in other departments.

1933

**11. Chase, Warren. (Combined major: Forestry and Plant Physiology). The composition, quantity and physiological significance of gases in tree stems. Minn. Agr. Exp. Sta. Tech. Bul. 99. 51 pp. 1934

1934

**12. Angelo, Ernest. (Joint major advisors: Plant Physiology and Horticulture). Hardiness studies of strawberry varieties. Not published.

1935

13. Vogele, Alfred C. The effect of environmental factors upon the color of the tomato and the watermelon. Plant Physiology 12: 929-955. 1937

1936

**14. McMichael, Scott C. (Joint major advisors: Agronomy and Plant Physiology) A comparative study of strains of sweet clover (Melilotus alba Desr.). Not published.

1938

**15. Lorenz, Ralph W. (Combined major: Forestry and Plant Physiology). Maximum temperature relationship of forest trees. Published as: High temperature tolerance of forest trees. Minn. Agr. Exp. Sta. Tech. Bul. 141. 25 pp. 1939

16. Nelson, Richard C. The production and function of ethylene in the ripening process in fruits. Food Research 4: 173-190. 1939

1941

**17. Stahler, Leonard M. (Combined major: Agronomy and Plant Physiology). Some ecological aspects of competition between bindweed and field crops. Not published.

1942

**18. Nelson, Russell T. (Combined major: Agronomy and Applied Plant Physiology). Studies of microbial activity, chlorate reduction, and chlorate toxicity in soils treated with sodium chlorate. Jour. Agr. Res. 68: 221-237. 1944

1944

19. Johnston, Frederick B. Studies on the dehydration of fruits and vegetables. Published in part as: Rapid moisture determination in dehydrated foods. Canadian Chemistry and Process Industries 27: 100, 102. 1943, and Determination of sulphur dioxide in dehydrated vegetables and fruits. Ibid. 28: 568-569. 1944

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

1927

1. Steinbauer, George P. Relation of light to growth and chlorophyll formation in forest seedlings.

1938

2. Johnson, Wallace M. Plan B, without thesis.

3. Zalar, John F. A quantitative study of ethylene formation by the banana fruit during the process of ripening.

1941

4. Reichenberg, Aaron. Physiological studies on tomato storage.

5. Zietlow, Richard G. Plan B, without thesis.

1942

6. Laties, George G. Plan B, without thesis.

1944

7. Tryon, Katherine. Plan B, without thesis.

WHAT THE REVIEWERS WRITE

HART, HELEN. Relation of stomatal behavior to stem-rust resistance in wheat. Jour. Agr. Res. 39: 929-948. 1929. Price 15 cents.

* * * * *

"A paper by our own Miss Hart. It looks to me like a darn good paper. Anyhow, it's interesting, altho I didn't understand it all. It seems to be well written."
J. M. Walter, in Literature Seminar

"Clear-cuttedness crystallized in every sentence."
Laura M. Hamilton, in The Inward Search.

"Clear cussedness for undergrads." A. Student, in Diseases of Cereal Crops.

"A masterpiece by an author who served humanity in the dawn, when most girls of her age were clinging coyly to their beautify sleep or wondering whether blue or green go best with reddish-brown hair." A. Feature Writer, in "Come Wander in the Dawn with Me. (Illustrated)

—From Aurora Sporealis, Vol. VI, No. 1, 1930

Graduate Students who Minored in the Division of Plant Pathology and Botany, 1907-1947

Major: Agricultural Biochemistry

Robert Newton	*M.S. 1921	*Ph.D. 1923	
Ferdinand Collatz		*Ph.D. 1922	
Aksel G. Olsen	*M.S. 1923	*Ph.D. 1928	
Arthur K. Anderson		*Ph.D. 1923	
Walter F. Hoffman		*Ph.D. 1924	
Houston Letcher	*M.S. 1925		
Walton B. Sinclair	*M.S. 1925	*Ph.D. 1929	
Forrest R. Davison		*Ph.D. 1926	(and Physiological Chemistry)
J. Roy Haag		*Ph.D. 1926	
John H. Martin		*Ph.D. 1926	(and Plant Breeding)
Harold M. Barnett	*M.S. 1927		
Ralph Kenneth Lamour		*Ph.D. 1927	(and Organic Chemistry)
Walter A. DeLong		*Ph.D. 1928	
Trumann A. Pascoe		*Ph.D. 1928	
Ernest V. Staker		*Ph.D. 1929	
Charles F. Rogers		*Ph.D. 1939	
Myer Fishman		*Ph.D. 1942	

Major: Agricultural Biochemistry and Forestry
Stanley J. Buckman

Major: Agronomy and Plant Genetics

Basil M. Benzin	M.S. 1912		(and Ecology)
Alfred R. Kohler	M.S. 1912		(and Economics)
Harry V. Harlan		D. Sci. 1914	
Fred Griffee	M.S. 1920	Ph.D. 1924	
James P. Shelton	M.S. 1921		
Olaf S. Aamodt	M.S. 1922	Ph.D. 1927	
James B. Harrington	M.S. 1922	Ph.D. 1924	
Harvey E. Brewbaker	*M.S. 1923		
Jacob A. Clark	M.S. 1923		
Arthur F. Swanson	*M.S. 1923		
Charles S. Dorchester	M.S. 1923		
Floyd L. Higgins	M.S. 1924	Ph.D. 1931	
Aksel P. Lunden	M.S. 1924		
Luke P. Vassar	M.S. 1924		
Edward W. Hardies	M.S. 1924		
Sydney E. Clark	M.S. 1925	Ph.D. 1927	
Karl S. Quisenberry	M.S. 1925	Ph.D. 1930	
Cyril H. Goulden		Ph.D. 1925	(and Biochemistry)
Arthur T. Elders	M.S. 1925		
Jesse Lefforge	*M.S. 1926		
Gavril G. Proytchoff	M.S. 1926		
Viggio H. Nielsen	M.S. 1926		
Louis R. Jorgenson	M.S. 1927	Ph.D. 1929	
Lawrence E. Kirk		*Ph.D. 1927	
Harry J. Siemens	M.S. 1928		
David W. Robertson		*Ph.D. 1928	
William G. McGregor	M.S. 1929		
Arthur N. Wilcox	*M.S. 1922	*Ph.D. 1929	

*Indicates Section of Plant Physiology

Roy O. Bridgford	M.S. 1930	
Charles W. Doxtator	M.S. 1930	Ph.D. 1936 (and Biochemistry)
Kenneth G. McIndoe		Ph.D. 1930
Rudolph F. Peterson	M.S. 1931	Ph.D. 1933
Kenneth W. Neatby		Ph.D. 1931
Leroy Powers		Ph.D. 1931
Alexis Frederic Kebreau	M.S. 1931	
William E. Haines	M.S. 1932	
Elmer R. Ausemus		Ph.D. 1932
Carl Borgeson	M.S. 1932	
Samule C. Salmon		Ph.D. 1932
Raymond S. Dunham	*M.S. 1933	
David G. Smith		Ph.D. 1934
Will Martin Myers	M.S. 1934	Ph.D. 1936
Laxman G. Kulkarni		Ph.D. 1934
Stephen M. Raleigh		*Ph.D. 1934
Keith C. Barrons	M.S. 1935	
Stanley P. Swenson	M.S. 1935	Ph.D. 1936
Chien-Liang Pan		Ph.D. 1935
Herman K. Schultz	M.S. 1936	Ph.D. 1940
Shao-Kwei Wu	M.S. 1936	Ph.D. 1939
Wilfred H. Waddell	M.S. 1937	
Trueman M. Stevenson		Ph.D. 1937
David A. Reid	M.S. 1938	
Royse Peak Murphy	M.S. 1936	Ph.D. 1941
Arne E. Carlson	*M.S. 1940	
Lewis C. Saboe	M.S. 1940	Ph.D. 1942
William Wiidakas	M.S. 1940	
Joseph O. Cu..bertson		Ph.D. 1940
Warren H. Leonard		Ph.D. 1940
William W. Brookins		*Ph.D. 1940
Sih-Chang Chang		*Ph.D. 1941
William J. White		Ph.D. 1940
Stephen L. MacIndoe		Ph.D. 1941
John R. Cowan	M.S. 1942	
Sigurdur B. Helgason	*M.S. 1942	
Emmett L. Pinnell	M.S. 1942	
George G. Roadfeldt	*M.S. 1942	
George A. Rogler	M.S. 1942	
Ernest H. Rinke		Ph.D. 1943
Rene Cortazer	M.S. 1943	
Albert H. Moseman		Ph.D. 1944
John R. Weir		*Ph.D. 1944
Feeroze H. Abbasi		Ph.D. 1945
Irwin M. Atkins		Ph.D. 1945
Herbert A. Kramer		*Ph.D. 1946
Howard B. Peto		*Ph.D. 1946
Wilson H. Foote	M.S. 1946	
Ady Raul De Silva	M.S. 1946	
Tien-Jan Liang	M.S. 1946	
Wilbert A. Russell	M.S. 1947	
Glenn S. Smith		Ph.D. 1947 (and Biochemistry)
Moti V. Vachhani		Ph.D. 1947
Howard L. Carnahan	M.S. 1947	
Osvaldo B. deMenezes	M.S. 1947	
Antonio Marino-Ambrosia	M.S. 1947	
Harold A. McLennan	M.S. 1947	

*Indicates Section of Plant Physiology

Major: Bacteriology

Allan G. Sandhoff	*M.S. 1934	

Major: Botany

Donald Folsom	M.S. 1914	
John E. Weaver		Ph.D. 1916
Louise T. Dosdall	M.A. 1917	
Gorm Loftfield	M.A. 1917	
Clarence E. Bausman	M.S. 1917	Ph.D. 1919
Frances L. Long		Ph.D. 1917
Helen Sorokin		Ph.D. 1925
Ethel Sue Horton		Ph.D. 1932

Major: Entomology

Charles W. Howard	M.S. 1913	
John R. Eyer		Ph.D. 1923
Robert E. Wall	M.S. 1926	
David Leonard Lindgren	M.S. 1931	Ph.D. 1935
William D. Buchanan	M.S. 1933	
Donald J. Pletsch	M.S. 1936,	Ph.D. 1942
Kwoh-Si Liu	M.S. 1937	
Louise Fulton Bush		Ph.D. 1938
Heber C. Donohoe		Ph.D. 1938
John T. Medlar		Ph.D. 1940
Albert W. Buzicky	M.S. 1941	
Roger F. Anderson	M.S. 1941	Ph.D. 1945
Philip H. Marvin	M.S. 1941	
Harry P. Nicholson	M.S. 1941	
Herbert E. Milliron		Ph.D. 1942
George F. Carter	M.S. 1941	
Daniel M. Benjamin	M.S. 1946	
Gerhard P. Kretzschmar	M.S. 1947	

Major: Forestry

Grover M. Conzet	M.S. 1913	
David A. Kribs	M.S. 1926	
Arthur F. Verrall	M.S. 1928	
Merrill E. Deters	M.W. 1931	*Ph.D. 1941

Major: Horticulture

Franklin J. Crider	M.S. 1910		(and Entomology)
William D. Valleau		Ph.D. 1913	
James S. Shoemaker		*Ph.D. 1925	
John Walker	*M.S. 1926		
Hamilton P. Traub	*M.S. 1924		
Clarence E. Steinbauer	*M.S. 1931		
Vincent E. Iverson	M.S. 1936	*Ph.D. 1939	
Henry A. Johnson	*M.S. 1935		
Alfred L. Richardson	*M.S. 1939		
Myron F. Babb		*Ph.D. 1939	
Wendell L. Bartholdi		*Ph.S. 1940	
John Wilner	*M.S. 1947		

Major: Soils

Paul Harmer	M.S. 1915	Ph.D. 1920 (and Bacteriology)
John V. Cutler	*M.S. 1925	
Geoffrey B. Bodman		*Ph.D. 1927 (and Geology)
John C. Hide		*Ph.D. 1935

Here's a Seance on a Good Plant Path Seminar

"I see a long, low-ceilinged (or is it low-celling) room high in a ruined tower; a long black table in its center; creatures entering with expressionless faces and ranging themselves about the room. All is tense and still, the air is thick and hot and stale and charged with an unknown potency. Every face is turned to the east when a voice rises and falls from an invisible source behind a forest of specimen jars and models. The chairs are propped on their hind legs, the heads of the creatures resting uncomfortably against the unyielding wall, which is marked with a darkened border that measures the mean length of the spinal columns supporting those heavy heads.

"Gradually the creatures take shape, speak, act, and become individuals with faces full of expression. Bonde sits as happy as any four-year-old, chewing his fist at odd moments when there is a particularly difficult problem to be considered. Tolaas sits in the near corner saying nary a word, and in front of him is Miss Hart mutely holding the door and gasping for fresh air. Occasionally Moore asks a question that is supposed to be deeply significant, but only Bam gets it. Walter speaks with authority now and again, and Loh asks questions to make the creatures laugh. A burst of cynicism comes from Christie on occasions, but he allows it to be squelched with only an enlightened "OH" in defense. Many sleep, drowze, nod, then waken wide-eyed and with an "open mind." Bam opens his eyes and mouth at the same moment and ends, with a sagacious question, a most heated argument.

"What stimulates this group to the fever pitch they often reach? What subject causes hot argument and cold nervous perspiration? Phytopath? Entomology? Questions that could be answered by any one of the recognized authorities present? NEVER. What is a ptilium? Is it the cold or the humidity that makes cold cold? These arguments bulge the walls, rattle the windows, and make the nearby powerhouse shake on its foundations."

—From Aurora Sporealis Vol. VII, no. 1, 1931

Divisional Secretaries

They also contributed who only sat and typed. Progress of plant pathologists at Minnesota has been both helped and hampered by office assistants, depending upon whether they reigned with the wisdom of Victoria and the beauty of Cleopatra, or napped over their notebooks and played "Kitten on the Keys". We shall attempt to list them in order of appearance on the scene. Chronological classification is subject to error, but classification in the categories mentioned above is easy: for it was represented to each new secretary who appeared on the scene that her predecessor had all of the royal attributes--ability, efficiency, accuracy, charm, and wit. The current incumbent could always fall back on humility while struggling along the paths once proudly trod by these former Queens, and try not to yawn while listening to History! Some of those who only Came After, however, had their places in the scheme of things plant pathological, for a number of them became Mrs. Plant Pathologist. (See asterisks)

In Dean Freeman's office--the head office of the Division until 1941--the order was about as follows: Isabel Dunn (Mrs. Oswald), Jessie Cleaver (Mrs. Lathrop), Abbie Merritt, Genette Davis, Mrs. Mary Skinner, Lois Trott (Mrs. E. Venke), Zoe Studeman (Mrs. Donald G. Tollefson), Gladys Anderson, Irene Loftus (Mrs. Hanson).

A number of these were promoted from Dr. Stakman's office where the sequence of secretaries--blonde, brunette, and redhead--has been more or less as follows: Wyllian Dunning, Genette Davis, Betty Bushnell (Mrs. Lang), Lillian Granbeck (Mrs. Puttick*), Mrs. Mary Skinner, Florence Johnson (Mrs. Anderson), Ruth Wetzel, Irene Loftus, Florence Swanson (Mrs. Sampson), Alicia Drage, Gladys Kelly (Mrs. Keilman), Edna Clayton, Irene Hinze, Rosemary McLeod, Helen Pearson (Mrs. Davies*) Dorothy Johnson (Mrs. Berglund), Gladys Saline (Mrs. Wright*), Rosemary Miltich (Mrs. Curran), Hazel Strege (Mrs. ?), Corrine Anderson (Mrs. ?), Floraine Toutenhoft, Teresa McNealy, Rajah Haik, Arloine Schmidt, Gloria Forliti.

The Federal position in this office has been practically a monopoly: after Agnes Haasle came Laura Hamilton.

In the Section of Plant Physiology reigned Faith Gugler, Arliss Carlson (Mrs. Franken), and Arloine Schmidt.

Potato Seed Certification (State Department of Agriculture) employed Julia Howie (Mrs. Trechsler), Irene Knuth, Alice Lozier (Mrs. Hink), Dorothy Harmala (Mrs. Moore*), Hazel Bersing, Lilly Mattson, Mrs. Florizel Mode, Mrs. Grace Hinds, Dorothy Maberry.

And last but not least, the following presided over Barberry Eradication: Sue Mason, Helen Barratt (Mrs. Thompson), Edna Brueggeman (Mrs. Stewart*), Louise Rohrs, Merle Lien, Charles Ludwig, Kenneth Edwards, Mrs. Wilhelmina Roberts.

---Laura M. Hamilton

Mark Twain said years ago:

> "There is something fascinating about Science.
> One gets such wholesale results of conjecture out of
> such a trifling investment in fact."

---From Aurora Sporealis Vol. VIII, No. 5, 1931

KITTEN BALL

In 1920 the kitten ball league was organized at University Farm. That year, Plant Pathology was crowned champion, and during the next 18 years the Department lost the championship but once, and that by a very close game. The teams were fighting teams, with determination to do their best, and also well-coached teams that really know how to play ball. Doc's motto was, "In games, as in work, always do your very best." For a number of years Plant Pathology competed with the best teams on the Minneapolis campus. As years went by the desire of other teams on the farm campus to conquer Plant Path grew and grew and grew, and the cry went out--Beat Plant Pathology! Beat Plant Pathology! Attempts were even made to disqualify one of our charter players, Olaf Aamodt, because he had a split major. Obviously, Olaf was an excellent player, one who came through in clutches. In the 20's, when Plant Pathology was at its height, huge crowds turned out to watch the games--students, members of the staff, including heads of departments, the Dean, and also the associate director. The wives, some with kids, always came to watch. For the champs, Miss Dosdall would provide cake, others root beer, and still others cigars. Yes, there was team spirit and departmental enthusiasm!

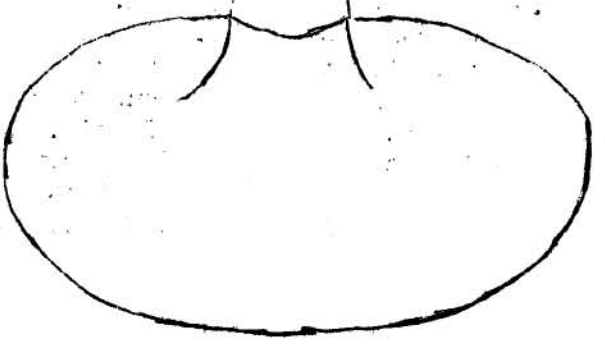
Remember some of the real Old Timers? E. C. Stakman played short-stop, Don Fletcher pitched, Al Larson was at first, and Melander played the field. Oh! how Jimmie Seal and Phil Brierly did hit the ball, way out past the icehouse. Even Dean Freeman came out to play. Those were the days when the Big Chief turned out for batting practice, I have been told, for hours at a time.

Plant Pathology has had many colorful players, such as Pee Wee Wallace, Duck Hines and Bernie Shema--natural-born kittenball players. Remember the sensational plays of T. C. Loh? Bill Broadfoot's record of four home-runs in one game still stands. To Rodenhiser should go the honor of being the most consistent hitter. Big Chief claims this honor (but his records have been lost). Rody, a right hand hitter, would always swing late, and the ball would usually sail over the 1st baseman's head; to this day the opponents have not discovered the secret of his success. For length of service "Chris" holds the record: for 18 years he did the catching. Ralph Lindgren, the all-American pitcher, had an easy way of delivering but a mean spinning up-shoot, and 12 to 15 strikeouts per game was not uncommon.

For years Eide was the water boy--and in this respect he has never been surpassed; and P. D. Peterson from his perch in the galleries helped to win many important games.

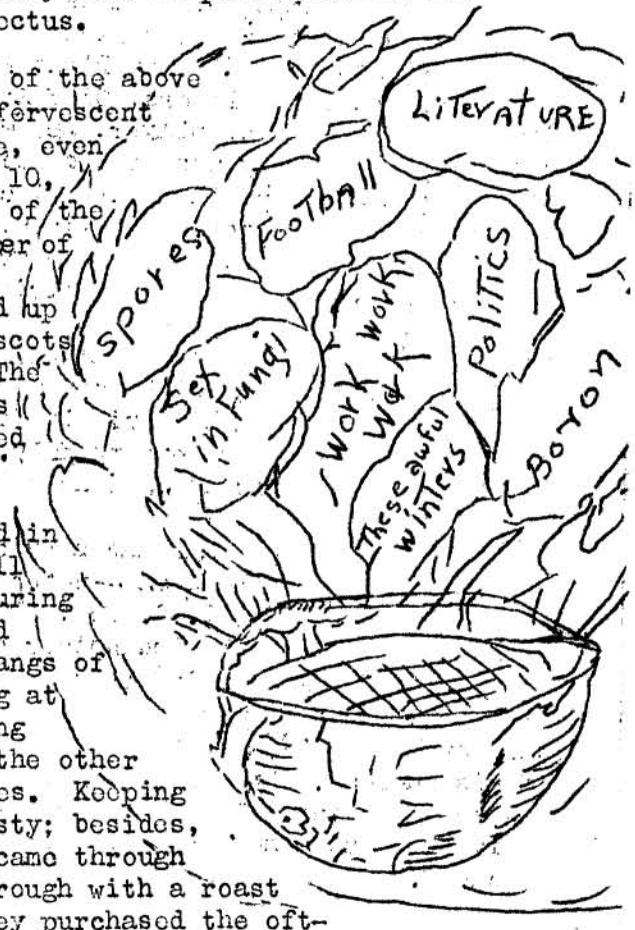
The two loving cups won by the old kitten ball team can still be seen in the Seminar room.

—J. J. Christensen



The Coffee Hour
or
SHADE GROWN AND MOUNTAIN PLANTED!

Things have come to a pretty pass indeed, or perhaps the coffee has become so mild that the staff of AURORA has been lulled into the deep slumber which stupefies the usual alacrity and perspicacity that has ever been embodied in the staff of our scandal sheet. For be it hereby known that they were found guilty of bumbling and bungling, but not bundling during the Christmas vacation. In working out the history of that noble and envigorating pastime, THE COFFEE HOUR, our editors had reached an impasse; they know not whither to turn for information. It has been pointed out that they should always seek the source; therefore, it is with pride and pleasure that the following information flows freely from the pen of one of the originators of the 10-3-10 indulgence in the homely brew as percolated in the environs of Phytobrickhauses Tremuloides and Erectus.



All who hail the smutty and rusty confines of the above mentioned edifices as home will remember the effervescent and delectable fumes which were wont to permeate, even saturate, our domain at the hours of 10, 3, and 10, thereby calling together the faithful followers of the art of dunking, yea, also that most ardent plopper of all--ECS. At such specified times the grisled elite pushed aside the cobwebs of larnin, rolled up their britches, and dribbled coffee on their wescots beside the shavetails of rust- and smutology. The ensuing effulgence of chesty wordiness sometimes cooled the bubbling concoctions, but never dimmed the luster of the time honored pot.

The beginning of the coffee hour is clothed in antiquity, but a few of the hoary Old Timers will recall that this noble enterprise was started during the Christmas vacation of 1938 by Ted Wright and Dudley Preston, in an effort to stave off the pangs of starvation wrought by the going wages prevailing at that time on the dusty Mezzanine of the Tottering Tower. Wright and Preston stayed behind while the other inmates journeyed to the meetings in other climes. Keeping all the neglected cultures alive made them thirsty; besides, they were fresh out of funds. Wright's mother came through with a fruit cake, and Preston's sister came through with a roast chicken and trimmings. Thus regally endowed they purchased the oft-maligned loaf of bread and a pound of coffee. Only by the strictest rationing of these comestibles were these gentlemen able to survive the holiday season.

When the other inmates returned there was still some of the first pound of coffee left. Andy Downie joined them in a gusty effort to use it up. Since all three thrived, the noble experiment continued--even drawing gulps from the then current edition of the QCF. The venture was pursued, and Wright, Preston, and Downie carried the burden for a long, long time. Gradually other members drifted in for a taste of the brew that lifted them to greater heights of endeavor. The fact that the coffee hour survived the first rigorous years was due almost entirely to the generous donations of Wright, Preston, and Downie. A few of the more enlightened visitors discovered that nickels and dimes would help to provide more and better cookies, but many never seemed to learn this fact--indeed made payment with gripes. In those days the cups were well filled and another pot could always be brewed in a few minutes.

In those days the rules were simple. Preston made the coffee; anyone who could stand the stuff drank it; Wright, Preston, and Downie cleaned up the mess, and paid for it. Later Stakman and Andrews did the talking, which has eventually led to the present lofty discourses which pervade the atmosphere at these sessions.

A special truck was provided to insure safe passage of the pot from the Tottering Tower to its new home in Phytobrickhaus Erectus. The present pot has evolved from the original one, gradually being replaced by larger ones, until finally superseded by the elegant extravaganza which has been used until recently. It has been rumored that this grandiose colossus (donated by ECS) has not retained it's resistance, because new races of table edges have been developed which caused extreme breaking of the stems. Evidence of this was noticed this winter when coffee was served from the original pot furnished by Preston. The size, number, and cleanliness of the pots has increased during the years, but one secret remains inviolate--how Preston always managed to squeeze sixteen full cups of java from an eight-cup pot!

Most people liked it hot! Many a luminary and lesser light quaffed the ambrosia provided at the coffee hour. The ladies, God bless em, partook with enjoyment until such time as our rockribbed venerables, ECS and ED. ANDREWS, began to fight the war. Beating a hasty retreat, the ladies would be seen no more until the aroma of their favorite nostrum for general lassitude once more filled the air. This was usually the only sign needed to start socialist Andrews and the Chief on their spontaneous remaking of the world. Such was the platitudinous essence of their oratory, coupled with it's redundancy, that any listener, after three rounds of this tautology, pleonasm, prolixity, diffuseness, circumlocution, periphrasis, and verbosity, could close his eyes and give either side of the battle complete with gestures. Finally, in the wee small hours, the Big Chief would find the coffee cooled to his liking, would drain it at one gulp, and would loudly announce that this sort of thing could not go on. Thereupon we were admonished that, if he ever came in and started such a thing in the future, we were to toss him out. The next night he would be back in the same chair for more of the same.

In the cozy chambers of the Tottering Tower no call was needed to gather together the faithful. However, the wide open spaces of Phytobrickhaus Erectus made it necessary to intone the hour of meeting with a bovine noise maker.1/ Today the number of drinkers attending any session is directly proportional to the magnitude of the bell ringing. When the good inmates now arrive, savoring the brew that should arouse their zest, they are greeted with a half-filled glass of a weak and tepid concoction that is a direct insult to the olfactory organs. Thus has passed the glorious beverage that used to steady the hand of the man behind the microMANipulator and sizzled the innards of all who heeded the sensory stimulus in the days of yore.

--Dudley A. Preston

Carl J. Eide (a Norwegian) says:

"Anyone knows one cup of coffee ain't coffee."

---From Aurora Sporealis Vol IX, Nos. 2,3, 1933

1/ For benefit of absentees, this refers to brass cowbell.

Cooperating Federal and State Agencies

Cooperation with the U. S. Department of Agriculture

"Certain disease investigations in cooperation with the U. S. Department of Agriculture were inaugurated in 1908," according to Dean Freeman. The sum total of the contribution to the work of the Department of Plant Pathology and Botany at Minnesota, in the way of financial aid, personnel, and encouragement, made by the Federal Department since the beginning of cooperation in 1908, has been extensive. Just how extensive probably was not apparent to the casual visitor because of the close cooperation in which the work was carried on. A history of each project will not be attempted, but a roster of personnel will give some idea of the extent of the Federal work.

Cooperation with the U. S. Department in breeding rust-resistant varieties was started by E. M. Freeman while he was in the Office of Grain Investigations in Washington. When he returned to Minnesota, this work was continued along with studies on smuts and other diseases; and during the first few years E. C. Johnson represented the Federal department with Dr. Freeman as Collaborator.[1/] Investigators on the project in 1919 and 1920 included Alden A. Potter, John Parker, Olaf S. Aamodt, and L. W. Melander, in addition to E. C. Johnson. Under the joint direction of H. K. Hayes, of the Division of Agronomy and Plant Genetics, and E. C. Stakman, the breeding work was carried on from 1920 to 1928 by O. S. Aamodt, the following year by Karl S. Quisenberry, and since September of 1929 by E. R. Ausemus, with headquarters in the Agronomy division.

Cooperation on physiologic specialization in stem rust and on rust epidemiology studies has been carried on since 1915. Preliminary studies on "identity of the biologic forms of Puccinia graminis on wild grasses" were begun by the Minnesota station in the spring of 1913[2/], and, after the work was put on a cooperative basis, it was continued by Piemeisel for the Federal Department and by Stakman for the University. Personnel engaged in epidemiology studies is given later. Stakman and M. N. Levine, the latter since 1917, worked on specialization in Puccinia graminis; and in recent years Dr. Levine has studied leaf rust races in the spring wheat area, and physiologic specialization in barley leaf rust. Between 1920 and 1923, D. L. Bailey also cooperated on specialization in oat stem rust.

Studies on the nature of resistance to stem rust were carried on by C. R. Hursh from 1920 to 1924, then by Helen Hart, who continued to July 1933, when Federal support was discontinued.

A notable roster of Old Timers devoted full or part time to flax diseases: Henry Barker from early 1919 to 1923; then A. W. Henry to 1926; Helen Hart from 1923 to 1924; C. V. Kightlinger from 1926 to 1927; Chi Tu for several months in 1927; then H. A. Rodenhiser to 1930, followed by C. C. Allison to 1933.

The Plant Pathology Garden, begun by Dr. Stakman, was in charge of R. H. Bamberg from 1929 to 1937, when Dr. Earl W. Hanson took it over, along with root-rot studies, until 1946. Since that time, support for the project has been primarily from State funds.

1/ E. M. Freeman and Edward C. Johnson. The loose smuts of barley and wheat. U.S.D.A., B.P.I. bull. 152. 1909; also The rusts of grains in the United States. U.S.D.A., B.P.I. bull. 216. 1911

2/ E. C. Stakman and F. J. Piemeisel. Biologic forms of Puccinia graminis on cereals and grasses. Jour. Agr. Res. 10: 429. 1917

All this work, except as noted in the next paragraph, was carried on in cooperation with the Office of Grain Investigations, later known as the Office of Cereal Investigations and now called the Division of Cereal Crops and Diseases.

Bureau of Plant Industry and Bureau of Entomology and Plant Quarantine

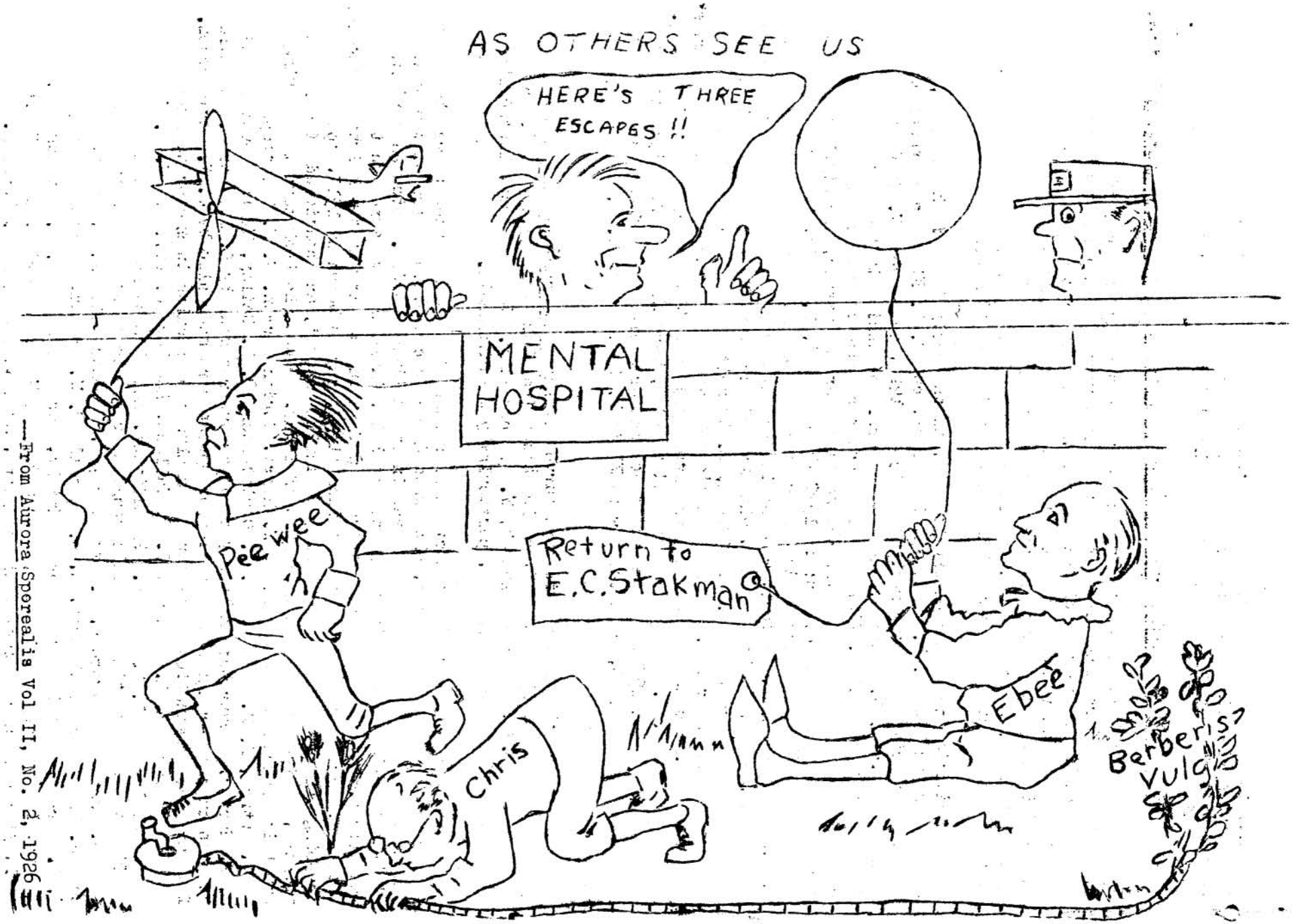
Cooperative epidemiology studies, begun in a small way in 1915, as already mentioned, were broadened in scope after the devastating epidemic of 1916 and centered at Minnesota the following spring. Begun under the Cereal Office of the Bureau of Plant Industry, all epidemiology work at Minnesota was carried on in the Office of Barberry Eradication after its creation in 1930, with the exception of Dr. Levine's work, and in 1934 was transferred to the Division of Plant Disease Control, Bureau of Entomology and Plant Quarantine.

In addition to Piemeisel and Stakman, in the early days of the project, the roster included A. F. Thiel, H. D. Barker, and R. S. Kirby, and others who were not strictly Minnesota men. In 1919 and 1920, there were W. N. Christopher, Frank Frolik,* G. R. Hoerner, and many others. Beginning in the winter of 1920 and subsequently until 1941, field observations were made in the Mississippi Valley by Wallace Butler. In 1921 we find the names of Gordon Curran*, Christopher again, barberry field men, and others; in 1922 there were J. L. Seal*, Reiner Bonde*, in addition to 15 cooperators during the winter of 1922-23. The following year came C. G. Anderson, E. B. Lambert, who was in immediate charge of epidemiology studies until 1928, and J. J. Christensen, who devoted part time to rust work until 1929 and again from 1930 to 1937. In 1924 L. A. Schaal*, J. H. Craigie*, and Henry Hecker were on the rolls. Frank Frolik's name appeared again in 1926, Lee Person's* in 1927, H. H. Thornberry in 1928, and from 1929 to 1932 there was H. G. Ukkelberg. C. J. Eide and J. M. Walter* contributed in 1930, Ward Marshall from 1931 to 1935, and G. H. Starr in 1931. New names do not appear again, aside from miscellaneous assistants, until 1940, when there were Ellis F. Darley* and D. E. Munnecke*, and in 1941 E. A. Andrews.

Details of the physiologic race survey of Puccinia graminis were supervised by J. M. Wallace from 1925 to 1928, by Lee Hines from 1928 to 1934, by R. C. Cassell from 1934 to 1938, and since 1938 by W. Q. Loegering. Some of those listed above also assisted in the greenhouse, particularly Ward Marshall.

Aerobiological work in connection with rust studies at Minnesota was begun in 1907 by Freeman and Johnson, who exposed plates containing water on top of a building on the Minneapolis campus and in an adjoining garden. Stakman performed similar experiments at University Farm in 1910, including exposures on the water-tank tower. To find rust urediospores 100 feet in the air was the height of adventure! Later, as part of the cooperative epidemiology program begun in 1917, spore trapping was done on a larger scale, beginning in 1921, and consisted of airplane flights, balloon flights, and flights of fancy. Those who took part in carrying out this program were Stakman, A. W. Henry, Gordon Curran, W. N. Christopher, E. H. Ostrom, E. B. Lambert, J. J. Christensen, D. L. Bailey, Wallace Butler, and W. P. Harter. Contribution by way of apparatus was made by G. D. George. Detailed studies on short-range dissemination of spores were made also by J. J. Christensen. In charge of examination of slides and analyses of results in one or more years were Helen Hart, J. H. Craigie, J. M. Wallace, Lee Person, Jr., and J. M. Walter, and since 1932 by R. U. Cotter. In addition, many Famous Names in the annals of Old Timers spent time peering through microscopes to count stem rust and leaf rust spores. Among them were H. G. Ukkelberg, E. G. Sharvelle, M. N. Kamat, Lee Hines, Leon J. Tyler, Clyde Shumway, R. C. Cassell, T. W. Graham, George Halstad, J. G. Harrar, Fred Davies, Glenn KenKnight, Ward Marshall, M. F. Kernkamp, E. K. Vaughn, Liang Hwang, T. H. King, Phares Decker, W. Q. Loegering, K. W. Kreitlow, J. L. Allison, Andrew Downie, Milton Petty, Axel Anderson, N. E. Borlaug,

*Were employed more than one year.



—From Aurora Sporealis Vol II, No. 2, 1926

Dudley Preston, R. E. Atkinson, Bernard Shema, Donald de Zeeuw, Arden Sherf, E. A. Andrews, S. M. Chen, W. J. Martin, John Mitchell, D. E. Munnecke, F. S. Thatcher, David Gottlieb, C. S. Schneider, Max Schuster, Savel Silverborg, W. D. Thomas, Jr., Dorothy Blaisdell Vaughn, Harry Young, Jr., R. S. Davidson, J. W. Hendrix, George Nyland, John B. Rowell, R. S. Mullin, and C. T. Tsiang.

Barberry testing for susceptibility or resistance to stem rust has been carried on by Ralph U. Cotter since 1924.

Barberry eradication in Minnesota, primarily a Federal project, is carried on cooperatively with the State Department of Agriculture as well as the University of Minnesota.3/ Eradication of bushes was begun in 1918, with Dr. Freeman the first State Leader, and the following as assistant leaders: A. G. Newhall, Freeman Weiss, Frank L. Brunkow, and Mark A. McCarty. Second State Leader, beginning in the summer of 1920, was Leonard W. Melander, with various assistant leaders, including E. H. Ostrom, Charles Hinkley, W. C. Hanson, L. M. Stahler, Ward Marshall, T. H. Stewart, and F. B. Powers. T. H. Stewart became the third State Leader in the spring of 1945, replacing Dr. Melander, who took over nursery sanitation, chemical experimentation, and ecological studies in connection with the national campaign. Many other Old Timers assisted in the field work of eradication, in the course of which over one million properties in Minnesota have been cleared of bushes.

Illustrative material for the rust studies, but particularly in connection with the Federal campaign in the eradication of barberries, was furnished by Gilbert D. George, who was appointed Illustrator in the Division of Cereal Investigations in June, 1919, and Agent, cooperating with the University of Minnesota, in November of that year, until his retirement in 1940.

Any discussion of the epidemiology work at Minnesota would be incomplete without grateful acknowledgement of the active cooperation furnished by Donald G. Fletcher, executive secretary of the Conference for the Prevention of Grain Rust. The early work of the Conference has been mentioned by Dr. Freeman.

Division of Sugar Plant Investigations, Bureau of Plant Industry

Sugar Beet disease studies have been carried on cooperatively at Minnesota by the following full-time Federal people: E. L. LeClerg, 1930-39; Andrew Downie, 1939-44; and since 1944 by H. L. Bockstahler.

Division of Forage Crops and Diseases, Bureau of Plant Industry

Support of the soybean disease work being carried on at Minnesota began in April, 1944. Cooperators included M. G. Boosalis, H. M. Murakishi, and John Gibler.

---Laura M. Hamilton

3/ Information on this project furnished by Thain H. Stewart.

Cooperation with the U. S. Department of Agriculture and State Agencies

Barberry eradication in Minnesota, already discussed, also belongs in this category, since the State Department of Agriculture has been cooperating since 1918.

White Pine Blister Rust--Several Federal and state agencies have cooperated in blister rust control work since 1916. The Division of Forest Pathology of the Bureau of Plant Industry, U. S. Department of Agriculture, has always been responsible for research work concerning the disease. Similarly, the Division of Plant Pathology, University of Minnesota has been interested in research work on the state level. The Bureau of Plant Industry, U.S.D.A., was responsible for the conduct of actual control work on the Federal level until blister rust and other disease and insect control programs were transferred to the Bureau of Entomology and Plant Quarantine in 1934. The State Entomologist has broad authority to trespass on private lands and to destroy host plants of plant disease and insect pests, and blister rust control in Minnesota was conducted under this authority until a specific blister rust control law was passed in 1929.

Beginning in 1917 we find the Bureau of Plant Industry of the U.S.D.A. cooperating with the State Entomologist and through the State Entomologist with the Division of Plant Pathology and the Division of Forestry, University of Minnesota. The Minnesota Forest Service was always represented at conferences. This type of cooperation lasted through 1919, when it was decided that the problem should be turned over to the Minnesota Forest Service. Thereafter for three years the Minnesota Forest Service represented other state agencies in cooperative agreements with the U. S. Department. During the years 1925 to 1929, inclusive, the Bureau of Plant Industry and the Division of Plant Pathology, U. of Minnesota, cooperated in putting one and two men in the field during the summer months to keep track of the spread of the disease. Since July 1, 1929, the cooperative agreement has been between the Federal agency and the Minnesota Forest Service. There has always been considerable informal cooperation on the part of the interested agencies, including Divisions of Plant Pathology, Forestry and Horticulture of the University of Minnesota; the State Entomologist; the U. S. Forest Service; the U. S. Indian Service; and the Minnesota Forest Service.

Control Methods

During the years 1917 to 1919 blister rust control was conducted with the hope of eliminating that disease entirely from the State. Shipments of white pine especially from nurseries wherein infection had been found were traced and examined. When infection was found the finder destroyed the infected plants and thoroughly disinfected his clothes before continuing scouting for additional infection. In the case of the Pine Hollow and Dry Creek areas all the pine in the areas was cut. Law logs were sold for lumber and the smaller material burned, and in other areas such as Afton and Rush Lake white pine under 3 inches in diameter breast height was cut and burned and white pine above that size pruned and thinned.

The 900-foot protective zone was adopted as standard about 1922 and was used into 1934. At that time it was recognized that the 900-foot zone was not necessary in denser swamp types, first because the dense foliage screened the pine-infecting spores out of the air and secondly because the cold air on the floor of the swamps tended to lie dormant. The fact that swamp eradication was costly and that it would be more economical to take a loss in white pine along swamp edges was also a factor in reducing protective zones in swamps. The protective zones now are about 50 feet in swamps, from 200 to 600 feet in upland forest types and 900 feet in cultivated land areas where Ribes' habitat is largely fence rows and roadsides.

1888. Klebahn established the fact that white pine blister rust was caused by a heteroecious fungi with the five-needle pines as one host and currants and gooseberries as another.

1906. Blister rust infection on Ribes was found at the New York State Experiment Station, Geneva, New York.

1912. The Plant Quarantine Act was passed by Congress and Federal Plant Quarantine No. 1 issued by the Acting Secretary of Agriculture.

1915. Rust on native pine was reported from Massachusetts and other states. Rust on planted pine was found in Polk County, Wisconsin.

1916. In May 1916, Professor E. G. Cheney, Division of Forestry, University of Minnesota, received a diseased white pine specimen from Amery, Wisconsin. He turned this specimen over to the Division of Plant Pathology at Minnesota for identification. The disease was identified as blister rust and Drs. E. M. Freeman and E. C. Stakman proceeded immediately to the Dr. James Wallace farm at Doronda, Wisconsin. They discovered that the infected white pine trees had been secured from the Baker nursery near St. Croix Falls, Wisconsin. Baker's nursery had been discontinued the previous year, but they found that part of the stock had been purchased by the Strand nursery at Taylors Falls. The pines in Strand's nursery were then inspected and the trees bought from Baker in the spring of 1915 were found to be diseased. Further investigation revealed that Baker had secured his stock from the Hill nursery at Dundee, Illinois. The Illinois nursery in turn had secured the white pine from eastern nurseries and had imported some seedlings from Germany.

Later in 1916 infection on both pine and Ribes was found at the Mayfield nursery, Lakeland, Washington county (Minnesota) and on planted pine in Lyon county. Infection on wild Ribes was found on Dry Creek about seven miles north of Taylors Falls (July 13, 1916) and also in Pine Hollow three miles below Osceola, close to the St. Croix River in Washington county (September 25, 1916).

1917. At a conference of interested officials, activities for the year were planned and responsibility for these activities divided as follows: 1) Eradication and scouting the St. Croix valley was under the direction of Dr. E. M. Freeman, chief of the Division of Plant Pathology, 2) Professor F. L. Washburn, State Entomologist, was responsible for scouting outside of St. Croix valley, for the inspection of nurseries and for following up on leads; i.e., tracing shipments of white pine stock from nurseries in which infection had been found.

During 1917 infection on planted and natural pine and wild and cultivated Ribes was found at a number of locations in Washington, Chisago, Pine and Isanti counties. The outstanding areas where infection on natural pine and Ribes was found were Afton, Washington county; Dry Creek, Chisago county; Franconia, Chisago county; Pine Hollow, Washington county; S. E. corner of Kanabec county; Marine, Washington county; three locations in the S. E. corner of Pine county; and in Nessel township, Chisago county. Infected planted pine was found in Lake Vadnais watershed plantings and in St. Paul in Ramsey county, in Minneapolis in Hennepin county, and in a nursery at Owatonna in Steele county.

All pine, some 150,000 ft. B.M. in Pine Hollow and Dry Creek, was cut.

The Legislature appropriated to the State Entomologist $7,500 per year for the fiscal years ending June 30, 1918 and 1919.

1918. Activities in 1918 were divided as follows: All scouting was under the direction of Dr. Freeman. All eradication was under the direction of Professor E. G. Cheney and leads and nursery inspection under A. G. Ruggles, State Entomologist. During 1918 no new infection areas were found.

Infected planted pine was found in Martin and Olmsted counties.

1919. In 1919 it was agreed to place the scouting and eradication under Dr. Freeman, leads and nursery inspection under Professor A. G. Ruggles and investigation of eradication methods under Professor E. G. Cheney. Pine infection was found for the first time in Isanti county in Maple Ridge township. Ribes infection was found in all counties where it had been previously found plus Anoka, Aitkin, Carlton, Hennepin, Kanabec, Mille Lacs, Rice, Steele, St. Louis and Wabasha counties. Ribes "infection was found practically wherever foot scouting was done."

The Legislature appropriated $7,500 per year to the State Entomologist for the fiscal years ending June 30, 1920 and 1921.

At a conference held October 6, 1919 it was recognized that eliminating the disease from the State was not possible and that further efforts should be directed to local control of the disease; i.e., the protection of individual white pine stands.

It was agreed by the state and Federal officials attending a conference that local control was a job for foresters and it should be turned over to the Minnesota Forest Service; that the Division of Plant Pathology would continue investigations of the dissemination of spores and the development of the disease; and that the Division of Forestry and the Experiment Station would continue investigations of Ribes eradication, and would conduct a survey to locate valuable young white pine stands.

1920. Mr. P. O. Anderson, now Minnesota's Extension Forester, was employed by the Bureau of Plant Industry and worked under the administrative direction of the State Forester in charge of blister rust control in Minnesota from November 1, 1919 to December 1, 1920.

Scouts working under direction of the State Entomologist found Ribes infection at Tower in St. Louis county, at Knife River in Lake county, at Deer River and Grand Rapids in Itasca county and on the east shore of Gull Lake in Crow Wing and Cass counties.

Ribes eradication was performed in Itasca, Jay Cooke, and Interstate state parks.

1921. K. J. Braden was State Leader.

Ribes eradication was done along the St. Croix between Marine and Otisville; re-eradication in Interstate Park, and some initial eradication in Duluth city parks.

1922. Ribes eradication was performed in the Primeval Pine Grove in Little Falls.

1922 and 1923. C. M. "Bob" Roberts was in charge of blister rust control in Minnesota from August 1, 1922 through 1923.

During the period 1917 to 1923 inclusive, Ribes eradication was performed on 4,981 acres at a cost of $14,180.17. Control work was done in Itasca, Jay Cooke and Interstate Parks and Primeval Pine Grove in Little Falls. This is in addition to eradication of Ribes and pine in the infection areas found in the St. Croix Valley. No work was done in 1924.

1925 to 1929, incl. Scouting for infection and collection of data from study plots was performed by one or two men paid by the Bureau of Plant Industry and working during the summer months under the direction of the Division of Plant Pathology at Minnesota.

1925. Ribes infection was found for the first time in Morrison county, pine infection in the city of Duluth in St. Louis county and near Two Harbors in Lake county.

1927. Pine infection was found near Crosby in Crow Wing county.

1929. Pine infection was found near Coleraine in Itasca county.

The Minnesota blister rust law was enacted. The law placed the authority and responsibility for white pine blister rust control in the Commissioner of Forestry and Fire Prevention. Subsequent legislation transferred this authority and responsibility to the Commissioner of Conservation who has delegated it to his Director of the Division of Forestry. The State Entomologist was made responsible for blister rust control in nurseries. L. B. Ritter was appointed State Leader.

1933. The CCC and PWA programs were started.

1934. Plant disease control activities of the Bureau of Plant Industry, U. S. Department of Agriculture, were transferred to the Bureau of Entomology and Plant Quarantine.

1935. WPA programs started. Blister rust control was one of the first activities to employ WPA workers. Federal agency WPA project ended in 1941.

1942. The CCC program was discontinued June 30. State agency sponsored WPA projects ended.

---L. B. Ritter

Cooperation with State Agencies

Potato Seed Certification--Prior to 1914 there was no essential difference between seed and table stock as far as the potato trade was concerned. Knowledge concerning certain important seed-borne diseases was very meager. Also no basis for grading had been established. Outside of a few varieties, potatoes were sold as round whites, round reds, long whites, etc., and varietal mixtures were not uncommon. The growing of potatoes was becoming an important phase of agriculture in the South, but the lack of good healthy seed stock brought from southern growers continuous streams of complaints.

In the winter of 1914 a nationwide conference, attended by plant pathologists, entomologists, growers, dealers and others was called by Dr. W. A. Orton, then Potato Pathologist with the U. S. Department of Agriculture, for the purpose of setting into operation a system of seed potato inspection and certification. Dr. Otto Appel, foremost potato pathologist in Europe, and at that time Director of the Imperial Institute of Agriculture and Forestry, Berlin, Germany, who had devised a satisfactory system of seed potato certification in his country, had been invited by Dr. Orton to study potato disease problems throughout the United States and to participate in this conference. As a result of the conference, representatives of the northern potato growing States saw the possibility of potato improvement through seed potato inspection, although they realized the fact that a considerable amount of preliminary work had to be done, especially with reference to the nature and recognition of virus diseases.

Wisconsin was the first state to start a certification program certifying 30,000 bushels of potatoes in 1915. During the next 4 years several other states followed. In 1919 the Minnesota State Legislature passed a bill creating the Minnesota Board for Seed Potato Inspection and Certification. This board consisted of the Director of the Experiment Station, the president of the Minnesota Potato Growers Association and three potato growers appointed by the Governor. Because of the regulatory features involved, the activities of the board were transferred to the State Department of Agriculture, Dairy and Food in 1921, where the work is

now carried on by the Seed Potato Certification Division. The original law was discarded in 1927 and the Department is now operating under the law passed that year.

From a total of 5,000 acres, of which about one-half met the certification requirements with a total production of 325,000 bushels consisting of seven varieties in 1919, the total has increased to 34,000 acres inspected, and 24,700 acres passed for certification with a total of 4,600,000 bushels consisting of 21 varieties in 1947. In 1946, certification tags were issued for 3,089 cars. This figure represents more than one-third of the total number of cars of potatoes shipped out of the State from last year's crop.

During the past 28 years much information has been gained about the many factors affecting the suitability of potatoes for seed. Disease tolerances have been lowered, and from time to time more stringent regulations regarding the production of foundation stock and more strict storage regulations have been adopted, so that seed potatoes now being certified are considerably better than those certified in the early days.

Inasmuch as the saturation point of certified seed potato production for the needs of potato growers throughout the United States has been reached, it means that growing and selling of certified seed potatoes is becoming a highly competitive business. Minnesota now ranks third in the production of certified seed potatoes.

—A. G. Tolaas

State Seed Laboratory--The Minnesota Seed Laboratory grew out of preliminary arrangements made for seed testing started January, 1910, as a definite service to farmers and seed dealers by the newly organized Division of Vegetable Pathology and Botany of the University Agricultural Experiment Station under Dr. E. M. Freeman, chief of the division. Organizing and conducting the work of the laboratory devolved principally on W. L. Oswald, instructor in agricultural botany, who was chiefly responsible for the inaugurating of the seed laboratory with its seed analysis, studies, and inspection. New seed service was the culmination of many years of casual seed examination and analysis of seeds for farmers and seed dealers by members of the agricultural experiment station staff.

The organized seed testing and inspection voluntarily started in 1910 by the University, together called the "Seed Laboratory," continued until 1913, when the first seed law (Laws, 1913, C.141) was enacted. This law required the agricultural experiment station to make analyses and tests of agricultural seed sold or offered for sale, as it may determine, to test free samples of seed received from residents of the state, and to appoint necessary agents as seed analysts, and part-time seed inspectors. Prosecution of violations reported to them by the experiment station was required of the attorney-general and the county attorneys.

While this law did not prohibit the sale of any kind of seed in the state, it did require specific labeling requirements for the more common agricultural seeds sold in Minnesota. The law did not provide specifically for a state seed laboratory, although the seed testing requirements of the law made it necessary for the experiment station to provide equipment and personnel for carrying out the provisions of the law. These provisions covered four lines: educational work, experimentation, seed testing, and seed inspection. Together they were known as, and constituted the first State seed laboratory.

Part-time inspectors were sent out into the State to inspect seed on sale and to secure samples for determining the nature and quality of seed being sold and to discover violations of the labeling requirements of the law.

This seed laboratory work was carried on by the Agricultural Experiment Station until 1921 when (Laws 1921, C.480) all the duties and costs of seed inspection and testing were by law transferred to the commissioner of agriculture.

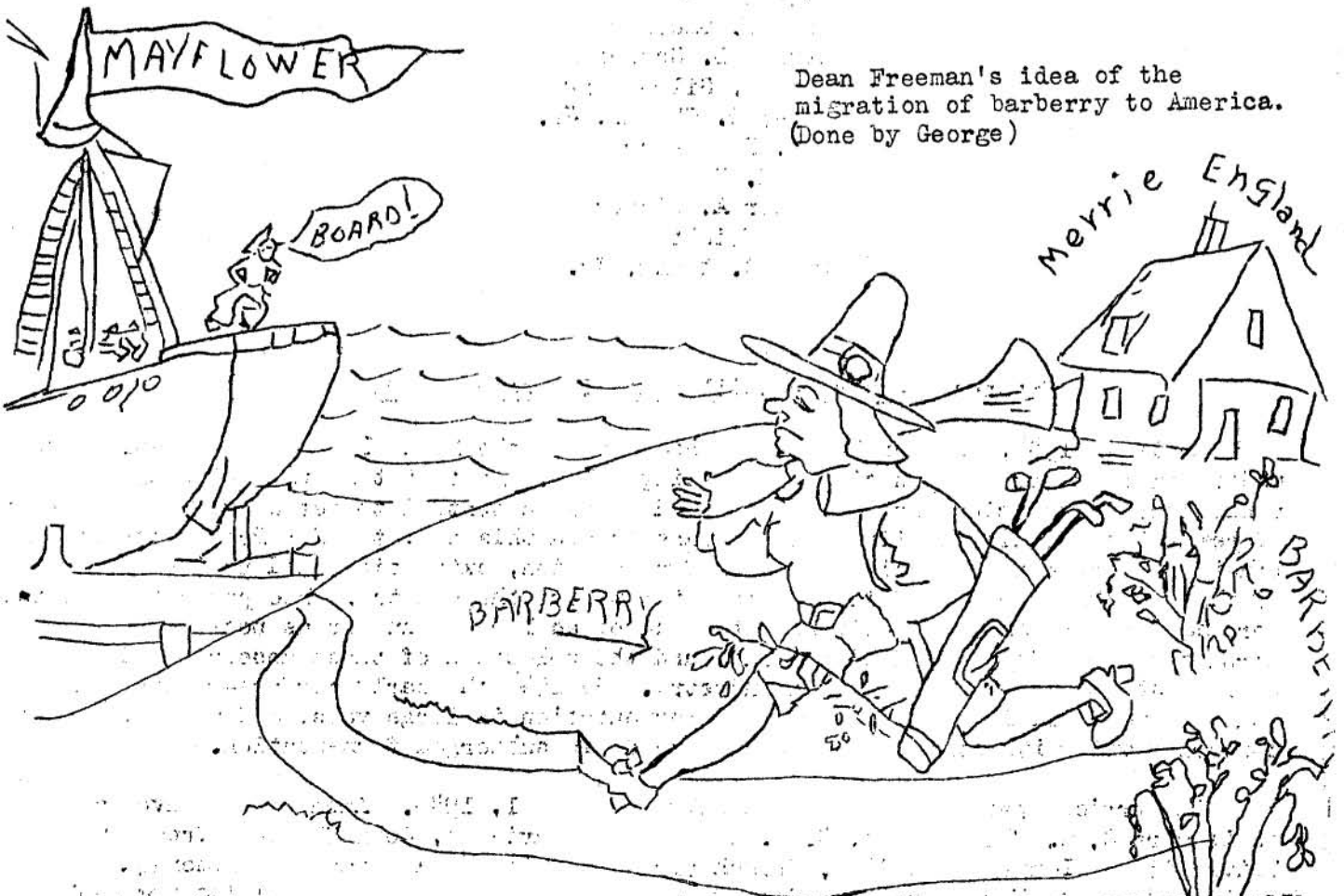
The seed testing (laboratory) equipment, personnel, and supervision remained at University Farm under the experiment station; and all weed, plant, and seed herbariums developed in connection with the seed laboratory were left there also as the property of the University. Costs of seed testing performed under the law by the seed laboratory were paid to the experiment station by the State Department of Agriculture.

Direct statutory provision for establishment and maintenance of a state seed laboratory was made by Laws, 1927, C. 387, when the commissioner of agriculture was authorized to take over the employment of personnel, the purchase of new equipment and supplies, and the direction and operation of the laboratory. The equipment then owned by the laboratory remained as the property of the experiment station, where the laboratory has continued to be located.

The work of the seed laboratory has been under a succession of able directors and seed analysts, as follows: W. L. Oswald, January 1910 to August 31, 1917; Robert C. Dahlberg, to August 31, 1920; A. H. Larson, who was seed analyst for three years preceding his directorship from 1920 to 1925 and has been collaborator since that time; C. P. Bull, 1925 to 1943, with Mrs. Ruby Crouley, who had been chief seed analyst since 1917, in direct charge of the laboratory from 1925 to her resignation on August 31, 1940. J. L. Larson, who has been employed in the laboratory since 1922, has been in charge since 1940, with the laboratory as a division of the Minnesota Bureau of Plant Industry since 1945.

The analysis and testing work of the seed laboratory has grown steadily, with some fluctuation, from 790 samples of seed for July, 1909, to 24,193 samples for 1947-1948. The largest number of samples was 28,684 in 1943-1944. There has been a decline of about 1000 samples each year since.

--D. W. Frear



Dean Freeman's idea of the migration of barberry to America. (Done by George)

--From Aurora Sporealis, Vol.VII, No. 2, 1931

WORLD WAR VETERANS

World War I

Olaf S. Aamodt
C. G. Anderson
Reiner Bonde
J. H. Craigie
J. J. Christensen
W. M. Christopher
Alfred E. Eagle
Donald G. Fletcher
W. F. Hanna
Leonard W. Melander
R. J. Noble
Howard E. Parson
Frank J. Piemeisel
R. C. Rose
W. L. Waterhouse

World War II

Old Timers

David Adams
Axel Anderson
Carl G. Anderson
Michael G. Boosalis
Huey I. Borders
Warren N. Christopher
Donald De Zeeuw
Faith Gugler
William F. Hanna
Lawrence Henson
Herbert Johnson
Milton F. Kernkamp
Thomas H. King
Thomas Laskaris
John G. Martland
John B. Mitchell
Donald E. Munnecke
George Nyland
Conrad Olson
John B. Rowell
Bernard Shema
Arden F. Sherf
Charles L. Schneider
Savel B. Silberborg
Walter D. Thomas, Jr.
H. H. Thornberry
John R. Vaughn
Chester A. Wismer
T. R. Wright
Harry C. Young, Jr.

New Timers

Stuart Andrews
A. David Baskin
Mortimer Cohen
Howard Ehrlich
Clayton W. Ellett
Paul R. Fridlund
John W. Gibler
Shosuke Goto
Charles E. Logsdon
Merle Michaelson
Lawrence I. Miller
Dick S. Pon
Malcolm C. Shurtleff

—M. F. Kernkamp

Prospecting for Penicillin at Minnesota in 1944

Early in 1944, the War Production Board asked the Plant Pathology Department to undertake a project on penicillin-producing molds. At that time the value of penicillin in medicine was recognized, and it was essential to get a sufficient amount of penicillin of high quality. As a means toward this end, the War Production Board subsidized projects on various phases of production, extraction, and purification of the drug at a number of institutions throughout the country. The project supported here had as its aim the preliminary testing of as large a number as possible of strains of penicillin-producing molds, and the selection of those deserving pilot plant testing for possible use in industry. By 1944 the early surface-production had been replaced largely by submerged fermentation in large vats, and we were concerned only with strains of possible value in submerged fermentation.

The project got under way officially on March 1, 1944. Among those involved in it were C. M. Christensen, S. M. Chen, R. S. Davidson, John Ehrlich (from the University of Idaho), and C. S. French (from the Minnesota Botany Department), Phillip C. Hamm, Ward Marshall, Chen Tong Tsiang and Dorothy Day. At the peak of the work there were about 35 full-time employees. The project occupied the entire

first floor of the Plant Pathology Building, and occasionally overflowed to the second and third floors.

Besides the people, there was an amazing amount of machinery and gadgets involved, much of it designed, and some of it built, by those on the project. The work essentially was to isolate large numbers of fungi, from any source whatever; test them, first, as to inhibition of Staphylococcus aureus on agar culture; pick out the best ones, grow these in replicate shake-flask cultures and test the liquid for penicillin on each of several successive days; select the best cultures, retest them; and then ship out the best of these for further testing on a larger scale elsewhere. The machinery ran day and night; the men, boys and girls and women involved usually ran just during the day, including Sundays and Holy days. The bearings on the machines burned out now and then, but most of the people held up remarkably well, considering the unusual stress to which some of them were subjected. Nobody got medals, but if any were given, they probably should go to those who had to wash 1000 petri dishes and 2000 test tubes and 800 Erlenmeyer flasks every day, and those who had to make the agar just so, fill the dishes, and fill them just so. In a sense, it was partly chain-gang work, but even those whose sole job it was to wash dishes would stop and cheer when they heard that we had produced a good culture. So a good spirit prevailed, as it always had prevailed in the Tottering Tower; and even on the penicillin project there were few who came into it who did not catch a part of that spirit.

The War Production Board contract on this project specified that it was to close on December 31, 1944, and close it did. In the 10 months that the project was under way, somewhere between 30,000 and 35,000 cultures were tested for their penicillin-producing capacity. These came from many different sources--some from local soil, rotten vegetables, old shoes, the air; some were sent in by soils extension men throughout the country, some by men in the Bureau of Entomology and Plant Quarantine. (Ray Bulger and some of the others in Barberry Eradication and White Pine Blister Rust Eradication were practically ex-officio members of the project, judged on the basis of their contributions to it.) At first, any and all cultures were tested. It soon was found out that, for the type of penicillin that we were hunting, green Penicillia from soil were a much better bet than any other molds from any other sources, and so the tests were restricted largely, but not solely, to these green Penicillia from soil.

Most of the high penicillin-producing wild cultures we tested came not from the tropics or from distant points or peculiar sources, but from a couple of bushels of soil that Carl Eide had collected some six months before in potato fields at Brooklyn Center and Moorhead, Minnesota, and had stored in the headhouse, for some obscure purpose. Several of the best of the more than 30,000 cultures we tested came from this soil. One of them was selected by Ward Marshall on the third day of the project, while some of the men were over at the General Storehouse practically hijacking cartons of Erlenmeyer flasks from the shelves so that we could get the project started. Other good cultures came from soil stored up to 17 years in the basement of the Soils Laboratory on the campus; some of this old soil fairly teemed with viable spores of high penicillin producers. Others came from various sources, from Pennsylvania to North Dakota.

The tests carried on here were only of a preliminary screening nature. The few high-yielding cultures we obtained were sent to the Northern Regional Research Laboratory at Peoria, where work on various phases of penicillin production, including the selection of higher producing strains, had been going on for years; to the University of Wisconsin, where the pilot plant tests of various industrial fermentations, including penicillin production, had been carried on for some time; and to some 20 industrial producers in the U. S. and Canada, most of whom had their own facilities for testing new strains.

The prize-winning culture that we had a hand in did not originate in our own laboratory. Dr. Kenneth Raper at the Northern Regional Research Laboratory in Peoria had, in 1943, picked up a high-yielding culture of Penicillium chrysogenum from a moldy canteloupe in a Peoria grocery store. It was suited to submerged fermentation, and, by selection, he and his coworkers had got some high yielding strains from it. In 1944, one of these was sent to Dr. Demerec at Carnegie Institute on Long Island. He exposed a spore suspension of it to x-rays, and sent to us several thousand cultures derived from these irradiated spores. One of these turned out exceptionally well in our tests, replicated several times, and so we sent it on to Wisconsin. They found it to be a super penicillin producer, and soon sent it out to industry. When our project was begun, in March 1944, a good culture would, in industrial practice, yield something like 80 to 100 units of penicillin per ml. of medium in submerged fermentation. The Peoria-Carnegie-Minnesota-Wisconsin culture yielded around 600 units per ml. The people at Wisconsin later isolated a still more productive strain from this one that would yield from 800 to 1000 units per ml. By that time other laboratories had found out more about isolating, purifying, and packaging penicillin, and so among the various research projects penicillin was made a common, cheap, and generally available drug.

We had only a relatively small part in the over-all picture. However, several of the cultures we selected were used by several of the major penicillin producers for more than a year, in large-scale production. Another has since been found by Dr. Raper at the N.R.R.L. at Peoria to be one of the best producers of penicillin X yet encountered, and we were partly responsible for the super-producer from which most penicillin has been made since December 1944. The War Production Board told us that the project here was "worth a million dollars to the penicillin industry." (We spent approximately $75,000 during the 10 months.) All in all, we felt that we had a share in making penicillin generally available more quickly, and more cheaply, than would have been possible if we had not been in on it. The work was mostly technological rather than basic research, but the Department at least proved that in an emergency it could put basic information and technological know-how to work for a practical end. To those directly engaged it proved that more perspiration than inspiration was involved in the miracle of penicillin.

—C. M. Christensen

When it was decided, at the suggestion of Dr. Stakman, to issue a news sheet to present and former graduate students of the Plant Pathology Department, it was necessary ... to select a suitable name. Members of the section were asked to hand in suggestions to the committee.

The following names were submitted and were voted upon by the staff:

Pathgrad	Plant Path Periscope
Minnepathgrad	Teliometer
Pathosotic Intelligencer	Pathosotist
Minnepathic Intelligencer	Pathologist
Pathfinder	Plant Path Pippins
Plant Path Pickin's	Aurora Sporealis

The Aurora Sporealis has proved the most popular.

—From Aurora Sporealis, Vol. 1, 1924

NECROLOGY

Robert Chester Dahlberg
1891-1935

Robert Chester Dahlberg was born March 5, 1891, at Fergus Falls, Minnesota. He attended the School of Agriculture at University Farm, St. Paul, in 1908-09 and the College of Agriculture from the fall of 1909 to 1913, specializing in Agronomy. In 1913 he received the degree of Bachelor of Science in Agriculture from the University of Minnesota. On August 1 of that year he joined the staff of the Section of Agricultural Botany in the Division of Plant Pathology and Botany as Seed Analyst in the Experiment Station and Instructor in the College and School of Agriculture, teaching botany courses in both College and School, in addition to his work in the Seed Laboratory. In 1917 he was made assistant Professor.

While at Minnesota, Mr. Dahlberg worked out methods of identifying species of Agropyron by the morphological characters of the lemma, palea, and rachis. With Andrew Boss he studied the distribution and eradication of perennial sow thistle, and with W. L. Oswald published the Fourth Annual Report of the Seed Laboratory. From 1918 to 1920, he served as secretary-treasurer of the Association of Official Seed Analysts of North America.

During W. L. Oswald's leave of absence from the University (September 1, 1917, to April 18, 1918) Mr. Dahlberg served as Acting Head of the Seed Laboratory in the Division of Plant Pathology and Botany and on Mr. Oswald's resignation was placed in charge of the Section of Agricultural Botany and the Seed Laboratory. He held this position until 1920, when he resigned to take up farming near Springfield, Minnesota. He died at Springfield in 1935.

Rodney Beecher Harvey
1890-1945

Rodney Beecher Harvey was born May 26, 1890, at Monroeville, Indiana. After graduation in 1912 from the University of Purdue as Pharmaceutical Chemist, he was appointed Assistant Botanist in the pharmaceutical manufacturing laboratory of the Eli Lilly Company of Indianapolis. In the fall of 1913 he entered the University of Michigan, from which he received the degree of Bachelor of Science in February, 1915. The following June he entered the University of Chicago as a candidate for the degree of Doctor of Philosophy under Dr. William Crocker. In August of that year he was appointed by the U. S. Bureau of Chemistry as Pharmacognocist but was transferred shortly to work in plant physiology under Dr. Rodney H. True in the Office of Plant Physiological and Fermentation Investigations in the Bureau of Plant Industry.

On June 16, 1917, he married Helen M. Whittier.

While on leave of absence, he returned to the University of Chicago in 1917 as a Fellow and was granted the Doctor of Philosophy degree the following year. His thesis dealt with winter hardiness of plants.

In 1920 Dr. Harvey left the Bureau of Plant Industry and came to the University of Minnesota as Assistant Professor of plant physiology, serving half time teaching plant physiology in the Department of Botany in the College of Science, Literature and Arts and half time on research in the Agricultural Experiment Station. For the first years Dr. Harvey assisted Dr. Lee I. Knight, but during the latter's illness and after his resignation in 1923 Harvey was made head of the Section of Plant Physiology and Agricultural Botany in the Division of Plant Pathology and Botany. He was made Associate Professor in 1921 and Professor in 1931.

On leave of absence in 1927-1928 and as a Fellow of the Guggenheim Foundation, he studied in England at Cambridge University with Dr. F. F. Blackman in the School of Botany; at the Low Temperature Research Station with Sir William Hardy, Professor Franklin Kidd, and Professor Cyril West; in Germany at the University of Bonn with Dr. Ernest Schaffnit; and in Russia at the University of Leningrad with Dr. Nicola A. Maximow. While in Russia he made a survey for the Guggenheim Foundation of research in progress in the agricultural experiment stations. In 1936-1937, while again on leave of absence, he served as Director of the Florida Citrus Research Laboratory at Dunedin, Florida. In 1942-1943 he acted as Director of the Division of Industrial Microbiology of General Mills, in Minneapolis.

On November 4, 1945, Dr. Harvey died of a heart attack after a brief illness.

Dr. Harvey's interests in research were as wide as the field of plant physiology, and he was a genius at foreseeing the practical applications of new principles. He was the first to introduce the artificial winter test for selecting winter hardy plants from hybrid materials. He also was the first to grow plants from seed to seed entirely in artificial light. He is probably best known, however, for his discovery of the use of ethylene gas in hastening the ripening of fruits and vegetables, a process adopted by over 2000 fruit jobbers in the United States and now in use in almost every country in the world. Many of his processes for coloring, sterilizing, wrapping and waxing fruits and vegetables were patented and also are in use throughout the world. He also introduced the process of X-ray inspection of fruits and vegetables for internal defects, now used extensively in the citrus and other industries. He developed a new series of chemicals for weed eradication and at the time of his death was investigating the effectiveness of certain hormones as weed eradicants.

Dr. Harvey helped to organize the American Society of Plant Physiologists in 1924 and served as its first secretary-treasurer. In 1921 he was elected vice-president and in 1936 president of the Society. He was largely responsible for the revival of the Minnesota Academy of Science in 1932, and especially for the organization and growth of the Junior Academy. He was author of the book entitled "Plant Physiological Chemistry" published in 1930, and nearly 200 scientific and/or popular papers. With A. E. Murneek, he edited a translation into English of Maximov's "Plant Physiology". One of his hobbies was collecting historical materials relating to plant physiology and botany: he had a collection of about 500 portraits of research workers, laboratories and student groups. Throughout his career he maintained comprehensive bibliographies of plant physiology, one of which was published in 1935 under the title "An annotated bibliography on low temperature relations of plants."

Dr. Harvey was recipient of many honors. In 1939 he was awarded an honorary degree of Doctor of Science by Purdue University. Starred in American Men of Science in 1933, he was a corresponding member of the Botanical Society of Czechoslovakia and of the graduate faculty of the University of Madras, India. He was a member of Sigma Xi, Gamma Alpha, Alpha Zeta, Phi Lambda Upsilon and Gamma Sigma Delta.

During Dr. Harvey's 25 years at Minnesota he rendered valuable service to science, particularly in relation to the practical applications of plant physiology.

Karl Isenbeck
1904-1945

Karl Isenbeck was born April 11, 1904, at Wiescherhofen bei Hamm, Germany. From the University of Halle he received the degree of Doktor der Naturwissenschaften in 1930. During the summers from 1923 to 1927 he worked on plant breeding farms in Germany, and from 1928 to 1930 in experimental fields at Halle.

In 1930-1931, Dr. Isenbeck spent a year at Minnesota in the Division of Plant Pathology and Botany as an assistant under the informal exchange agreement between the plant pathology sections of the University of Halle and the University of Minnesota. While here he worked on the genetics and physiology of physiologic races of Sphacelotheca sorghi. He was elected to membership of Sigma Xi in June, 1931.

On returning to Germany he became Dozent fuer Pflanzenbau and Pflanzenzuechtung under Dr. T. Roemer at the University of Halle, and in 1937 became Privat Dozent. At Halle his work dealt with the breeding of barley varieties resistant to Helminthosporium gramineum and with biologic specialization and breeding for field resistance in Puccinia glumarum. With Dr. Roemer and Dr. W. H. Fuchs he was co-author of the book "Die Zuechtung resistenter Rassen der Kulturpflanzen" published by Paul Parey, 1938.

In a letter written February 2, 1941, Isenbeck reported that, after almost a year in war service, he had been released for scientific work: Since November, 1940, he had been director of the Institut fuer Acker- und Pflanzenbau at Admont, Steiermark, formerly in Austria. Word was received in 1946 of his death through accident.

Delia Elizabeth Johnson
1884-1946

Delia Elizabeth Johnson was born February 24, 1884, at Fergus Falls, Minnesota. She taught in the public schools of northern Minnesota from 1908 to 1914, becoming assistant principal of the Crosby-Ironton High School during her second year there. She then became laboratory assistant in the Fargo, North Dakota, City Health Department, and in September, 1915, matriculated in the North Dakota Agricultural College. With her major field of specialization bacteriology and her minor botany, Miss Johnson graduated from the Curriculum in Education with the degree, Bachelor of Science, in June 1917. From 1917 to 1925 she was State Bacteriologist in North Dakota.

In 1926 Miss Johnson entered the Graduate School of the University of Minnesota, where her major field was plant pathology and the minor soil bacteriology. Under Dr. J. G. Leach she investigated the relationships of the cabbage maggot and other insects to the spread and development of soft rot of cabbage. From 1930 to 1933 she remained as an instructor in the Section of Plant Pathology, investigating certain chitin-destroying bacteria and making a significant contribution in her work on the antibiotic effect of certain bacteria to smuts and other fungi. The results of these studies were published in Phytopathology,

For several years following her resignation she worked with Dr. Arthur Henrici in the Department of Bacteriology in the Medical School of the University of Minnesota. The results of their studies of fresh water bacteria were published in the Journal of Bacteriology for 1935. In 1942 she became Research Bacteriologist at the Florence Filter Plant, Metropolitan Utilities District, Omaha, Nebraska. She remained in this service until her sudden death, May 13, 1946, at Crosby, Minnesota. Her most important contribution during her service for the Utilities District was a study of the significance of the presence of non-conforming gas formers, results of which were published in Water Works Engineering.

Jane Nisbit
1869-1924

Jane Nisbit was born June 6, 1869, at Rochester, Minnesota, where her father, John Nisbit, was a florist. After taking the Professional Course at Winona State Normal School in 1887-88, she taught in the schools of Olmsted, Dodge, Clay, and Nobles counties until 1901. From 1901 to 1904 Miss Nisbit attended the University of Minnesota, from which she received the Bachelor of Arts degree in June, 1904. After further teaching in the high school at Royalton, then Rochester, she returned in 1909 to the University of Minnesota for graduate work, to major in the Division of Vegetable Pathology and Botany and minor in the Division of Soils. She received the degree of Master of Science in June, 1910, her thesis problem dealing with the identification of Agropyron species by seed characters. Following this, she taught science in the Rochester public schools until her death on March 18, 1924.

Wieland Leo Oswald
1879-1944

Wieland Leo Oswald was born September 20, 1879, at Fennimore, Wisconsin. He completed the Advanced Course at the Milwaukee Normal School for Teachers in June 1900, taught rural school one year and served as principal of a grade school another year before coming to University Farm, St. Paul, in 1904 as Instructor in Botany in the School of Agriculture. In 1908 Mr. Oswald's work in the School of Agriculture became incorporated at his own request, in the new Division of Vegetable Pathology and Botany, and in 1909 he began teaching agricultural botany courses in the College of Agriculture. In 1910 he was appointed Assistant in Agricultural Botany in charge of the Seed Laboratory, in 1912 Assistant Agriculturist and Seed Analyst, and in 1914 Assistant Botanist in charge of the Section of Agricultural Botany and the Seed Laboratory. He was made Assistant Professor in 1914.

Mr. Oswald served as vice-president of The Association of Official Seed Analysts of North America in 1913 and as president in 1914 and 1915.

During the year 1917-18 Mr. Oswald was granted leave of absence from the University to accept an appointment as Special Agent in the Division of Markets of the U. S. Department of Agriculture, to assist in determining whether the seed supply in the United States would be adequate to meet the demands of the 1918

growing season. His district included Minnesota, Wisconsin, North and South Dakota, with headquarters in Minneapolis.

Mr. Oswald resigned from the University on April 18, 1918. After completing his Federal assignment, he was associated with the commercial grain trade in Minneapolis until he went to Chicago in 1921 as editor of the Seed World. In February, 1941, he retired as editor and moved to California to become West Coast correspondent of the magazine, holding this office until his death in California on January 23, 1944.

Under Mr. Oswald's alert and energetic direction the Seed Laboratory at University Farm grew rapidly. One of the principal services rendered was that of testing seeds of farmers and growers for purity and germination; during the first year of the laboratory, 790 samples of seed were tested, which increased to 13,000 samples during the last year of Mr. Oswald's tenure. Other services were the dissemination of information on weed pests in Minnesota and the training of seed analysts for other States. With Dr. E. M. Freeman, Chief of the Division of Plant Pathology and Botany, and Dr. A. F. Woods, Dean of the Department of Agriculture, Mr. Oswald was largely responsible for obtaining passage of the Minnesota State Pure Seed Law in 1913.

His son, John W. Oswald, has received a Ph.D. in plant pathology at the University of California.

Howard Everett Parson
1897-1943

Howard Everett Parson was born May 13, 1897, at Smith's Creek, Michigan. In 1917-18 he attended Michigan State Normal College at Ypsilanti, his course there interrupted by induction into military service on August 15, 1918. After serving almost a year with the U. S. Army in the Medical Company of a Casualty Detachment in England and France, he returned to Normal College, then attended Michigan State College of Agriculture, receiving the degree of Bachelor of Science in Agriculture in 1923. During the summers of 1923, 1924, and 1925 Mr. Parson worked on barberry eradication; and during the school year of 1924-1925 he taught agriculture and served as superintendent of the Smith-Hughes School at Mesick, Michigan.

Mr. Parson entered the Graduate School of the University of Minnesota in September, 1925. While here he taught botany in the School of Agriculture and was Research Assistant in plant pathology. In addition, during the spring and summer of 1927 he did field work on rust epidemiology for the U. S. Department of Agriculture in the western Mississippi Valley. He received the degree of Master of Science in 1928, with a thesis problem on physiologic specialization in Puccinia coronata avenae. While at Minnesota he also worked with Dr. J. G. Leach and Howard W. Johnson on the acid mercury dip treatment for controlling Rhizoctonia on seed potatoes.

On January 1, 1929, Mr. Parson was appointed Junior Pathologist in the Bureau of Plant Industry, U. S. Department of Agriculture, with headquarters at Thomasville, Georgia, for work on pecan diseases in Georgia and Alabama. Later he was transferred to Shreveport, Louisiana, where he worked principally on pecan leaf spot diseases and their control, and on the virus bunch disease which affected pecan and water hickory in Louisiana, Texas, Arkansas, and Mississippi.

On October 6, 1930, Howard married Adelaide Blanche Bunnell, whom he met while she was working for the Extension Division and studying Home Economics at the University of Minnesota. He died November 18, 1943, at Shreveport.

Howard Parson was a quiet, diligent worker with a genial, even disposition which won him many friends.

Frank Joseph Piemeisel
1891-1925

Frank Joseph Piemeisel was born on June 30, 1891, at Jordan, Minnesota. In 1914 he received the degree of Bachelor of Science in Agriculture from the University of Minnesota. As recipient of the Sheylin Fellowship in Agriculture the following year, Mr. Piemeisel completed work for the Master of Science degree in June 1915, the major field being plant pathology and the minor botany. His thesis dealt with the life history of Ustilago zeae, especially longevity of chlamydospores and sporidia.

On July 1, 1915, Mr. Piemeisel was appointed half-time Laboratory Assistant in the Division of Plant Pathology and Botany and half-time Scientific Assistant in the Office of Cereal Investigations, U. S. Department of Agriculture. Later in 1915 his State appointment was changed to Research Assistant: and in the spring of 1917 he was transferred to a full time appointment in the Office of Cereal Investigations, which he held until he was inducted into the army on September 20.

Piemeisel left with the first contingent of enlisted men from Jordan, Minnesota, serving as Corporal in the Meteorological Section of the Signal Corps. While in service his health became so badly undermined that he never returned to scientific work, and he died on November 24, 1925, in the Veteran's Hospital at St. Cloud, Minnesota.

During his short period of scientific activity at the Minnesota Agricultural Experiment Station and in the Office of Cereal Investigations, Frank Piemeisel was in charge of the rust epidemiology work. He made an outstanding record in this work and exhibited excellent research ability. With E. C. Stakman he demonstrated that Puccinia graminis avenae can infect various strains of timothy and that the host exerts an appreciable effect on the morphology of the urediospores. In 1916 and 1917 he made a survey for biologic forms of Puccinia graminis on cereals and grasses, covering parts of the Pacific Northwest, the Northern Great Plains area, the Red River Valley of Manitoba, and the upper Mississippi Valley. It was in this work that the second race of the wheat form was found, the so-called Puccinia graminis tritici-compacti.

Frank Piemeisel was a serious, earnest, and thorough student, and his scientific achievements showed promise of a brilliant scientific career.

Gail Ferguson Puttick
1896-1924

Gail Ferguson Puttick was born on February 29, 1896, at Wellington, South Africa. After attending South African College at Capetown from 1912 to 1914, Gail spent a year at the Elsenburg School of Agriculture, specializing in agricultural chemistry. From 1915 to 1918 he attended Cornell University at Ithaca, New York, where he received the degree of Bachelor of Science in Agriculture with honors in 1918. After a year of graduate work in plant pathology and plant breeding at Cornell, Mr. Puttick came to the University of Minnesota as an instructor in plant pathology. Here he taught the beginning course in plant pathology and continued graduate study with a major in plant pathology and a minor in plant breeding. He received the degree of Master of Science in June, 1920, with a thesis on the reaction of F_2 generation plants from a cross between Mindum and Marquis wheats to two physiologic races of Puccinia graminis.

In August, 1920, Mr. Puttick married Lillian Granbeck of St. Paul, a secretary in the Plant Pathology office, and in December of that year left Minnesota to accept the position of Plant Pathologist at the Government Experiment Station and School of Agriculture, of the Union of South Africa, at Potchefstroom. He held this position until his death, from typhus fever, on August 23, 1924.

In South Africa Mr. Puttick started an active research program, his principal work embracing the three major crops, corn, wheat and potatoes. His primary objectives were to evolve types of corn suited to the different climatic areas, to develop wheat varieties that would be resistant to the rusts of the northern areas, to control bunt, and to attempt to determine the causes of potato seed degeneration.

His native country expected much of Gail Puttick. Following Puttick's death, Mr. T. G. W. Reineke, Principal of the Potchefstroom School, stated in his annual report, "The abrupt ending of a most promising career is little short of a national disaster."

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