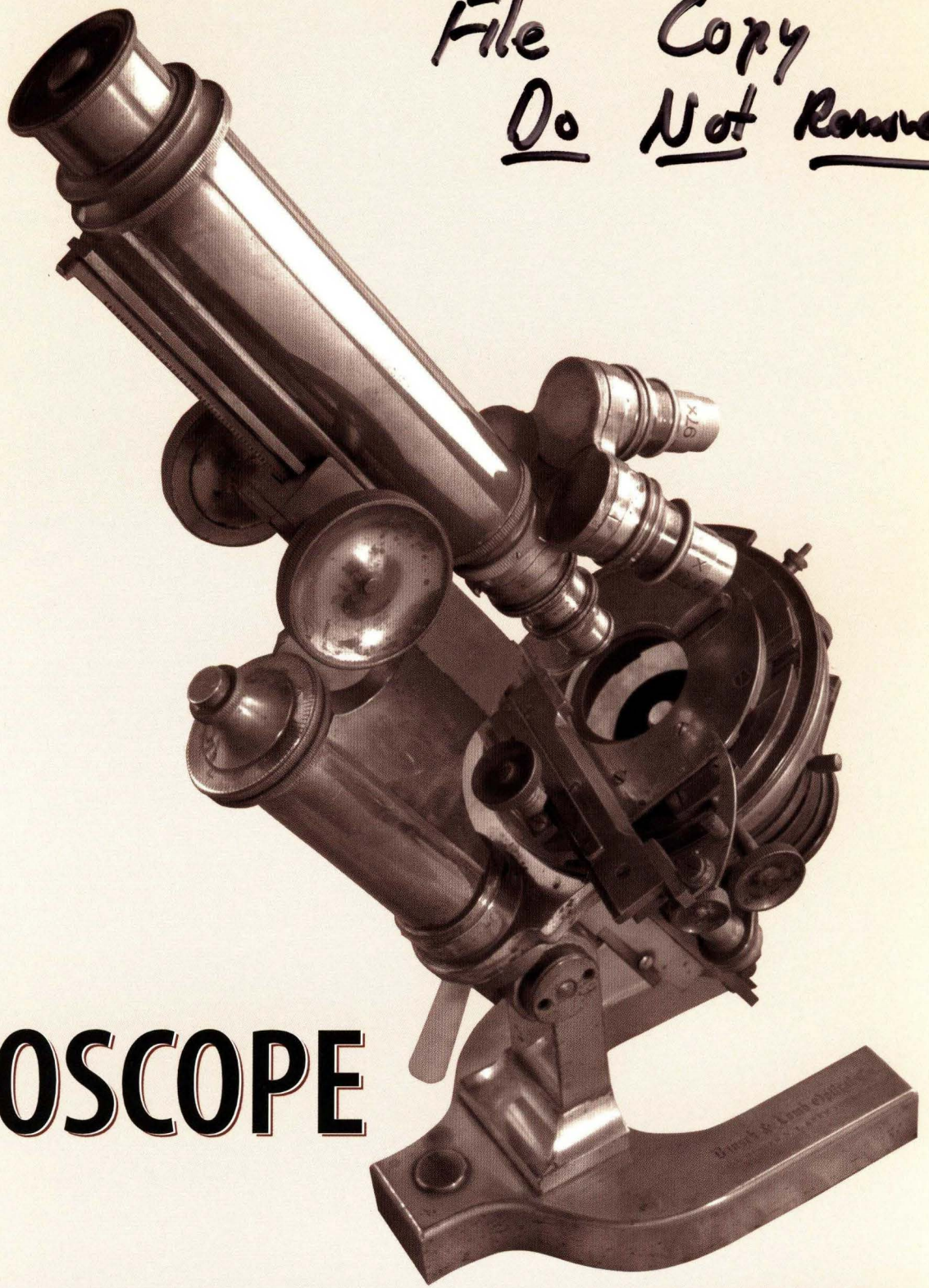


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UNDER THE MICROSCOPE

ONE HUNDRED YEARS OF MICROBIOLOGY
AT OREGON STATE UNIVERSITY

Jim Fisher

**UNDER THE MICROSCOPE:
100 YEARS OF MICROBIOLOGY
AT OREGON STATE UNIVERSITY**

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Cover: Emile F. Pernot's microscope, used to take photographs that led to the beginning of the Department of Microbiology, was discovered in the fifth floor attic of the Agriculture Building in 1928 by Dr. Walter B. Bollen and is now preserved by the Department of Microbiology. Gordon Reithmeier of Toronto, Ontario, Canada, a specialist in early American microscopes, has identified this as a Bausch and Lomb Model CD, manufactured in late 1896 or early 1897. It carries the Bausch and Lomb name and a serial number 23022.

*This history of the first 100 years of microbiology education
and research at Oregon State University is dedicated to the memory of*

Emile F. Pernot

Founder of the Oregon State University Department of Microbiology

and pioneer microbiologist,

and Mabel E. Pernot

Daughter of Emile F. Pernot, benefactor of microbiology education

and research, and friend of the department.

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An advisory committee offered comments and recollections from the past, and read drafts for accuracy and completeness. Thanks to Dr. Lyle R. Brown, Cindy Fisher, Dr. John L. Fryer, Helen and Dale Hays, Dr. Jo-Ann C. Leong, Sharon Magnuson, Don and Barbara Overholser and Dr. William E. Sandine. Linda Whiteman and Lynn Wyatt supplied me with reference information and arranged interviews, while Peggy Peterson worked very hard at locating records of past graduates.

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Finally, thanks to my daughter, Sue Fisher, who coordinated the publishing of this book through her business, TriAd, Inc., our third writing project.

Each of us looks at history with a different perspective. In writing this 100-year history, it may be difficult to satisfy everyone, but I hope that readers will find a comprehensive, interesting review of microbiology at Oregon State University.

Jim Fisher
Sisters, Oregon
September 1, 1998



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INTRODUCTION

This is the story of the first 100 years of the Oregon State University Department of Microbiology, one of the most resourceful and successful departments of our university. From its simple beginning in the curiosity of a photographer taking photographs through his microscope to the quality scientific research and educational programs of today, this department has made significant contributions to our knowledge of the hidden world of microorganisms.

Oregon State University was barely forty years old when the Department of Microbiology had its beginning in 1899. Indeed, the science of microbiology had existed for only twenty-three years when Emile F. Pernot convinced the Board of Regents that this was an important subject for instruction and research.

The department first began as a service unit to help the Schools of Science, Agriculture and others meet their needs in research and education. Gradually, under the leadership of an outstanding series of department chairs, faculty and researchers, the department matured into a major unit of the university, guiding its own destiny in this modern-day science.

Over the past 100 years, the department has made significant contributions to a wide diversity of industries in Oregon and throughout the world. Improved practices in food and dairy industries have resulted from department research. Faculty are recognized internationally as leaders in infectious diseases of Pacific salmon. New knowledge of microorganisms in agricultural and forest soils came from department faculty. Its areas of studies have ranged from finding "cold-loving" bacteria in the ocean depths to helping to protect our environment and the food we eat. In another remarkable effort, department staff were successful in working with university administrators, the state Legislature, Oregon industries and grant sources to build Nash Hall in 1970 as a major addition to our campus.

If the next 100 years are as productive as the department's first century, we are going to see the Department of Microbiology continue to bring exciting new knowledge to our world that will impact all of our lives. Enjoy this centennial history of the Oregon State University Department of Microbiology.

Paul G. Risser, President
Oregon State University
July 1, 1998

John V. Byrne, President
Oregon State University
1984-95

Robert W. MacVicar, President
Oregon State University
1970-84

CHAPTER 1

THE SCIENCE OF MICROBIOLOGY

Microbiology, as defined by Webster's New World Dictionary of the American Language, is "the branch of biology that deals with microorganisms."

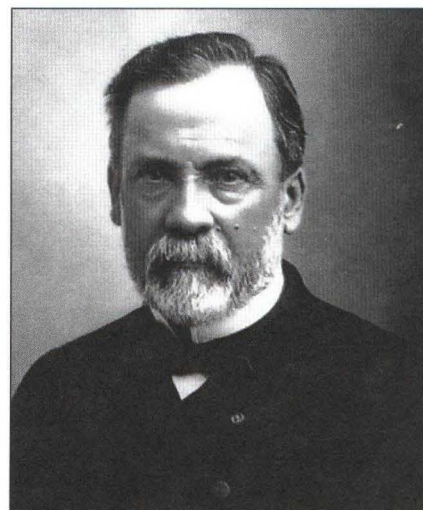
Within that eight-word definition is a science that studies the bacteria, viruses and other microorganisms that affect the world we live in, the food we eat, and indeed, our survival. Wars have been decided on the presence of infectious diseases and the microbes that cause them. We use them to fight disease, prepare much of our food and beverages and make our lives more enjoyable. Some of the most important scientific discoveries of this century have been made by microbiologists. Since 1910, about one-third of the Nobel prizes in medicine and physiology have been awarded to microbiologists.

As early as 1546, the Italian Girolamo Fracastoro introduced his germ theory of disease. During the next two centuries, Marcello Malpighi and Anthony van Leeuwenhoek helped perfect the microscope. The first recorded observations that indicated there might be life of some kind in a microscopic world came in 1677 when van Leeuwenhoek wrote about "little animals" that appeared in water from rain, snow and the sea, and water from a well to which he had added ground pepper. Seven years later, van Leeuwenhoek observed "animals" again when he viewed scurf from his teeth through a magnifying glass.

The real science of microbiology had much of its beginning in 1876. That year, Louis Pasteur published a book on production of wine, describing the chemical activities of microorganisms and the process of fermentation. The life history of the Anthrax Bacillus was described in both nature and in the laboratory in 1876 by Robert Koch. Finally, a taxonomic classification system for bacteria was developed using the fundamental principles proposed by Ferdinand Cohn.

Pathogenic microbiology began with the earliest studies of animal diseases. The body's response to invasion by foreign agents, such as bacteria, viruses, fungi and other parasites has long been the subject of study by microbiologists. For all vertebrate animals, an understanding of how the immune system is regulated and how it acts to control disease is important, especially in the development of vaccines and diagnostic reagents.

Development of the electron microscope allowed microbiologists and other scientists to describe, for the first time, the many small organisms we know as viruses. Microbiologists could examine these infectious viruses that cause diseases in important agricultural plants and diseases in humans and domestic animals.



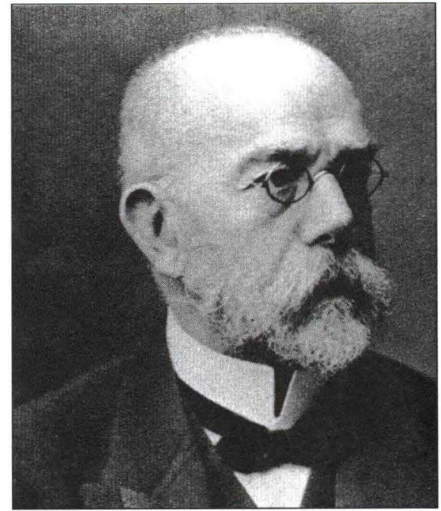
Louis Pasteur

Microorganisms and how they react in the environment is another major field of activity. Microorganisms have been found in areas of extreme temperature and a wide range of hydrostatic pressure. Studies of genetic mechanisms within microbes have taught scientists how expression of genes regulates cellular activities of microorganisms.

Microorganisms play major roles in many aspects of our agricultural industry. They can reduce or help increase crop yields and animal growth. Industrial microbiology is concerned with the application of various microorganisms to produce products that meet a variety of needs. Most well known are the different branches of the food industry which rely on microorganisms to produce edible products, such as fermented dairy products, meats and vegetables, fruits and grains used to produce alcoholic beverages, and the use of fungi and bacteria to produce antibiotics.

The recent scientific revolution involving molecular biology, cloning and genetic engineering is particularly important to microbiology. Microbiologists all over the world are making major contributions.

How microbiology teaching and research began at Oregon State University and how it evolved to the extensive and successful program of today is an exciting story. As with many great strides made in civilization, the right people in the right place at the right time made this all happen. The story begins with a curious photographer and a microscope.



Robert Koch

CHAPTER 2

THE EARLY YEARS • 1899-1910

Public-supported higher education in Oregon began in 1856 when the private Corvallis Academy was established by local residents under the sponsorship of the Southern Methodist Church. This name was changed to Corvallis College in 1858.

After Oregon gained statehood in 1859, Congress passed the Morrill Act or Land Grant Act in 1862 giving the new state some 90,000 acres of land to sell to provide a perpetual fund to support an agricultural college. Because of strong feelings against any group associated with the South following the end of the Civil War in 1865, the private college began to lose much local support. In 1868, the Corvallis College administrators saw this as an opportunity to save their institution and convinced the state Legislature to contract with the college to teach agricultural courses, supported by proceeds from the sale of land grants. The name was changed again to Corvallis College and Agricultural College (of the State).

In 1870, the first class, consisting of one woman and two men, graduated from the college with bachelor of science degrees. Total enrollment was 169 students plus 28 in the "agricultural college." Oregon's population was just under 91,000.

COLLEGE NAME CHANGES

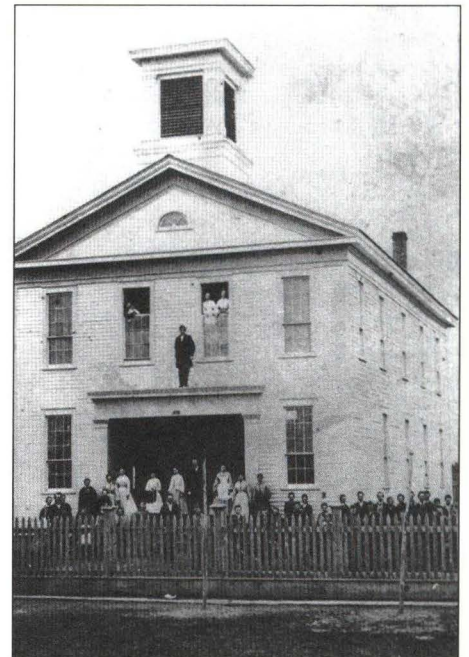
The college went through a series of additional name changes as opposition continued to grow from those still concerned with the southern affiliation of its name and from those associated with other churches. These names included the Corvallis State Agricultural College in 1872, State Agricultural College (Corvallis College) in 1876, Corvallis College and State Agricultural College in 1879 and Corvallis College and Oregon State Agricultural College in 1882.

Biology was taught at the college in the School of Physics in 1876-77, including instruction in principles and use of the microscope.

By 1880, total college enrollment had dropped to 163 with the city of Corvallis population now at 1,128. Oregon's population was growing and stood at 174,768.

Continued strong opposition to the church ties of the college led to the church relinquishing all claim to the college and state funds in 1885. That year, the new name, State Agricultural College of Oregon, was adopted.

In 1889, a sanitation course was offered to fourth-year students. College enrollment dropped to ninety-nine. Three years later, in 1892, Professor Moses Craig offered a botany course on how to manipulate and study with the compound



Corvallis College circa 1874.



Professor Emile F. Pernot

Emile Francis Pernot

Emile Francis Pernot was born in New York City in 1859, one of four sons of A. D. and Emile Caroline Pernot. His father, a native of France, was a skilled machinist and had made the first sewing machine needles for Elias Howe, inventor of the sewing machine.

Emile was educated in Ohio and moved to Philadelphia, Pennsylvania, where he first studied bacteriology. For a while, he did office work in the oil fields. A long-time sufferer of asthma, he moved in 1889 to a better climate in Corvallis, Oregon, at the request of his brother, Eugene, who had established a photographic studio in Corvallis. Eugene later became a farmer in the Granger Hills north of Corvallis. Another brother, Henri, was the first physician and surgeon in Corvallis. A third brother, Charles, established apple and prune orchards southwest of Corvallis. His sister, Lucie, operated a gift shop in Corvallis, until her death in 1900.

In 1890, Pernot was hired to teach photography and engraving for the Agricultural College of Oregon, and to take photographs for experiment station publications.

In 1892, Pernot married Edith Jane Coote of Corvallis, whose grandparents were from England. Her family had lived close to the estate of Sir Charles Darwin, where her grandfather had worked in Darwin's greenhouses. Her family also had relocated to a healthier

microscope. His course also included information on "the lower plants of economic importance, such as bacteria, mildew, mushrooms, rusts, smuts, mosses, ferns, etc."

EMILE F. PERNOT

A brief report was submitted by the Department of Photography and Engraving in the 1893 annual report of the Oregon Experiment Station of the State Agricultural College. Photographer Emile F. Pernot, hired by the college in 1890, summarized his work in photographing diseased fruit trees, fruits and vegetables for Agricultural Experiment Station publications, as well as college scenery. "A very important and useful feature of this department is the work of photo-micrography," Pernot reported. Pernot was paid \$500 a year, the total amount appropriated for his department. Out of this money, he was to buy equipment and supplies. Any funds left would be for his salary.

In 1894, Pernot wrote to his friend, Wallis Nash, secretary to the college Board of Regents:

"If there is any chance of having my case reconsidered by the Board, I am very anxious to have it represented to them . . . for as I have said before there are members of the Board who do not fully understand the existing conditions. I am receiving only sixteen dollars and sixty-five cents per month for all of the work that I do for the college including teaching, literary work, and the same duties and responsibilities as any other member of the faculty. The engravings made last year aggregated a value exceeding my salary and that is but one item of the work done."



Agricultural College of the State of Oregon, 1898.

The 1895-96 catalog stated that a section on bacteria and mildews was included in the botany course. In addition, Professor Margaret C. Snell taught a course on household science and hygiene. In 1896, the college changed its name again to Agricultural College of the State of Oregon. In 1897-98, Professor A. B. Cordley offered a course in physiology and hygiene in the Department of Zoology-Entomology-Physiology.

That same year, Pernot was listed in the catalog as Professor of Freehand Drawing and Photography, earning an annual salary of \$700, plus spending \$95.65 for supplies. He reported that during that past year, he had made fifty-one engravings for publications, ninety-five lantern slides for lectures and many micrographs of fruit pests and plant diseases. Over half of his report was a summary of his work examining samples of milk, cream and butter for bacteria. Some of his micrographs of plant diseases were "turned over to the Botanical department for classification."

Pernot also reported his work photographing the cell walls of prunes from different plum varieties during the drying process, seeking the best temperature to protect cell structure and flavor. In a forecast of how science could benefit Oregon's

climate in western Oregon with Wallis Nash who moved here to build a railroad from the Oregon coast to Idaho. Pernot's wife's grandfather, George Coote, later was appointed professor of floriculture and gardening and founded the Horticultural Department at Oregon Agricultural College. Pernot and his wife had twins who died at birth, a son, Peter, and two daughters, Mabel and Aimee.

Pernot was named professor of bacteriology at the Agricultural College of the State of Oregon in 1899. He taught the first bacteriology course at the college and for ten years, was the only faculty member in the science. His major field of study was preserving cheeses and he started a life-long interest in tuberculosis research. In 1903, he was recognized with an honorary master of science degree from the college, and named state bacteriologist of Oregon by Governor George E. Chamberlain.

Pernot left the college in 1910 to establish the Portland Bacteriological Laboratory and to become bacteriologist for the city of Portland, a position created for him. He served as city bacteriologist from 1910 to 1916. Pernot continued as state bacteriologist until 1913 when he left the position, returning in 1916 and serving until 1923. In 1918, when the severe flu epidemic struck, Pernot worked long hours making vaccine, quarantined in his Portland laboratory. In 1915, he renamed his laboratory the Pernot Laboratories and operated it until 1923. He was a part-time instructor at North Pacific Dental College in Portland, lecturing on bacteriology and joining the dental college as a full-time staff member in 1923. Pernot's first wife died in 1921. In 1923, he married Mary E. Shaver of Portland.

For thirty-five years, he did extensive research on tuberculosis, leading to the discovery of the bacillus responsible for tuberculosis in poultry. For this discovery, he received an Award of Honor at The Hague in The Netherlands and he was named

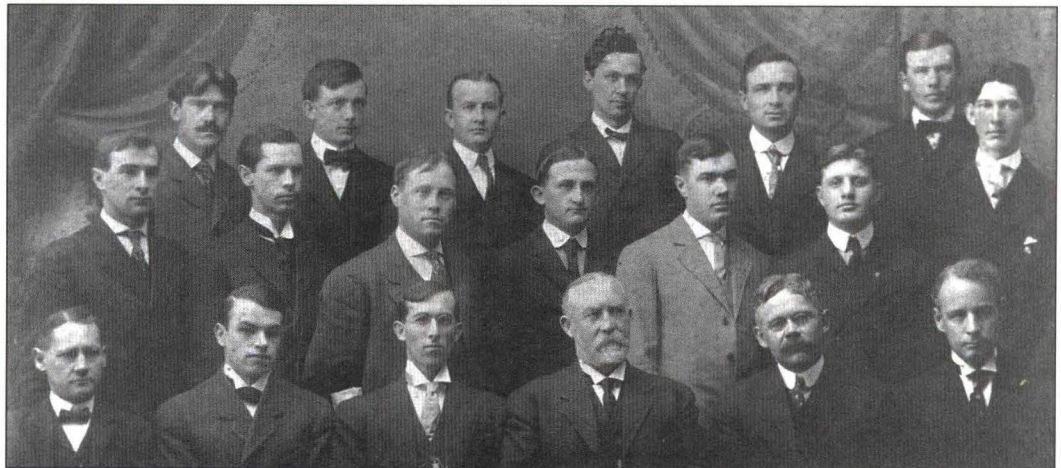
growing industries, Pernot added "This one experiment, if properly carried out, will be of immense value to the prune industry, because proper drying determines the commercial value of the product."

THE BEGINNINGS OF THE DEPARTMENT OF BACTERIOLOGY

In 1899, bacteriology was listed for the first time in the college catalog as a separate course, taught by "Emile F. Pernot, Bacteriologist." Pernot later explained that his fascination with bacteriology had developed over the past decade while taking photographs through a microscope. James K. Weatherford, long-time member and officer of the College Board of Regents, and Thomas E. Cauthorn, another board member and state senator, were instrumental in helping Pernot to establish a bacteriology laboratory on the campus.

Pernot introduced the new course in a brief and bold statement:

"Within the last decade bacteria have laid a very strong hold on the thought and imagination of the scientific world, and have come to be looked upon as playing a most important part, not only in the production of disease and in fermentation, but also in many everyday processes hitherto supposed to be dependent on very different causes. In consequence of this, bacteriology has been raised to the dignity of a science, and its ramifications have become so numerous and wide-spreading that many of the other sciences, and even some of the arts, have been freely pressed into service of one or the other of its branches."



School of Agriculture faculty, 1908. Professor Emile Pernot, far left, first row. Assistant Glen DeHaven, second from right, middle row. Dean Arthur B. Cordley, second from right, front row.

He went on to state that the study of bacteriology had made great strides both in pathological and technical branches of the subject, and that within the last few years, a number of stations and laboratories had been established in industries where microorganisms played an important part.

Pernot added a description of the college facilities:

"This station and college has a well-equipped bacteriology laboratory for the investigation and study of bacteriological diseases, both animals and vegetable."

He closed with a description of the three courses that had been added to the college curriculum as an elective study in the senior year:

Bacteriology—A course in the elements of bacteriology, including lectures and laboratory practice in sterilizing, making culture media, inoculating and growing cultures,

"father of Avian tuberculosis."

In early 1927, Pernot announced that he was close to discovering a cure for tuberculosis. Within a week, he contracted a severe cold and was hospitalized. Four days later, on February 2, 1927, Pernot died in Portland at the age of sixty-seven. At the time, he also was studying the transmission of tuberculosis in cattle to humans and a possible cure for each.

His daughter, Mabel E. Pernot, made a major contribution exceeding \$500,000 to the Oregon State University Department of Microbiology shortly before her death in 1991. This endowment supports teaching, research and the writing of this history.

studying cultural characteristics of certain definite species of bacteria, mounting, staining and examining slides, classification.

Dairy Bacteriology—Study of the bacterial diseases of milk, bacteria in the dairy, study of bacteria in butter making, and in cheese making. Study of yeasts and ferments.

Bacteriology—Lectures and laboratory work in pathogenic germ diseases of stock and poultry; a study of vaccines, their manufacture and use; of the nitrifying bacteria in leguminous plants; of bacteria in the soil and the bacterial analysis of water.

These courses were taught by Pernot in the Horticulture and Photography Building, located north of Benton Hall and west of Apperson Hall.

In the 1899 Oregon Agricultural College annual report, Pernot reviewed studies of diseases of goats and hogs from the state asylum farm, a stereoscopic slide presentation on wool fibers to a wool growers convention at Pendleton and studies in growing clover in different soils of the state. He also had studied and classified fungi that had damaged wheat and conducted experiments to produce jelly from apples and other fruits without the addition of sugar.

Oregon's population was just over 400,000 by 1899. Enrollment at the State Agricultural College had increased to 352. This made it the largest of any higher education facility in Oregon, including private and state-supported. It was even larger than the University of Oregon at Eugene, which had opened in 1876.

EARLY RESEARCH

In 1901, Pernot submitted material for the college annual report that told of new studies:

"The major subjects have been the investigations of diseases in poultry and the smutting of cereals."

A preliminary bulletin, No. 63, issued in November 1901, set forth results of experiments on the prevention of smut in oats by dry heat, with comparative tests of other methods in vogue. In December 1901, bulletin No. 64, "Investigation of Diseases of Poultry," was issued by Pernot, one of the earliest serial publications on that subject from

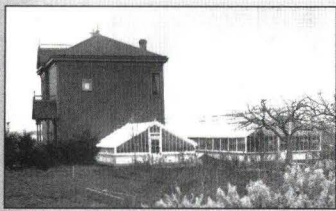
the college. "The work of these two subjects will be continued until the investigations are completed when a full report will be made," Pernot reported to Dr. James Withycombe, vice-director of the Agricultural Experiment Station.

He went on to describe his studies on diseases of sheep and the effect on wool by cross breeding. He also studied a disease in cut worms, experimented with cider vinegar and worked with the state veterinarian in diagnosing diseases of calves and other animals.

The 1902 Agricultural College of Oregon annual reported for the first time work done in the "Department of Bacteriology." That year, Pernot reported that many stud-



Bacteriology students doing laboratory work in 1909.



Horticultural Building, first home of the new Bacteriology Department in 1899.

The First Classroom

The first bacteriology courses were taught by Emile F. Pernot in the Horticulture and Photography Building constructed in the summer of 1892. In 1997, this building was the fourth-oldest structure on the Oregon State University campus.

The building originally was located north of Benton Hall and west of Apperson Hall in the courtyard formed by the present Production Technology Building. It was described as a thirty-foot by forty-foot structure, two stories in height with a basement to house a furnace. The building was built to house the Horticulture Department, but the 1896-97 college catalog lists it as the "Horticulture and Photography Building." The facility also provided an office and operating rooms for the photo-micrographer, Emile F. Pernot. Pernot was listed as Professor of Freehand Drawing and Photography and George Coote, his wife's grandfather, was listed as Professor of Practical Horticulture and Landscape Gardening.

A year later, the 1897-98 catalog identified the building as "Horticulture Hall and Bacteriological Laboratory," reflecting the influence of Pernot. Therefore, this small building was the start of three major university programs — Horticulture, Microbiology and Photography.

Pernot briefly described these first facilities in the 1899 college catalog: "This station and college has a well-equipped bacteriological laboratory for the investigation and study of bacteriological diseases, both animals and vegetable."

In the fall of 1913, the building was moved to Twenty-sixth and Jefferson streets, the present location

ies were continuing and that new ones had been added, including fermenting of corn silage and experiments in tracing germs from foul water to the milk of cows. The annual report added:

"Professor Pernot, station bacteriologist, has by some investigation been able to can cheese and control its flavor as desired. This is a very valuable discovery. In this production, there is no rind, no mold, no evaporation."

NEW COURSES

The 1902-03 catalog included a section on the Agricultural Experiment Station that offered a special course in dairying, including lectures and laboratory work in dairy bacteriology. This course was presented in the Dairy Department on the first floor of the Agriculture Hall that had been dedicated in 1903. This stone building later became Science Hall, then "Chem Shack." Later it was remodeled into Education Hall. This same catalog also listed a thesis on "Chemical and Bacteriological Analysis of Water" by Burnaugh and Mayfield.

The bacteriology section of the Agricultural Experiment Station Report for 1903 described a practical method to ripen cheese in tin cans, to do bacterial counts on milk from silage-fed cattle, to treat wheat with copper sulfate and formaldehyde to prevent smut and to process fruit juices in beer bottles.

The brief report that Pernot made in 1904 contained some significant statements:

"The class in bacteriology has been taught the underlying principles of this important modern science, and the knowledge they have gained through lectures, and the laboratory experiments which they have carried out, will be of great benefit both to them and the community in which they live."

He went on to describe studies of bacterial diseases in human beings, livestock and poultry. Other studies in bacterial analysis of water and milk were required of all students. He reported that seven students had written their graduation theses on this subject. Pernot remained the only faculty member in the 1904 college catalog under bacteriology studies.

Bacteriology classes continued through 1907 with few changes. The 1906-08 President's Report contained major budget requests for the Bacteriology Department totaling over \$5,100. Most of this was for equipment, including fifteen compound microscopes, workbenches, lockers, tables, burners, glassware and other apparatus. Some \$600 was requested for student assistants in laboratories, today referred to as teaching assistants or "TAs."

In 1907, Pernot worked with Professor John Fulton, head of the college Department of Chemistry, to help the Hawaiian Pineapple Company determine how to use pressure and temperature to eliminate a bacterial problem that was damaging canned pineapple. In appreciation, the company sent Pernot a case of canned pineapples every Christmas as long as he remained at the college.

In early 1908, Pernot reported on work by his department in sterilizing milk with electric currents, the production of six different flavors of cheeses and cooperative work with the Dairy Department in eliminating off-flavors of butter. He also was studying mortality of incubator chicks with the Poultry Department. He closed with an appeal for more funds:

"I have estimated in a report to the President that the funds required for the year July 1, 1908 to July 1, 1909, would be approximately \$850.00, including supplies, equipment, and assistance. My expenditures in the past have been very light and the equipment and supplies need replenishing."

of Weatherford Hall, to serve as the main building for the Department of Poultry Husbandry. Sometime during the 1927-28 school year, the building was moved once more as Weatherford Hall construction started. This time, it was placed west of The Mall near Dryden Hall. Here, the building was used as a feed-mixing facility for the Department of Poultry Science.

In 1997, when plans were announced to raze the building, Endex Engineering of Corvallis acquired the structure for one dollar and moved it to Eighth and Washington streets. The company plans to place the building on a new foundation over a basement. The first floor will be rented for commercial use and the top floor for residences.

New studies involved testing the transmission of tubercle bacilli from human sputa to fowls and the bovine type to fowls by feeding. Pernot was also starting tests on transmission of bovine tubercle bacteria to milk through the mammary glands.

The college adopted a new name, Oregon Agricultural College, in 1908 and changed from a term system to a semester system.

BACTERIOLOGY FACULTY INCREASED

In 1909, Pernot acquired his first assistant, Glen DeHaven. Some fourteen bacteriology courses were now offered, including sanitary bacteriology, home bacteriology, dairy bacteriology, economic bacteriology, soil bacteriology, pathogenic bacteriology, technical bacteriology and advanced bacteriology as senior year electives. Pharmacy required senior year courses in general bacteriology and practical bacteriology. Agriculture required a sophomore year course in elementary bacteriology. Other courses were major bacteriology, laboratory practice and thesis bacteriology. The major course was described as "equal to a course in bacteriology in any of the medical schools."

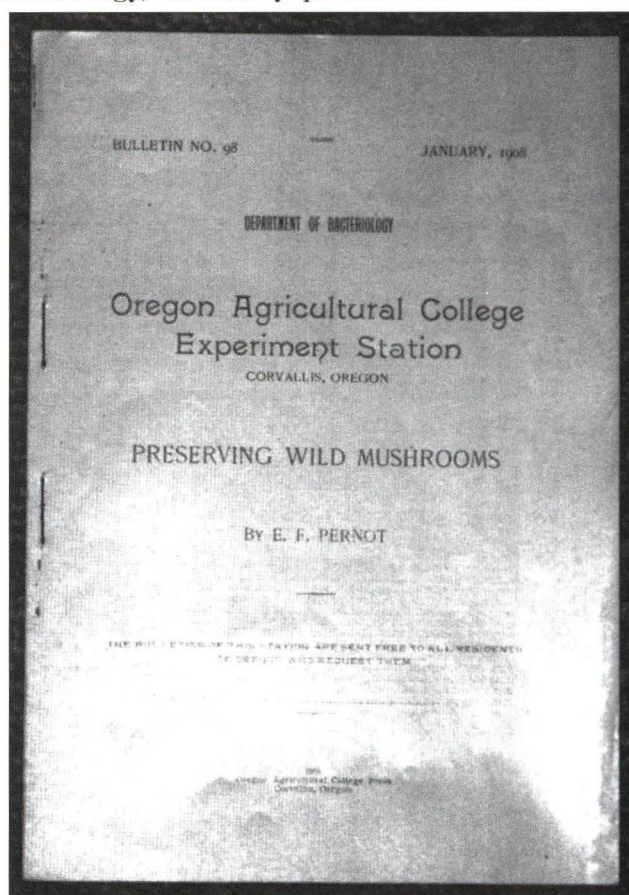
As in the past, Pernot used the catalog as an opportunity to promote the growing science of bacteriology:

"The science of bacteriology has reached a state in its development where it is within the reach of all students taking a collegiate course. A knowledge of the subject has heretofore been confined principally to the medical profession, but since its relation to agriculture and the domestic arts has become better understood, the teaching of the subject has been added to the curriculum of higher institutions of learning. Bacteria play such an important role in the economy of nature, and are so closely associated with our every day lives, both in health and disease, that it becomes essential for a modern student to acquire a knowledge of what bacteria are and what they do."

FIRST THESES

The first bacteriology undergraduate thesis was written in 1908 by DeWalt Q. Elrod, entitled "The Dissemination of Disease-Producing Micro-organisms by Sputa." Two years later, Ruth J. Hess and Laura E. Jackson wrote the next undergraduate thesis together.

The first master of science thesis in bacteriology was completed by Pernot's



A report on preserving wild mushrooms published by Professor Pernot in 1908.



The Agricultural Experiment Station had its first home in 1892.

Agricultural Experiment Station

When Emile F. Pernot wrote his first report on photo-micrographs and engravings in the 1893 annual report of the Oregon Agricultural Experiment Station, the station was only five years old. The federal Hatch Act, signed by President Grover Cleveland in 1887, gave funds for experiment stations at land-grant colleges in each state and territory. In 1888, Governor Sylvester Penney directed the Board of Regents of the State Agricultural College to administer this grant. When the college received the first annual grant of \$15,000, it boosted its budget by 50 percent.

The Experiment Station included a single laboratory and a thirty-five acre college farm, donated by Benton County citizens, located where lower campus is today at Oregon State University. Over the next 109 years, facilities expanded to ten research centers at Aurora, Hood River, Hermiston, Ontario, Burns, Powell Butte, Klamath Falls, Medford and Newport. Several experimental farms are near Corvallis.

The station is the research arm of the Oregon State University College of Agricultural Sciences. The staff includes more than 400 scientists in twenty-seven academic units in four colleges—Agricultural Sciences, Home Economics, Veterinary Medicine and Science, including the Department of Microbiology. Sixteen persons have served as director of the station, including Thayne R. Dutson, the current director and dean of the College of Agricultural Sciences since 1993.

assistant, Glen DeHaven, in 1910. It was entitled "The Fixation of Atmospheric Nitrogen and the Symbiotic Nitrogen Fixing Bacteria."

PERNOT RESIGNS

On May 25, 1910, Emile F. Pernot resigned from the Department of Bacteriology of Oregon Agricultural College. He moved to Portland, Oregon, to establish a bacteriological laboratory and to accept the position of city bacteriologist. After nearly twenty years at the college, he was ready to move on, having laid the major foundation for bacteriology research and education. One chapter of bacteriology at Oregon Agricultural College had come to a close and a new one was about to begin.

CHAPTER 3

COMING OF AGE • 1910-1919

In 1910, when Emile Pernot left Oregon Agricultural College, enrollment had increased to 1,591. The population of Corvallis had increased to 4,552 while the state's population had grown to 672,765.

At this time, the department had moved into what eventually became the north wing of Agriculture Hall. Other wings were added in 1911 and 1913. Eventually, the department occupied space in all three units.

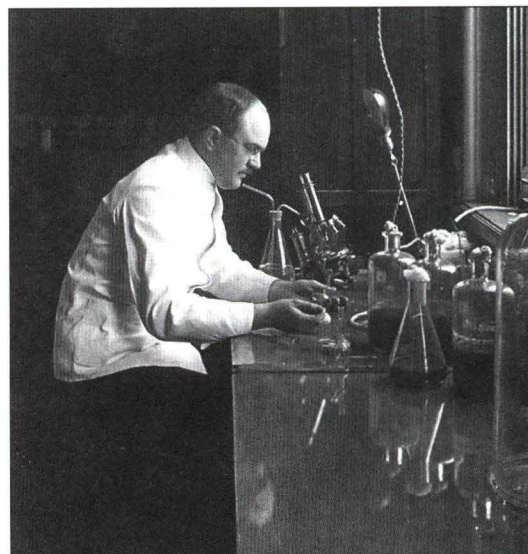
In July, 1910, the Board of Regents hired E. G. Peterson as professor of bacteriology to teach for the 1910-11 school year. During the 1911-12 school year, the bacteriology faculty included Professor Peterson and Assistant in Bacteriology Godfrey V. Copson. The catalog introduced the fourteen courses offered with this statement:

"The work of the Department of Bacteriology is along three lines: 1st, general courses offering the fundamentals of bacterial activity; 2nd, special courses making application of the knowledge of bacteriology to agriculture, dairying, domestic science, veterinary science, and pharmacy; and 3rd, original investigations."

RESEARCH

The 1910-12 biennial report of the Experiment Station included information on the study of soil bacteria from the nearby college farm and from substations in northeastern Oregon at Union and Hermiston. Other work involved providing cultures for seed and soil inoculation to more than three hundred farmers throughout the state growing alfalfa, vetch and clover crops. Benefits realized by the farmers ranged from five to one hundred percent.

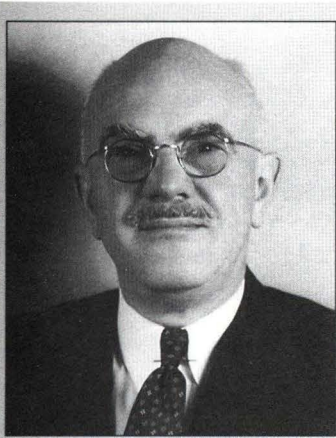
Other studies had been done with yeasts to make ciders and vinegars. In dairy bacteriology, work was under way to study milk quality to manufacture high grade butter. Routine examinations were made to help improve health and sanitary conditions, including examinations of water. Research in pathogenic microbiology focused on hog cholera and diseases of poultry, most notably avian tuberculosis.



Professor Theodore Beckwith became the second Department of Bacteriology head in 1912.

BECKWITH NAMED DEPARTMENT HEAD

In 1912, Professor Theodore Day Beckwith became head of the Department of Bacteriology. He came to Oregon Agricultural College from North Dakota College. Walter B. Bollen, a student of Beckwith's at the time and later a long-time faculty



Professor Theodore Day Beckwith

Theodore Day Beckwith

Theodore Day Beckwith was born on December 8, 1879, in Utica, New York, the son of Theodore George and Jane (Day) Beckwith. He received a bachelor of science degree in 1904 and a master of science degree in 1907, both from Hamilton College in Clinton, New York. During his graduate studies, Beckwith was an expert science assistant and bacteriologist with the U. S. Department of Agriculture's Bureau of Plant Industry.

In 1907, he accepted employment as assistant professor of bacteriology and plant pathology at North Dakota College at Fargo. Three years later, he was named professor at the college and assistant botanist at the North Dakota Experiment Station.

In 1909, he married Cornelia Lyon in Fargo, North Dakota. From this marriage came four children: Josephine, Jane, Stephen, and Theodore, Jr.

In 1912, Beckwith accepted the position of head of the Department of Bacteriology at Oregon Agricultural College to direct teaching and research. In addition, he was bacteriologist with the Oregon Agricultural College Experiment Station.

From 1918 to 1919, Beckwith served as an officer in the U.S. Army Sanitary Corps during World War I. He was discharged in April 1919 and resigned from Oregon Agricultural College in August of that year to complete his doctoral

member of the department, recalled that Beckwith "was a rather large man, fairly heavy-set, very jovial, kindly and extremely well-educated, well-informed."

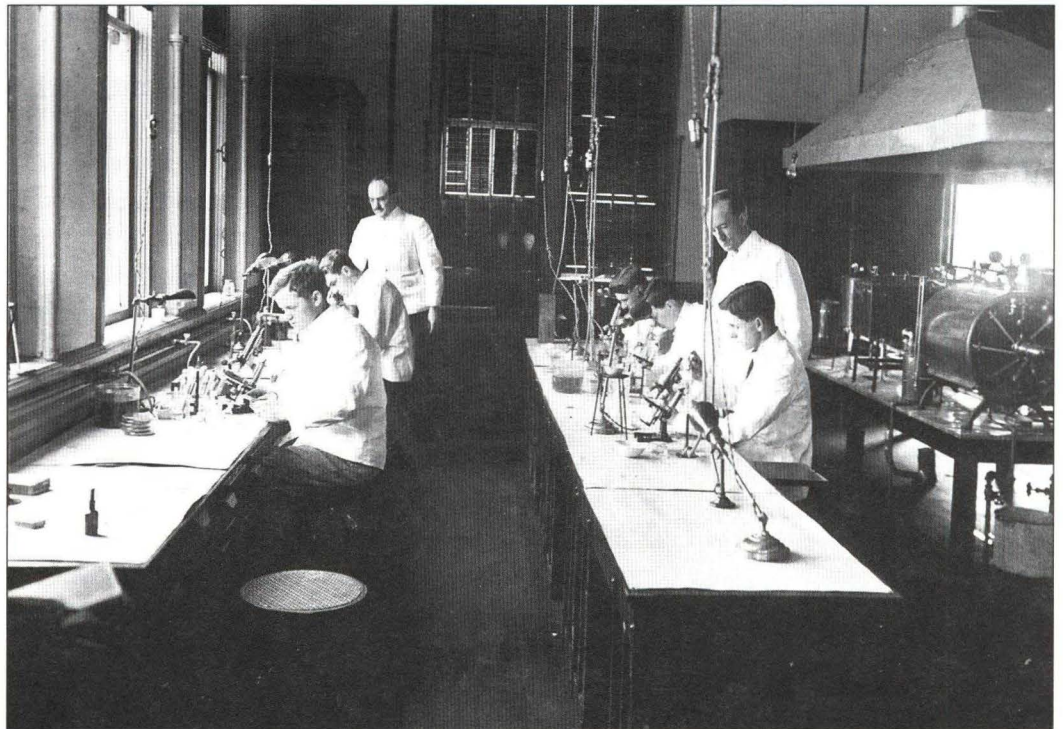
Completing the faculty that year were Alonzo F. Vass as an instructor and Godfrey V. Copson as an assistant instructor.

Peterson apparently left with the hiring of Professor Beckwith.

CURRICULUM

Bacteriology courses were rearranged, renumbered and expanded for the 1912-13 college year. Courses included elementary, general and advanced bacteriology, as well as specific fields of study.

Among these were pharmacy, domestic science, agronomy and sanitation. New courses included pharmacy bacteriology, immunity and vaccine therapy and zymology, all offered for the first time. Another new course was provided in water and sewer bacteriology for seniors in civil engineering. Thesis was listed under research in bacteriology and offered for junior and senior years.



Laboratory conditions were very basic when Professor Beckwith (standing at left) came to the department.

"The laboratory is especially equipped for work in agricultural bacteriology. However, ample facilities for research in veterinary, domestic science, or pharmaceutical bacteriology are at hand," the catalog stated.

Beckwith, following a pattern set earlier by Pernot, introduced this curriculum with a challenge:

"The relationships of the comparatively new science of Bacteriology to everyday life in the various industries have increased so largely in numbers and intimacy that it is necessary for any student properly equipped in Dairying, Agriculture, Agronomy, Pharmacy, Domestic Science, etc. to have a working knowledge of the subject."

During the 1913-14 school year, laboratory fees ranged from \$1.50 to \$2.00 for each course.

studies at the University of California at Berkeley.

After receiving his doctorate in 1920, he accepted a position as associate professor of bacteriology at the Berkeley campus and as a member of the California Stomatological Research Group. In 1932, he moved to the University of California at Los Angeles as associate professor of bacteriology and was promoted to professor in 1933. A year later, he was named head of the bacteriology department at the University of California at Los Angeles and served in this role for twelve years. Beckwith continued as head of the bacteriology department at the University of California at Los Angeles until his death on July 18, 1946, at the age of sixty-six.

During his career, Beckwith wrote many articles and publications on water supply, sewerage treatment, germicides, bacteria, pulp and paper operations and both medical and dental bacteriology.

SECOND THESIS

The second thesis for a master of science degree for bacteriology studies was approved on June 1, 1913. Assistant Instructor Godfrey V. Copson, who later succeeded Beckwith as department head, submitted a thesis on "An Efficiency Test of the Albany Filtration Plant." The thesis proposed tests to maintain the quality of the water during changing weather conditions for the water system of the City of Albany. The original thesis is on file at the Oregon State University Valley Library and a true copy is located in the Department of Microbiology.

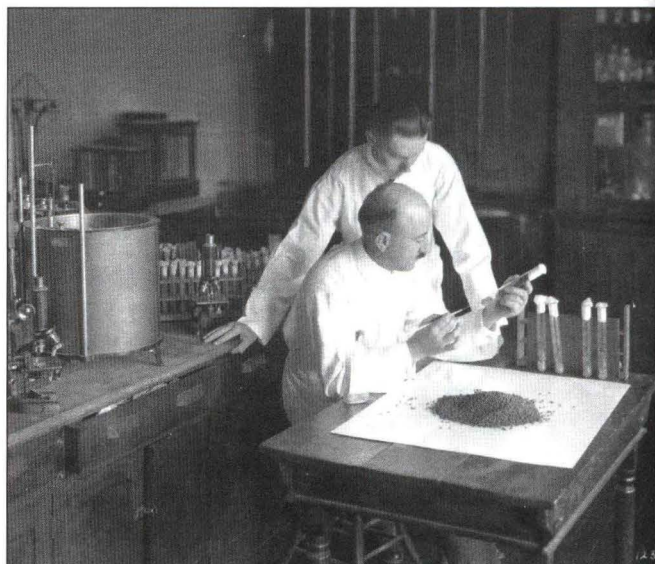
FACULTY CHANGES, 1914-17

The 1914-15 college catalog reported several faculty changes. Beckwith continued as professor and head of the Department of Bacteriology and Vass became assistant professor. George D. Horton and a Mr. Curtis completed the listed faculty. Copson was on leave for graduate study. Beckwith and Vass continued as faculty members for the 1915-16 school year. Copson returned to the department as an assistant professor, advancing to associate professor in two years, and Ralph McBurney was added as an instructor. Later, the 1914-16 report of the Experiment Station stated that at the end of the 1915-16 school year, Vass had been "dropped from the staff on account of repeal of Experiment Station funds."

Mark H. Middlekauf was added as an instructor in 1916. Middlekauf later left the faculty to enter military service after the start of World War I. He was killed in the war, one of only two Oregon Agricultural College faculty members to lose their lives in that conflict. His sister, Ruth M. Tyson, later provided funds to establish the Mark H. Middlekauf Outstanding Graduate Student Award in the department, as well as undergraduate scholarships, in his memory.

DEPARTMENT CHANGES

A new course on poultry disease bacteriology was listed in the 1914-15 catalog and a comment added that a series of lectures would be given to forestry students on camp sanitation. The 1914-16 Agricultural Experiment Station report stated that a comparison of the Department of Bacteriology's effort for the years 1911-12 and 1915-16, showed that "the amount of instructional work, measured in student credit hours, has increased in five years, for the first semester, $5\frac{1}{2}$ times, and for the second semester, $2\frac{1}{3}$ times. The amount of instructional time, however, available for this increased work is slightly less than $1\frac{3}{4}$ times what it was in 1911-12. It should be noted that there has been practically no increase in the equipment of the department during the biennium." For the school year 1915-16, courses remained unchanged.



Professor Beckwith (seated) found a promising student in Godfrey V. Copson, future department chair.



From 1909 to 1970, the Department of Microbiology occupied portions of all three wings of Agriculture Hall, here having its third wing added in 1913.

Agriculture Hall

In 1909, the Department of Bacteriology moved to the new Agriculture Hall, a building completed that year at a cost of \$30,750. The building contained some 25,890 square feet as the north wing and was later called the Agronomy Wing. In 1911, a central wing was constructed at a cost of \$55,000 that added another 47,152 square feet. It was named the Agricultural Wing.

Finally, in 1913, another 34,206 square feet were added as the south wing at a cost of \$49,701. It was renamed the Horticultural Wing.

In 1914-15, the Department of Bacteriology occupied the fourth floor of the Agricultural Wing. Eventually, the Department of Bacteriology was housed in portions of all three wings, including the basement and the infamous "fifth floor attic."

After Nash Hall was completed in 1970, the department moved to that location. In 1983, Agriculture Hall was renamed Strand Agriculture Hall to honor the ninth president of Oregon State University, August L. Strand.

In May of 1916, Beckwith wrote a five-page letter to Experiment Station Director A. B. Cordley summarizing "the financial value to the state of the activities of this department." Values identified were \$70,678 from cultures sent to farmers after deducting \$400 spent by farmers and \$1,500 spent by the Experiment Station. Added to this was \$27,432 of additional commercial value of the nitrogen fixed by these cultures and \$83,147 for the valuation of additional production of red clover and alfalfa brought about by the use of the cultures. This had resulted in a financial benefit of \$181,257 to the farmers. Additional "thousands of dollars" of value were realized in combating poultry diseases and other "thousands of dollars" in lives saved from 1,332 general laboratory examinations (over half were water examinations). Beckwith pointed out that insurance companies had placed a conservative value of \$5,000 on one human life.

For the 1916-17 school year, courses remained basically unchanged. However, they were listed along definite specialized lines during the junior and senior years. In addition, the catalog mentioned for the first time that a master of science degree could be obtained in bacteriology and students majoring in other fields could minor in bacteriology, if they wished.

DEPARTMENT FACILITIES

For the first time, the 1916-17 college catalog described in detail the training facilities of the department:

"The department of bacteriology is located on the fourth floor of the Agricultural Building. It occupies two large laboratories for general class work, one for special soil bacteriology, and a laboratory for combined Experiment Station and research work. In addition, there are the offices of the members of the department, a small but well-selected library including most of the leading American and foreign periodicals. A dark-room, well equipped for work in photomicrography, a store-room and large incubator room with automatically controlled temperature, is furnished for student use."

Other facilities available were the highest-grade microscopes, ample glassware and lead-topped desks. Sterilizers, incubators, sinks, a high-power centrifuge and other minor pieces of equipment were available. Laboratory fees had increased to a range of two to four dollars a course.

Career opportunities were added to the catalog for the first time:

"The purpose of these courses is to train students for Agricultural College and Experiment Station positions; for work in Scientific Bureaus of the United States Department of Agriculture; for positions as Sanitary and Milk Inspectors with various State and City Boards of Health; as Laboratory Technicians for Health and Sanitary Boards and for Hospital Services; and likewise for testing laboratories for corporations, such as creameries and producers of food products."

SERVICE DEPARTMENTS FORMED

On September 1, 1918, the first of a long series of organizational and name changes came to the Department of Bacteriology. Eleven college departments that offered instructional services to two or more schools were united into an administrative unit under the term "Service Departments." Ezra J. Kraus, dean of the new Service Departments, was responsible for Art and Architecture, Bacteriology, Botany, Chemistry, English, Entomology, History, Mathematics, Modern Languages, Physics, Zoology and Physiology.

With this organizational structure, the college hoped for a "fuller appreciation

of the requirements of the several schools and a constant broadening and strengthening of the instructional work rendered.”

The college also returned to the quarter system from the semester system starting in 1918.

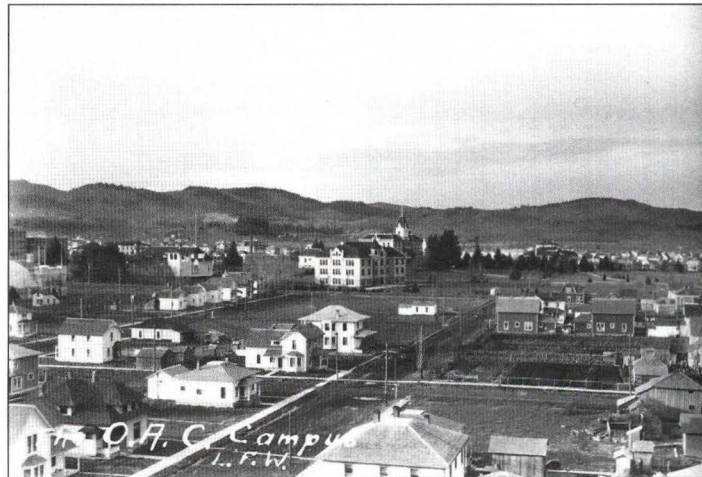
WARTIME IMPACT

In 1918, a report written by Dean Ezra J. Kraus addressed the growing impact of war conditions in Europe on Oregon Agricultural College:

“One entirely new course, designed to train students for the Sanitary Corps, was instituted with success by the Department of Bacteriology, assisted by the Departments of Chemistry, Zoology and Physiology, and Modern Languages.”

The department’s section of the college catalog also carried the statement “Military Value—The various courses in Bacteriology are of direct value in preparation of men for the Sanitary Corps and the Medical Corps of the United States Army and Navy.” A new course, military sanitation, was offered in the department. It involved “a discussion of the laws of sanitation as applied to military practice. A war-emergency course dealing with the sanitation of the camp, protective inoculations, the carrier problem, and other questions of like nature directly related to the health of the recruit. Open to all students . . . No fee.”

Walter B. Bollen later recalled taking this course as one of several students interested in bacteriology.



In 1912, Oregon Agricultural College was beginning to grow.

FACULTY CHANGES, 1918-19

World War I made other impacts on the Department of Bacteriology. At the start of the 1918-19 college year, only Beckwith and Copson were listed as bacteriology faculty. Then, Professor Beckwith took leave at the end of spring term of 1918 to become an officer in the Sanitary Corps of the United States Army and Godfrey V. Copson was named acting head of the department. That same year, Leslie C. Whitaker was hired as an assistant instructor. A new instructor, Joseph E. “Mike” Simmons, a future department chair, was added to the faculty in 1918.

BECKWITH RESIGNS

With the close of the war, Beckwith returned from the service, but left Oregon Agricultural College in August of 1919 to complete his doctoral studies at the University of California at Berkeley. During Beckwith’s tenure as department head, the department had continued to grow in stature on the campus, despite faculty reductions during wartime. However, the next few years would see other changes come to the growing department.

CHAPTER 4

TRANSITION YEARS • 1919-1922

By 1919, its fiftieth anniversary year, Oregon Agricultural College had an enrollment of 1,668 and a faculty of 160. Following the end of World War I, the campus attempted to return to a normal operation with students and faculty returning from military service.

TEMPORARY TRANSFER TO SCHOOL OF AGRICULTURE

For the 1919-20 school year, the Department of Bacteriology transferred from the Service Departments to the School of Agriculture. This organizational change reflected the growing ties the department had to agricultural studies. However, the change was to last only a year and it was returned as part of the Service Departments.

DEPARTMENT OPERATIONS

The 1919-20 college catalog reflected several changes in the department's operations. An introduction to the department stated: "Bacteriology has become fundamental to such sciences as **Agriculture, Pharmacy, and Home Economics** and is a necessary part of the training of every man or **woman** who is seeking a true education" (emphasis added). Bacteriology was becoming an increasingly important part of other college studies and both sexes were identified as potential students.

The bacteriology courses were adapted to meet both technical and cultural needs of the student. Studies in the sophomore year were general and fundamental in nature, and often the same for all students. Later, courses became more complex, as the catalog stated:



Laboratory facilities were still primitive during the 1920s.

"So complex has the study of Bacteriology become that the attempt is no longer made to master the whole field but only one or two of the main branches of the subject such as Soil Bacteriology, Dairy Bacteriology, Pathogenic Bacteriology, and others."

During junior and senior years, students could pursue advanced studies in several fields. Students in agriculture could minor in bacteriology, students in pharmacy and pre-medicine could study medical bacteriology, sanitation and public health. Graduate students in dairy husbandry, soils, horticultural products, pharmacy or home economics could select bacteriology as a minor with approval of their major



Professor Godfrey V. Copson

Godfrey Vernon Copson

Godfrey Vernon Copson was born February 13, 1884, in Worcester, England, the son of Octar H. Copson, and Sarah (Ford) Copson. He came to the United States at the age of eleven and became a naturalized citizen in 1898.

In 1903, Copson was enrolled at Michigan Agricultural College until 1907. He entered Oregon Agricultural College in 1910 for undergraduate studies in bacteriology. He was a graduate assistant at the college while he studied for his master of science degree, which he received in 1912.

Copson took a two-year leave for additional graduate studies at Massachusetts Agricultural College and at the University of Berne in Switzerland. In 1915, he returned to Oregon Agricultural College as assistant professor in bacteriology, advancing in two years to associate professor. From 1918 to 1920, he served as acting head of the department while Professor Beckwith was in military service. Copson was named head of the Department of Bacteriology in 1920, a position he held for twenty-nine years.

In 1915, he married June Seeley. They lost their only son, Arthur Paul, in a drowning accident, and established "The Paul Copson Memorial Scholarship" at Oregon State College.

Copson continued his education at the University of Wisconsin in the

professor and minor professor of bacteriology.

Increased need for a "fair knowledge of General Chemistry" was also noted in the catalog as a prerequisite of the courses in bacteriology. "Before a student can progress very far in the work, a knowledge of Qualitative, Organic, and Agricultural Chemistry is necessary, but these subjects will have to be taken by students in the degree curricula by the time they are required in their bacteriological work."

The catalog continued to expand its description of the equipment available in the Department of Bacteriology, both "for resident work and Experiment Station work, with dark room, storeroom, large incubator room for student use, and a departmental library containing the latest authentic texts on Bacteriology. The general library has all the available American and foreign bacteriological periodicals of recognized merit. The department is well-equipped with the highest grade microscopes, glassware, and other equipment for general and advanced work."

1919-20 CURRICULUM

Some twenty-two courses were now offered in the department, many building on past courses and others being offered to meet new needs. These courses included vocational dairy bacteriology, general bacteriology, general bacteriology (agricultural), home economics bacteriology, advanced bacteriology, dairy bacteriology, soil bacteriology, pharmacy bacteriology, immunity and serum therapy, zymology and fermentations, seminar, and research in bacteriology.

RESEARCH

The 1921-22 college catalog included a section reporting work of the Agricultural Experiment Station. Experimental work in bacteriology was described as microbiological studies of certain acid soils and studies of *hemorrhagic septicemia* in cattle, sheep and hogs.

FACULTY CHANGES, 1920-22

Godfrey V. Copson was appointed acting head of the Department of Bacteriology following Beckwith's departure for military service in 1918. In 1920, Copson was advanced to professor and head of the department, the third person to hold this position.

This same year, Joseph E. Simmons was advanced to assistant professor and William V. Halverson joined the faculty as the major professor in soil bacteriology. Halverson had received his bachelor's degree at Utah Agricultural College and his master's degree at Iowa State College. Leslie C. Whitaker was advanced to instructor in bacteriology and taught until the end of the 1920-21 school year. In 1921, James A. Berry, with a master of science degree from Michigan Agricultural College, was hired as an instructor.

In 1922, Walter B. Bollen, a future department faculty member, obtained his master's degree in agriculture from Oregon Agricultural College, the first to be granted as a major from the Department of Bacteriology. The title of his thesis was "Studies on Sulfur Oxidation in Oregon Soils."

SCHOOL OF BASIC ARTS AND SCIENCES

After three organizational changes in just under four years, the Department of Bacteriology experienced a fourth organizational change approved in 1922 by the Board of Higher Curricula. The former Service Departments organized in 1918 were

summer of 1920, and at Columbus University in the summer of 1924. During the 1941 school year, Copson was acting dean of the School of Science while Dr. Gilfillan was acting president of the college.

He served as department head, professor of bacteriology and bacteriologist-in-charge at the Agricultural Experiment Station until his retirement in 1949. He continued to teach part-time until his death on September 1, 1953, at the age of sixty-nine. "The Godfrey Vernon Copson Scholarship Memorial Fund" was established by his widow with The Benton County Foundation for a scholarship at Oregon State College.

Water Samples

For many years, testing of water samples from home and farm wells was a major activity of the Department of Microbiology, both to serve the public and to produce revenue for the department.

Godfrey V. Copson wrote many brief personal narratives to farmers and homeowners reporting on tests, offering both scientific and practical advice. Here are excerpts from his reports:

"It is absolutely impossible for a water supply to cause boils, abscesses or pimples. This is due to an entirely different condition in the body about which you will have to consult your physician."

September 22, 1937

"We have tested the two samples of water brought in by you for bacterial analysis. Personally, I should not want to use the water from the new well in the present condition but would not mind drinking from the old well."

December 4, 1937

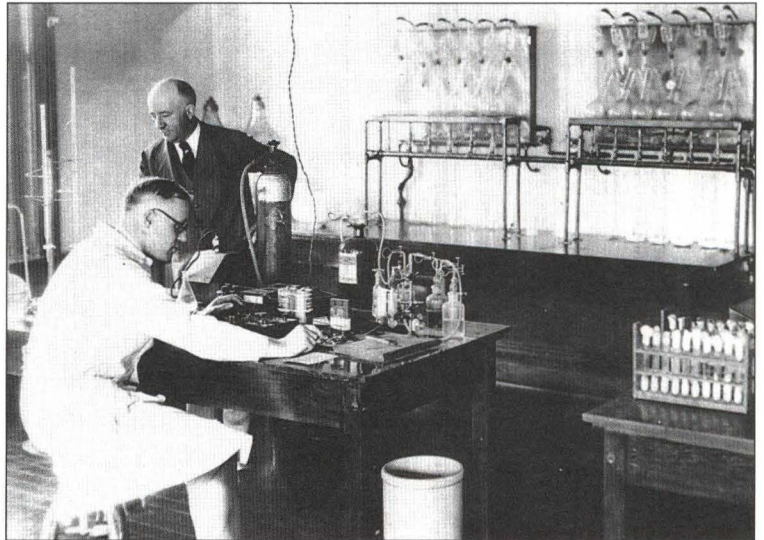
"If I were quite sure that nothing could get into this well from the toilet, and I do not believe it is getting in from there, I should be willing to drink it in spite of the report I am sending you."

March 30, 1938

renamed the School of Basic Arts and Sciences. The Department of Bacteriology and the ten other departments under the former Service Departments were assigned to this new school. These other departments were Architecture, Botany and Plant Pathology, Chemistry, English Language and Literature, Entomology, History, Mathematics, Modern Languages, Physics and Zoology and Physiology. Public Speaking and Dramatics, separated from the English Department, was added to this school.

The goal of the reorganization was "not to parallel and duplicate institutions of Liberal Arts, but to achieve economy, efficiency, and thoroughness in that part of the education of technical and professional students upon which specialization depends for its scientific worth." The organization was to exist for college administrative purposes only with the various departments retaining their autonomy. Students would not be registered in or graduated from this new school, but would maintain their educational tie to their appropriate technical school.

The new organization strengthened the position of the Department of Bacteriology as a key part of the college. With an expanded curriculum in place, a new department head in Godfrey V. Copson, and the new college organization, the Department of Bacteriology was well prepared to move into its third decade.



Professor Copson, pictured with a laboratory assistant, worked in both research and teaching.

CHAPTER 5

THE GREAT DEPRESSION AND WORLD WAR II • 1922-1946

In 1922, Oregon Agricultural College had an enrollment of 3,077. Corvallis had grown in population to 5,752. In the meantime, Oregon's population continued to grow, reaching 783,389 in 1920.

CURRICULUM

In 1925, some renaming of department courses continued and a new advanced course in agricultural bacteriology was added. Another new course, thesis and graduate study, was also added that year. Experiment Station projects included cross-inoculation studies with legume bacteria. Microbiology of soils was becoming a major study area.

For the 1929-30 school year, several curriculum changes were announced. Food bacteriology replaced "zymology" and new courses on sanitary bacteriology and microscopy of waters were added.



School of Science faculty in 1940. In front row, fifth from left, President George Peavy; third from right, Professor Godfrey V. Copson.

FACULTY CHANGES, 1923-34

Under Godfrey V. Copson's leadership, the Department of Bacteriology faculty included Department Head and Professor Copson, Assistant Professor William V. Halverson, Assistant Professor Joseph E. Simmons, and Instructor James A. Berry. The faculty continued unchanged for the department through the 1923-24 and the 1924-25 school years.

By the 1926-27 school year, Simmons was an associate professor and Berry an assistant professor. The department occupied the entire fourth floor of Agriculture



Dr. Walter B. Bollen

Walter Bollen

Walter Beno Bollen was born in 1896 in Portland, Oregon, to Walter Wesley and Henriette Fredricka Beno Bollen. His father worked as a fisherman, an inventor, an electrician installing dynamos and electrical equipment on river steamboats, a homesteader and an Indian agent on the Siletz Indian Reservation. Later, his father worked in logging where he was a bookkeeper, commissary agent and part-time medical technician. This family life gave Walter a broad education.

As a young boy, Bollen lived in logging camps in Washington and Oregon and at fourteen, he became a logger. His early schooling was at logging camp schools and at home with his mother. After the family moved to Portland, he graduated from Washington High School in 1915. Following graduation, Bollen worked for a year as assistant storekeeper with Southern Pacific Company and then entered Oregon Agricultural College to major in horticulture, specializing in vegetable gardening.

During World War I, he was encouraged by Dr. Theodore Beckwith of the Department of Bacteriology to enter the Yale Army Laboratory School to work in mobile laboratories overseas. The armistice was signed before he finished his studies, so he finished his military time in a laboratory at Fort Leavenworth, Kansas.

In 1919, Bollen married Hildegard A. Mueller in Portland. They had a

Hall by the start of the 1927-28 school year. No faculty changes were made in the 1928-29 school year. In June of 1929, Professor Halverson left Oregon State Agricultural College to become head of the Bacteriology Department at the University of Idaho at Moscow. He was replaced that fall by Walter B. Bollen, who had received his doctorate in soil fertility from Iowa State College and for five years was an assistant chemist in the Agricultural Experiment Station at the University of Idaho, at Moscow.

Dr. Bollen later recalled returning to the school where he had completed his undergraduate studies:

"I was on the Experiment Station staff for research, and I was on the teaching faculty to teach courses. The first six months I didn't do any teaching. I wanted to get my laboratory set up and start some research projects . . . I taught the laboratory courses."

David B. Charlton was hired in 1929 as an instructor. In 1930, James A. Berry resigned and moved to Canada with Charlton assuming many of his duties. No major faculty changes occurred during the next four years as the university felt the impact of The Great Depression.

COLLEGE NAME CHANGES

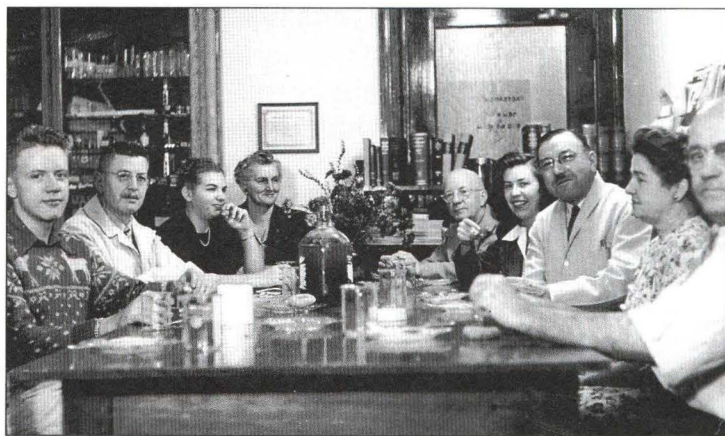
Since 1908, the college had been named Oregon Agricultural College. In 1927, this was changed to Oregon State Agricultural College, a name used for the next ten years. In 1937, the name was changed again to Oregon State College, although this new name was not officially recognized by the Oregon Legislature until April 15, 1953.

SCIENCE EDUCATION CONTROVERSY

Before 1932, degrees in science offered by Oregon's state-supported colleges were granted only by the University of Oregon at Eugene. Science courses at Oregon State College were limited to service courses taught especially for technical schools on the Corvallis campus, including the Department of Bacteriology. The purpose of this approach was to minimize duplication of courses offered by state-supported colleges.

A proposal to change this system came from a survey of Oregon's higher education requested by the newly formed Oregon State Board of Higher Education in 1929 and completed in 1931 by the U. S. Office of Education. That report concluded that: "A great School of

Science should be developed at Corvallis." The report stated that education in the technical schools at Corvallis would be better served by this arrangement. This plan was approved by the board in 1932 and the new School of Science began instruction at Corvallis in the fall of 1932. Faculty and equipment were transferred from the University of Oregon to Oregon State Agricultural College. However, conflicts continued for the next decade between faculty and administrators at the two colleges.



Bacteriology faculty in 1938 included Dr. Bollen (second from left), Mrs. Leach (fourth from left), Professor Copson (fifth from left), and Professor Simmons (seventh from left).

son, Walter M. Bollen, and a daughter, Catherine Bollen Everingham. He returned to Oregon Agricultural College and graduated with his bachelor's degree in horticulture in 1921.

He considered working with his father to commercially grow vegetables in greenhouses. However, because of an interesting bacteriology course he had taken at Oregon Agricultural College, Bollen returned to Oregon Agricultural College to obtain a master's degree in bacteriology. Under the guidance of Dr. William V. Halverson, he wrote his thesis on "Sulfur Oxidation in Oregon Soils," later published in *Soil Science*. Bollen received his doctorate in soil fertility at Iowa State College at Ames, where he studied the effect of gypsum on crop production.

For five years, Dr. Bollen was assistant chemist at the Agricultural Experiment Station at the University of Idaho at Moscow. In 1929, he returned to Oregon Agricultural College as assistant professor and associate bacteriologist, replacing his former advisor, Dr. Halverson. At Corvallis, he did research for the Experiment Station and taught classes. Much of his research was on microbiology of forest soils, decomposition of organic matter in soils, soil pesticides, analysis of wood waste products as mulching materials and disposal and utilization of organic wastes.

Dr. Bollen advanced to associate professor in 1937 and professor in 1948. In 1958, he was presented with the Oregon State College research award honor by the college chapter of Sigma Xi, national research society.

He retired as professor emeritus on June 30, 1965, but continued part-time work. He also worked for eleven years in a part-time position as principal microbiologist with the U. S. Department of Agriculture Forest Service Pacific Northwest Forest Sciences Laboratory on the Oregon State University campus. Dr. Bollen died on March 30, 1989, at San Rafael, California, at the age of ninety-two.

The University of Oregon continued its efforts to restore science courses, stating that while "applied science" should be located at Corvallis, "pure science" would suffer if combined at the new School of Science, and that it should remain at the university. In the meantime, Oregon State Agricultural College took the position that the intent of the board's reorganization was to create a single state university of Oregon located on several campuses with the School of Science a part of that university. After ten years of political battle, the University of Oregon was successful in 1941 in being authorized to offer science courses on that campus.

REORGANIZATION

In the reorganization creating the School of Science at Oregon State Agricultural College, the former School of Basic Arts and Sciences was changed to the College of Arts and Letters. The Department of Bacteriology was transferred in 1932 as one of eight departments to the new School of Science, joining the departments of Botany, Chemistry, Entomology, Geology, Mathematics, Physics, and Zoology. Later, a Department of General Science was organized as an additional department in the school.

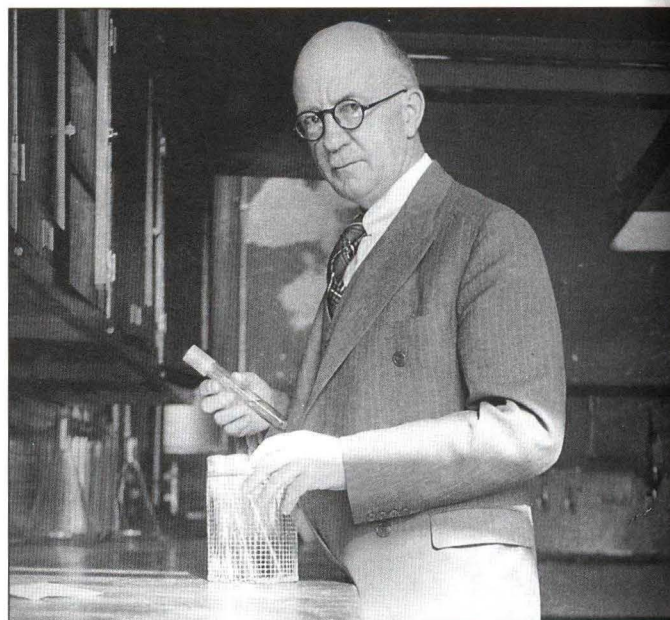
With this reorganization, the Department of Bacteriology could now offer advanced degrees. Beginning with the 1933-34 school year, graduate courses were listed in a separate section of the college catalog with courses including advanced work in bacterial physiology and biochemistry. A five-hour course in systematic bacteriology, two terms of physiology of bacteria, and one term of bacteriological techniques were introduced in 1934-35. All graduate courses were taught by Dr. Bollen.

IMPACTS OF THE DEPRESSION

The new School of Science was organized at the worst possible time as the Depression continued to make itself felt throughout the economy, including state government. Funds were not available to hire needed staff or to purchase necessary equipment. In 1932, cuts made in state government reduced salaries of lower-paid faculty by 15 percent and by 25 percent for department chairmen and professors. Salaries were not restored to pre-1929 levels until 1937.

Dr. Bollen remembered the economics of working at the college during the Great Depression:

"When I first came here, the salary, I think, was twenty-six hundred dollars a year. During the Depression years, they reduced that to twenty-two hundred and they didn't pay you for the summer months. So, we took quite a beating during the Depression years."



Professor Copson was active in both research and teaching plus Department and School of Science administration, during his long career.

River Pollution Studies

In the November 1930 issue of the *Oregon State Monthly*, Professor Joseph E. Simmons reported on a study of water quality problems that predated the environmental movement of the 1960s. Simmons and Professor Copson of the Department of Bacteriology worked with staff from the School of Engineering, School of Health and Physical Education, and Department of Zoology to survey water quality of the Willamette River in Western Oregon.

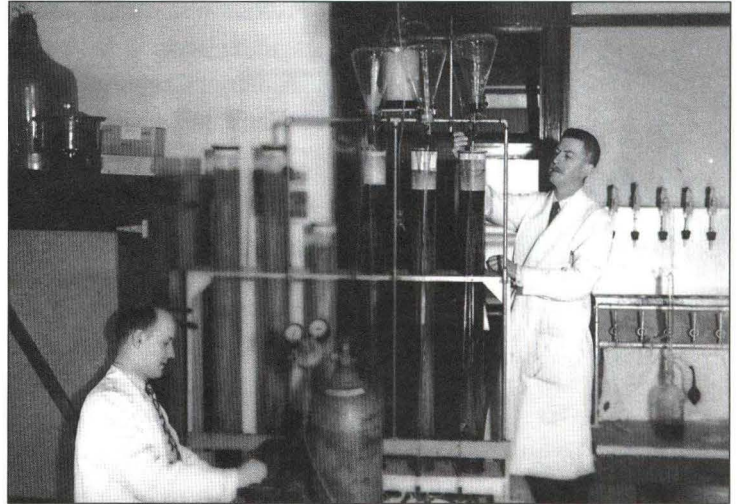
Water samples were taken at twenty-eight locations between Cottage Grove and Portland to measure the growing impact of water pollutants from major cities, industrial wastes and domestic sewage on fish life and public health. Industrial wastes from the state flax mill at Salem and pulp mills from Salem to Portland made a demand for oxygen in the river five times as great as the domestic sewage discharged into the Willamette. The report concluded that total bacterial count and *Escherichia coli* index were so high in local areas as to make bathing undesirable and to create unsafe sources of public water supplies.

It would be several decades before the public demanded changes that would begin the major task of cleaning up the Willamette River.

Bollen also recalled there were no funds to buy new equipment and that research funds were drastically reduced, including those from private companies.

During these years, the department did create some income by selling legume cultures and doing laboratory work to determine quality of milk and water. Eight-ounce bottles of legume cultures with enough bacteria in each to inoculate seed for two acres were sold for fifty cents each. This was a major department activity from 1930 to 1952 when commercial cultures became available. At that time, the department closed down its culture operations.

Other services were provided at no cost, including blood-typing by Professor Simmons. "We do considerable public health work in the Department, mostly free of charge," Professor Copson reported. One of the Corvallis doctors using the blood-typing services was Dr. Nicholas L. Tarter. Dr. Tarter later established



Dr. Bollen studied microbes in soils as part of his research.

research fellowships for graduate students in the Department of Microbiology and the Department of Chemistry at Oregon State University.

FACULTY CHANGES, 1935-37

For more than five years, the department faculty had been unchanged. Professor Godfrey V. Copson continued as department head, working with Associate Professor Joseph E. Simmons and Assistant Professor Walter B. Bollen. Instructor David B. Charlton, who had been released from the faculty in 1933 because of "financial stringency," returned to the department in 1934 after completing his doctorate at Iowa State College. Charlton worked at the department until 1937 and then left to form Charlton Laboratories in Portland, Oregon, a respected commercial technical services laboratory.

With this limited faculty, there were major problems in meeting the demands of the class loads and having adequate preparation time. By 1936, the department was not accepting any new students and some classes were being eliminated. Professor Copson expressed his concern that the Department of Bacteriology might become just a "service department" if improvements were not made.

During this same time, Dean of Science Earl L. Packard wrote Professor Copson that the Department of Bacteriology should not attempt to offer doctoral studies. His letter stated "It might not be wise to attempt any graduate work."

HYGIENE COURSES ADDED TO DEPARTMENT

In 1935, hygiene courses were added to the Department of Bacteriology. This probably was done to avoid transferring these courses to the University of Oregon during the adjustment period following the struggles between Oregon State College and the University of Oregon. The inclusion of hygiene brought additional faculty to

the department, including Clair Van Norman Langton, professor and director of hygiene, and Henrietta Morris, associate professor of hygiene. A course on forest sanitation and another on applied hygiene were added to the curriculum.

FACULTY CHANGES, 1937-46

In 1937, Professor Copson succeeded in having Walter B. Bollen advanced to associate professor, writing that the promotion was "years overdue." In 1938, Associate Professor Simmons was advanced to professor. Noel Gross, a graduate assistant since 1932, became an instructor after receiving both his bachelor's and master's degrees from Oregon State College. His job was eliminated in 1939.

No major staff changes occurred during the war years.

ACTING DEAN OF SCIENCE

Besides working to maintain a strong department faculty during difficult times, Professor Copson also remained active in the School of Science controversy that was still alive between Oregon State College and the University of Oregon. He had remained a close advisor of the Dean of Science, Francosais A. Gilfillan, who had replaced Packard as dean in 1938. When Oregon State College President Frank L. Ballard became ill and resigned, Gilfillan was named acting president on September 10, 1941, and on the same date, Copson was named acting dean of science. Copson served in this role during the 1941-42 school year.

The 1941-42 biennial report of the State Board of Higher Education looked to the future as the nation geared up for the war effort:

"The institution can never be stronger than its School of Science, nor can its Graduate Division maintain its standards without a strong School of Science. If science courses under different applied science names are to be offered all over the campus, the strength of the School of Science will be dissipated, much money wasted, and the reputation of the College will suffer."

WORLD WAR II IMPACTS

As with all universities throughout the nation, Oregon State College suffered greatly during World War II. Undergraduate students entered military service, the ranks of graduate students were depleted and many faculty were drafted, although the Department of Bacteriology lost no faculty to the service.

In April 1943, the Oregon State Chapter of Phi Kappa Phi, in cooperation with others, hosted its Fifth Annual Biology Colloquium. This was an informal discussion of current knowledge and an opportunity to share knowledge. Professor Simmons was one of nine invited speakers. He spoke on "Bacteriology and Sanitary Problems of Wartime." In closing, Professor Simmons commented on the shrinking world and its impact on disease: "The long distance barrier (of warfare) has to a very marked extent been entirely wiped out. High speed aeroplanes span the distance from America to Europe or Africa in a few hours. Constant vigilance of public health authorities is necessary to prevent the recurrence of the common scourges of the 19th Century, such as smallpox and diphtheria."

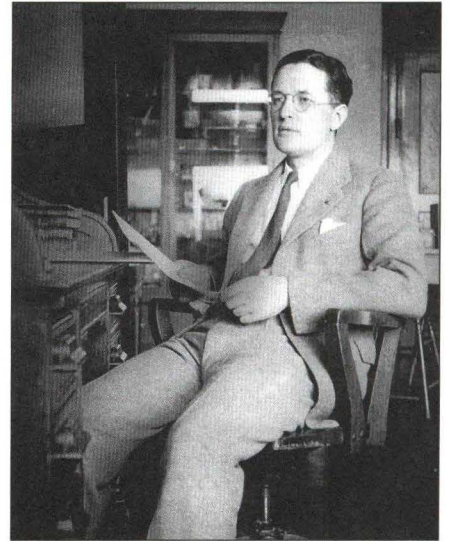
There was an increased demand by the military for specific research and services vital to the war effort. The 1943-44 biennial report of the State Board of Higher Education described the roles of various departments under the Army Specialized Training Program:

"Description of the participation of the School of Science in the Army Specialized Training Program must be brief. The Department of Bacteriology aided in instructing a group of advanced sanitary engineers over a period of one and one-half terms."

POSTWAR PREPARATIONS

When the war ended in 1945, the Department of Bacteriology, together with all other departments and schools in the state educational system, prepared itself for a return to normal times. The 1945-46 Biennial Report of Oregon State College spoke to what the future might hold:

"Needs of the biennium ahead are many and pressing . . . Oregon State College will begin its seventy-ninth year with the biggest responsibility and opportunity in its history, but with physical facilities so inadequate that hundreds of students, if not thousands—students that the College exists to serve—will be unable to enter . . . Men and women students are returning to the campus with government aid. They are returning to make up for lost time."



David Charlton was on the Department faculty for five years before leaving to form Charlton Laboratories in Portland.

CHAPTER 6

DEPARTMENT OF BACTERIOLOGY AND HYGIENE • 1946-1961

A new era began for the department with the start of the 1946-47 school year. Returning war veterans, aided by the GI Bill entered universities in large numbers. Total enrollment of the Department of Bacteriology was 244, up from 167 just ten years before, with 27 undergraduate majors and just one graduate major. However, only \$2,000 of research support was available in the department budget for faculty.

DEPARTMENT OF BACTERIOLOGY AND HYGIENE

Since 1936, hygiene courses and faculty had been a part of the Department of Bacteriology. The fast-changing times, brought on in part by the impacts of a nation devoting four years to a major war, had an effect on how the department was viewed.

The 1946-47 Oregon State College catalog gave an indication of growth to come. After reviewing the importance of the department, the growing number of both undergraduate and graduate studies in bacteriology and the opportunities to be found in research, the catalog added:

"The recent trend towards industrialization in certain parts of the state, with attendant increases in population densities, demands more bacteriologists with specialized training in hygiene."

A new name, the Department of Bacteriology and Hygiene, within the School of Science, was the result of this direction and the name was officially adopted.

CURRICULUM, 1946-47

The department's curriculum had continually evolved from the first year that bacteriology courses had been offered, responding both to new information and technology gained from research and the demand of Oregon companies and organizations. The 1946-47 school year continued this evolution and the following curriculum was offered in the Oregon State College catalog:



Professor Copson, here holding recorded charts for a research project, retired in 1949.



Professor Joseph E. Simmons

Joseph E. Simmons

Joseph Ellsworth "Mike" Simmons was born May 11, 1891, in Hazel Green, Wisconsin. He attended Platville State Normal School in Platville, Wisconsin, for two years and then entered the University of Wisconsin where he obtained his bachelor's degree in 1916. He served as an instructor there and at the Ontario Agricultural College from 1916 to 1917. He returned to the University of Wisconsin as an instructor and for graduate studies, where he received his master's degree in 1918.

Simmons came to Oregon State Agricultural College in 1918 as an instructor in the Department of Bacteriology. The following year, he was advanced to assistant professor. He soon assumed a major portion of the instructional workload in the department, teaching general bacteriology, pathogenic immunology, clinical laboratory methods, food bacteriology, and dairy bacteriology. In 1926, Simmons became associate professor. He was named professor in 1938.

His heavy teaching workload continued into the 1940s with courses in pathogenic bacteriology and immunology, plus supervision of the medical technology program. Retired Department Chair Paul R. Elliker later recalled his impressions of Professor Simmons during Elliker's early years with the department starting in 1947:

"I often wished in later years that I had made a greater effort to spend more time with Mike Simmons, as he was called. He was an interesting indi-

Lower-division Courses

Elementary Bacteriology
Principles of Bacteriology

Upper-division Courses

Pathogenic Bacteriology
Applied Hygiene
Research
Reading and Conference
Dairy Bacteriology
Soil Bacteriology
Systematic Bacteriology
Physiology of Bacteria
Epidemiology
Microscopy of Waters

Graduate Courses

Research
Reading and Conference
Advanced Bacterial Physiology

General Bacteriology

Immunity and Serum Therapy
Forest Sanitation
Thesis
Seminar
Agricultural Bacteriology
Bacteriological Techniques
Systematic Bacteriology Laboratory
Physiology of Bacteria Laboratory
Sanitary Bacteriology
Bacteriological Problems

Thesis
Seminar
Biochemistry of Bacteria

FACULTY CHANGES, 1946-49

In 1946, department faculty continued unchanged despite the growing number of students. Godfrey V. Copson continued as department chair with Professor Joseph E. Simmons and Associate Professor Walter B. Bollen both teaching and conducting research in bacteriology. Professor Clair Van Norton Langton and Associate Professor Henrietta Morris instructed courses in hygiene.

In 1947, Dr. Paul R. Elliker, a future department chair, came to Oregon State College from the University of Wisconsin and Purdue University as professor of bacteriology. He taught general bacteriology, as well as food and dairy bacteriology. Dr. Bollen was advanced to professor in 1948.

Assistant Professor Phillip Gerhardt joined the department in 1949 after obtaining his doctorate from the University of Wisconsin. He was recruited by Dr. Elliker who had worked with him in the army on biological warfare research. Gerhardt, who held an army reserve commission, was recalled to military service



Professor Joseph E. Simmons served as Department Chair from 1949 until his untimely death in 1951.

vidual, very conscientious and industrious, a good-natured, though often brusque, fellow. Despite his sometimes crusty mannerisms, he had the welfare of the Department genuinely at heart and worked overtime at the task. When he wasn't in class teaching, he generally could be found moving around the Department or in his office, usually with a cigar in his mouth or close at hand. With the assistance of Mrs. Leach, he conducted considerable laboratory diagnostic work for local physicians and had a close working relationship with them."

When Godfrey V. Copson retired as department chair in 1949, Professor Simmons was named to succeed him. He served as chair from 1949 until his death from a heart attack on December 30, 1951, near his beach cottage at Waldport, Oregon.

His friends and colleagues established the Joseph E. Simmons Scholarship for the Department of Microbiology in recognition of his contributions to education and science.

in 1952 during the Korean Conflict and returned to biological warfare research. In 1949, Arthur W. Anderson came to the department as an instructor, both to teach and to study for his doctorate.

COPSON RETIRES

Professor Godfrey V. Copson retired as department chair

at the end of the 1948-49 school year, ending more than four decades of association with the department as student, professor and department chair.

SIMMONS APPOINTED CHAIR

Professor Joseph E. Simmons was named the new department chair, succeeding Professor Copson at the start of the 1949-50 school year. Simmons brought more than thirty years experience with the department to his new position. However, on December 30, 1951, Professor Simmons died suddenly while at his beach home near Waldport, Oregon. Professor Paul R. Elliker was appointed acting chair to finish the school year. He later was appointed department chair.



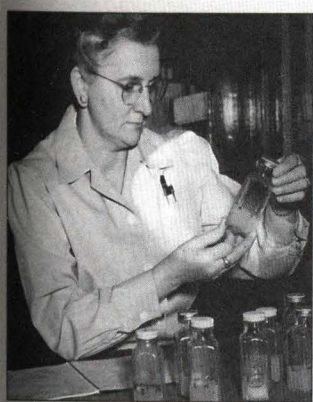
In 1950, Professor Simmons led his dairy bacteriology class on a tour of Oregon dairies.



Dr. Bollen (second from left) taught this soil microbiology laboratory in 1947.

CURRICULUM CHANGES

In 1951, bacteriology laboratory was added to the department's curriculum as a lower-division course to meet science group requirements. In addition, sanitary bacteriology was added as a lower-division course. Upper-division courses added were sanitation, that focused on communicable diseases in public areas; serology, concerning theories of immunity to diseases; community health problems; and history of



Laura Leach

Laura Leach

Laura Leach was one of many dedicated classified staff who worked for the Department of Microbiology. First hired in 1924 as a laboratory assistant and dishwasher, she saw her duties quickly expand. Dr. Bollen recalled how she "rapidly advanced to an indispensable general assistant and technician. As the numbers of students and general activities in the Department increased, her services became more and more important."

In 1947, Department Chair Copson wrote that "Mrs. Leach has been with us for 23 years and is very highly trained and the only technician we have. She is in charge of the stock cultures, routine analysis of milk, water, urine, and blood cultures and vaccines. Preparation of artificial inoculation of legumes and sale of same. Supervises the work of the Laboratory Assistant (Media Maker), Clerk-Stenographer, Domestic Worker (Dishwasher), part-time student help, typists, and laboratory workers." Professor Copson later added, "It is difficult to see how we could manage the department without her help."

Mrs. Leach knew where everything was and helped faculty and students quickly find what they needed. She knew how to use a hammer and saw, and was able to build a shelf or whatever was needed, an important skill as Agriculture Hall aged. Her philosophy was that she could do these jobs as well as or better than any man.

One day, students and their instructor in a laboratory class on the fourth floor of the building were

bacteriology. Marine bacteriology was added to the curriculum in 1953, but other instruction and research in this field were not established until 1962 when Dr. Richard Y. Morita joined the faculty.

In 1956, dairy bacteriology was changed to food sanitation microbiology to accommodate a request for a course by Dr. Harold Schulz, head of food science. This course provided fundamentals of sanitation for both dairy microbiology and food production and was taught by Dr. Elliker. In 1960, Dr. Sandine assumed instruction for a second term course on dairy bacteriology and Dr. Elliker continued to teach the food sanitation course, along with the second term of general bacteriology.



Department faculty in 1948 included: Mrs. Leach (first row, second from left), Dr. Bollen (first row, fourth from left), Professor Copson (first row, fifth from left), and Dr. Paul R. Elliker (second row, far left).

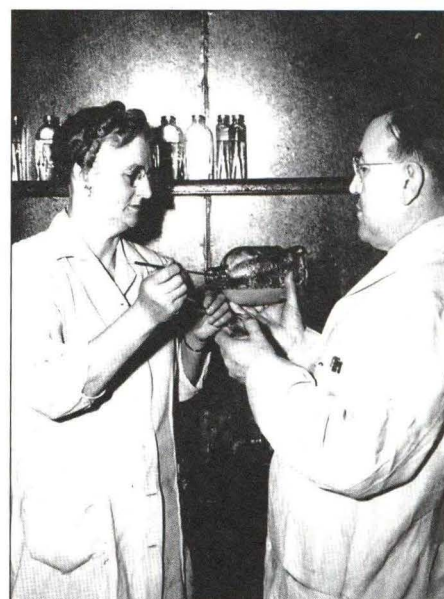
RESEARCH

The 1957-58 biennial report of Oregon State College gave a concise update on research within the Department of Bacteriology and Hygiene:

"Research work on microorganisms associated with dairy products and with bactericides used in dairy and food industries, which is being conducted by the Department of Bacteriology and Hygiene, is being recognized in many foreign countries. Interest in research on bacteria resistant to gamma radiation has also reached international proportions . . . Other studies, such as those on the relation of chemical structure to antiviral activity, on soil microbiology, on sawdust as a soil conditioner, on the four species of yeast found associated with the Douglas-fir beetle, and on stimulation of soil bacteria with gibberellic acid, also have national and international importance."

In 1957, Dr. Elliker wrote a letter to F. E. Price, director of the Agricultural Experiment Station, strongly recommending that a research program be established in bacterial physiology under the station's supervision. He believed that such a program would aid both his department and others on the Oregon State College campus, and that available funds from industry and the federal government would pay for most of the additional staff and support needed. Director Price agreed with the need for the program, but could not approve it with the limited funds available at the station.

A short time later, the Experiment Station suggested that funds from Dr. Bollen's assistantship left over from K. C. Lu's completion of his



Mrs. Leach (left), "jack-of-all-trades," and Department Chair Joseph E. Simmons in 1950.

startled to hear a crash overhead and see a foot protruding from the ceiling. The foot belonged to Mrs. Leach, who was looking for something in a storage area in the fifth-floor attic when she stepped in the wrong place.

Dr. Paul Elliker remembers that when he first came to Oregon State College in 1947, Mrs. Leach and Professor Simmons helped him renovate his limited research and teaching facilities. Mrs. Leach also was responsible for managing much of the department's budget. "As far as I was concerned, Mrs. Leach was an indispensable cog in the day-to-day functioning of the department," Elliker later wrote.

Mrs. Leach started many of the popular social activities of the department, including picnics in Avery Park, Christmas socials and other events.

Mrs. Leach advanced to laboratory technician, bacteriologist II, and finally microbiologist II. When she retired in 1963, the department held a banquet in her honor to recognize her many years of valuable service. In the Emile F. Pernot Study Room in Nash Hall, an engraved plaque identifies a section of publications purchased through contributions to the Laura Leach Memorial Fund.

research be combined with additional appropriation from the station for a staff appointment, with the understanding that Dr. Elliker would secure the balance from resident instruction funds from the College of Science. This was accomplished to establish a joint experiment station science faculty position in microbial



Department faculty, staff and graduate students in 1955 included (back row): Kenneth Soike, Paul Clare, Lee Damsky, Jack Roberts, Dugal MacGregor, Dr. Paul Elliker, Campbell Gilmour, and Dr. Arthur Anderson; (middle row): K. C. Lu, Martha Porter, Gordon Parrish, Ione Morris, Helen Hays, Sigrid Klungsoyr, Sprague Watkins, and Laura Leach; (front row): Lori Thompson, Kay Black, Joan Edwards, Vonnie Fielder, Beverly Folston, Ruth Baines, and Dr. K. "Steve" Pilcher.

physiology. The next two experiment station assistantships from the dairy microbiology research program were sacrificed to set up a similar staff appointment for Dr. Sandine.

In 1958, Dr. Elliker responded to a request from the assistant director of the Agricultural Experiment Station for a statement of the aims and objectives of the department with the station's program. Dr. Elliker stated:

"A major portion of the research of the Department of Bacteriology is sponsored by the Agricultural Experiment Station. The remainder is supported through outside grants through the School of Science. Some idea of the rapid development of the research program in recent years in Bacteriology is provided by figures showing increase in number of graduate students engaged in research and study towards an advanced degree in Bacteriology. In 1947, there was one graduate student engaged in research and study. . . By 1950, this had increased to seven, by 1952 to thirteen, and by 1957 to twenty-two. We anticipate even more rapid expansion of our research program in the next ten years."

Elliker went on to describe the increasing trend toward research in metabolism of the bacterial cell and how research on microorganisms was aiding agriculture. Soil microbiology, metabolism of food-spoilage bacteria, bacteria resistant to gamma radiation, viruses of animal diseases, microbial physiology and immunology were other areas he saw as needing greater research.

FACULTY CHANGES, 1950-53

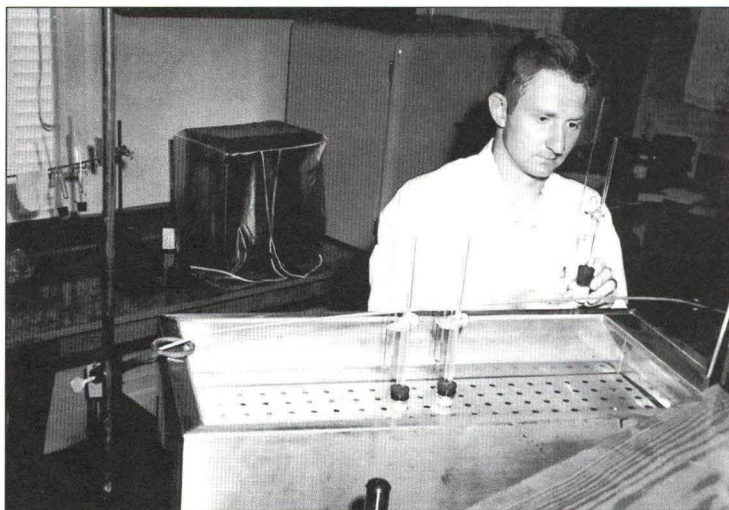
New faculty during the early 1950s included Instructor William Arthur Koski hired to teach hygiene courses. Dr. Karl S. "Steve" Pilcher from Cutter Laboratories also joined the faculty as an assistant professor in 1951. He directed instruction and research in pathogenic bacteriology and virology, as well as medical technology, and was advanced to associate professor in 1952. Richard B. Parker was appointed instructor for the 1951-52 school year.

Dr. Campbell M. Gilmour came to the department in 1952 from the University of Wisconsin as an assistant professor to succeed Dr. Gerhardt. While Dr. Gilmour taught a number of bacteriology courses, he would later teach and do research in soil bacteriology.

In 1953, Dr. Arthur W. Anderson was appointed assistant professor after a year in a postdoctoral position with the Office of Naval Research, University of California, Berkeley. Instructor Koski was advanced to assistant professor.

FIRST DOCTORATES

A major milestone was reached by the Department of Bacteriology and Hygiene in 1952 when the first doctorate degrees were granted in the department. Donald D. Miller earned his degree with a research program financed by a grant from Klenzade Products, Inc., of Beloit, Wisconsin. His study dealt with factors affecting the activity of germicides. He was a graduate student under Dr. Elliker. Dr. Miller left Oregon State College to become director of animal husbandry at New Mexico State University.



In 1956, graduate student and future Department faculty member William Sandine tested lactic acid bacterial cultures.

Arthur W. Anderson earned his doctorate that same year researching the effect of chemical variation in the composition of milk on growth of lactic acid starter-culture bacteria. Anderson also had studied as a graduate student under Dr. Elliker. He continued with the Department of Microbiology for a productive twenty-five-year career.

K. C. Lu earned the third doctorate degree from the department in 1953 with a major in soil bacteriology. Dr. Lu served three years under Dr. Bollen, working on projects concerned with flax retting and microbiological effects of bark and sawdust added to soils. He left to join the staff of the U. S. Department of Agriculture Forestry Science Laboratory at Corvallis.

FACULTY CHANGES, 1954-61

No major staff changes were made in 1954 or 1955. In 1956, Dr. Karl S. Pilcher was advanced to professor and Dr. Campbell M. Gilmour was advanced to associate professor. No major faculty changes were made in 1957 or 1958.

In 1958, Dr. William E. Sandine obtained his doctorate degree in physiology and taxonomy of lactic acid bacteria. He joined the department faculty as an instructor that year, took a leave of absence for postdoctoral studies at the University of Illinois in 1959 and returned to Oregon State College as an assistant professor in 1959. His role was to cooperate with instruction and research in dairy microbiology, assuming some of Dr. Elliker's workload.

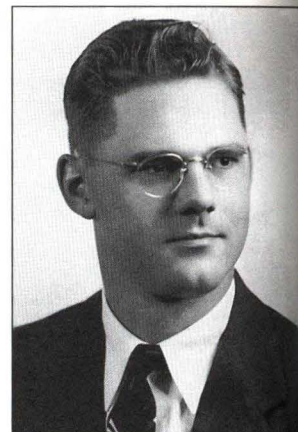
Dr. Leo W. Parks with a doctorate from the University of Washington, followed

by a postdoctoral appointment at Argonne National Laboratory, Chicago, was appointed assistant professor in 1958. Dr. Parks was responsible for instruction and research in microbial physiology. At the same time, Dr. Campbell M. Gilmour was placed in charge of teaching systematic bacteriology in 1959, freeing Dr. Bollen to devote more time to research. Also in 1959, Microbiologist II Helen A. Hays moved from the classified staff to the teaching faculty and returned to the classified staff a year later.

END OF THE DECADE

By 1960, there were eight faculty members teaching in the Department of Bacteriology and Hygiene. Student enrollment in the department had reached 297 with 25 undergraduate majors and 26 graduate majors.

That year, six undergraduate degrees were granted, three master's degrees, and two doctorate degrees. Annual support for research had increased to \$25,000. The department had published twenty-two publications, a new high. In planning for staff development during the rapid period of department growth, every effort was made to establish positions jointly with the Agricultural Experiment Station-School of Science, with funding from both sources. This meant that staff teaching loads could be reduced to enable more time for research and counseling of students. Also, staff did not have to be concerned with soliciting summer salary funds from outside sources, and were available during the summer to counsel both graduate and undergraduate students. Reduced teaching loads created a superior research effort, more useful research publications and superior instructional efforts.



Dr. Phillip Gerhardt served on the Department faculty from 1949 to 1952.

OREGON STATE UNIVERSITY

On March 6, 1961, Governor Mark O. Hatfield signed into law the legislative act changing the name of Oregon State College to Oregon State University. Over the next few years, the various schools, including the School of Science, were renamed administratively as "colleges."

More changes were coming to the department as it entered the decade of the 1960s.

CHAPTER 7

DEPARTMENT OF MICROBIOLOGY AND HYGIENE • 1961-1968

Both the university and Corvallis continued to grow. The university had 7,899 students enrolled at the start of the 1961-62 school year. Population of Corvallis had increased to 20,669 and the state of Oregon was now home for 1.7 million residents.

NEW NAMES

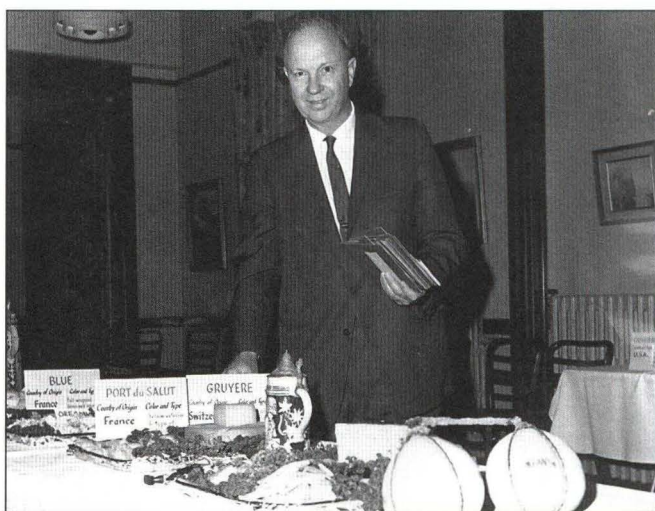
The 1961-62 school year started with a new name for the College—Oregon State University—and another name change for the department—the Department of Microbiology and Hygiene.

CURRICULUM

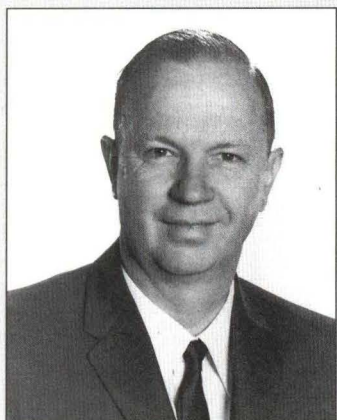
The microbial genetics program was established in 1961, following a visit by Dr. Elliker with a former Oregon State University instructor, Dr. Noel Gross of the National Institutes of Health. He suggested a training grant application for the program that was quickly approved, funding a staff member, a postdoctoral appointment, three graduate research fellows and extra costs for laboratory renovation, equipment, supplies and travel. The application also included a commitment from the department to continue the program when the training grant expired.

When this new program was added, there already were thirty-two graduate majors in microbiology, including sixteen for the master's degree and sixteen for the doctorate. In the 1962-63 school year, virology and virology laboratory were offered for the first time. These new courses centered on properties of viruses, with emphasis on animal viruses, including their major groups and their relations to diseases. Microbial genetics was offered for the first time the following year, the result of Dr. Curtis B. Thorne joining the faculty.

For several years, there had been a marine microbiology course listed in the catalog, but no department faculty member was active in this field, or within the rapidly expanding Department of Oceanography. Dr. Elliker visited with Chairman Wayne Burt of the Department of



Dr. Paul R. Elliker became Department Chair in 1952 and soon became popular for his cheese presentations at cheese and dairy gatherings.



Dr. Paul R. Elliker

Paul R. Elliker

Paul R. Elliker was born February 12, 1911, in La Crosse, Wisconsin. He enrolled at the University of Wisconsin and received his bachelor's degree (cum laude) in 1934, his master's degree in 1935, and his doctorate in 1937, all in bacteriology. During his time at the university, he received varsity letters in football and track.

Elliker served on the University of Wisconsin faculty in 1938-39, the University of Maryland in 1939-40, and Purdue University 1940-43. From 1943 to 1945 he was a commissioned officer in the U.S. Army Sanitary Corps working in biological warfare research. At the close of World War II, he returned to Purdue University from 1945 to 1947.

In 1947, Elliker accepted a position as professor with the Department of Microbiology and Hygiene at Oregon State College. Because this position had been supported by the Oregon dairy industry, Elliker developed a major research program in this area. Over the next thirty years, his work brought both him and the department national and international recognition. Elliker wrote a textbook entitled *Practical Dairy Bacteriology* first published in 1949. The book continues today as a valuable reference.

In 1952, following the death of Department Chair Joseph E. Simmons, Elliker was appointed chair of the Department of Microbiology and Hygiene. He held the position for the next twenty-four years. Besides his primary work in the dairy industry,

Oceanography, and they agreed to seek funding for a joint program. The General Medical Sciences Section of the National Institutes of Health was contacted and approved a training grant to support a faculty member for five years, together with six research fellows, funds for equipment and supplies and funds to renovate research space in Agriculture Hall. After the initial grant period, the university would assume the funding of the faculty position, but could reapply at least once for continued support for equipment and supplies.

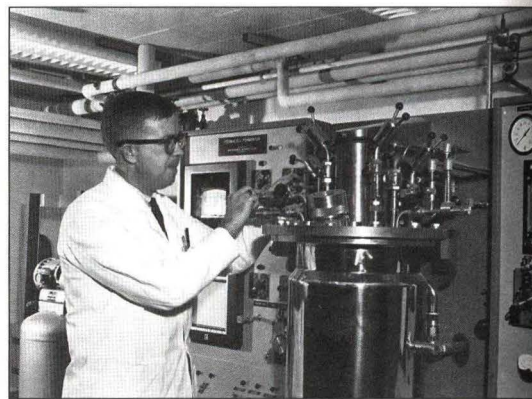
This grant was approved and a national search was conducted to fill the faculty position. Dr. Richard Y. Morita of the University of Nebraska was hired in 1963. He soon developed a strong internationally recognized research and instructional program in marine microbiology.

The combined contribution of the two training grants for both graduate research and overall instructional programs in microbiology was a major factor in the department's development. The funds provided for staff, graduate students' stipends, supplies, equipment, publications, travel to scientific meetings and renovation of facilities. The funds were most important for both expanded research and teaching programs. Renewal of the genetics grant for an additional five years and the general medical sciences grant for an additional ten years provided permanent, and difficult to obtain, staff positions for the department. These grants were also a factor in securing funds for a new building for the Department of Microbiology.

In the early 1960s, department faculty agreed that only graduate students who could demonstrate a good working knowledge of English would be accepted. The faculty was carrying such a heavy workload that there was no time for teaching graduate students both the professional program and how to communicate in writing and speaking in English. Acceptance of transfer students from other university graduate schools was also limited to those with an adequate undergraduate background and an assigned major professor in advance to their arrival at Oregon State University.

RESEARCH

In a department publication "History of the Department of Microbiology at Oregon State University," written by Dr. Walter B. Bollen and the microbiology staff for



Senior Instructor Donald Overholser advised undergraduate students, taught classes and maintained Department facilities.



By 1964, laboratory conditions were becoming crowded for microbiology classes.

Elliker was also an advisor on projects ranging from the sterilization of production equipment for manufacturing polio vaccine to cleaning and sterilizing kidney dialysis machines. He was a consultant on space projects for the National Aeronautics and Space Administration.

Dr. Elliker received numerous awards from professional and industrial organizations. He is the author or co-author of more than two hundred articles and abstracts. One of his major achievements was providing the inspiration and leadership for planning, funding and construction of Nash Hall. He also became popular for wine and cheese parties that he presented as a hobby, a popular highlight of the annual Oregon Dairy Industry Conferences for thirty years. Within the department, he encouraged many social functions for faculty and staff members.

Dr. Elliker retired as professor emeritus in 1976 and moved from Corvallis to his home at Otter Rock on the Oregon Coast. Here, he continues to write papers and correspond with former students around the world. In 1993, during an E. coli outbreak in a fast-food restaurant chain in the Pacific Northwest, the U.S. Food and Drug Administration issued a report on sterilization of kidney dialysis equipment. Their report indicated that the method suggested by Dr. Elliker, based on Oregon State University microbiology graduate student research, was the best of three methods used in the United States. Numerous children and some adults were saved by kidney dialysis treatment during this epidemic. The report came on Dr. Elliker's eighty-second birthday and "that was the best birthday present ever for me."

The philosophy of Dr. Elliker was summed up well by a close associate who stated that "it is amazing what can be accomplished if you are not concerned about who will get the credit."

the university's 1968 centennial, a summary of microbiology research was presented:

"Current research in the Department of Microbiology is concerned with fundamental problems in the field as well as studies in the applied areas. Research problems deal with (1) environmental health and human disease, (2) basic investigations of chemical activities and genetics of microorganisms, (3) important agricultural functions such as how microorganisms affect soil fertility and studies on causes and control of diseases of domestic animals and fish, and (4) specific commodities such as meats, poultry, sea foods and milk and milk products."

Microbial physiology research directed by Dr. Leo W. Parks, focused on understanding the regulation of biosynthetic pathways in microorganisms. In marine microbiology, guided by Dr. Richard Y. Morita, effects of low temperature and hydrostatic pressure on marine microorganisms were tested. Dr. Dorothy K. Fraser was in charge of research in microbial genetics, studying bacterial cells.

Soil microbiology research by Dr. Campbell M. Gilmour studied the conservation and improved use of nitrogen in western soils. Aquatic microbiology research by Robert E. Pacha looked at aquatic bacteria in both pure and polluted fresh waters. Pathogenic microbiology, virology and immunology research conducted by Drs. John L. Fryer and Karl S. Pilcher focused on diseases of Pacific salmon.

Food microbiology research by Dr. Arthur W. Anderson, was designed to gain a better understanding of food-borne infections and microorganisms in food that cause intoxication. Specific projects involved testing irradiation resistance of food pathogens in seafood to determine if irradiation pasteurization could be used.

Physiology of lactic acid bacteria examined enzymes important to the growth of lactic acid bacteria in milk. Research concerning bacteriophages and germicides studied lactic acid bacteria and the effects of viruses on their growth. These research projects were directed by Dr. William E. Sandine and Dr. Paul R. Elliker.

NEW BUILDING ON THE HORIZON

In 1962, the College of Agriculture and the Agricultural Experiment Station established a new priority list for needed space with the top spot shared by the Department of Microbiology and Hygiene, and the Department of Fisheries and Wildlife. Dr. Elliker, with the assistance of Dr. Thorne, worked on preliminary plans for these departments to be placed in an additional wing of Cordley Hall, then being planned.

The department obtained a federal grant requiring state matching funds. However, the state Legislature failed to provide the needed funds, so the grant was canceled.



Dr. Bollen retired in 1965, ending a 36-year career with the Department.



Agriculture Hall and the "Notorious Fifth Floor" in 1955.

The Notorious Fifth Floor

For years, the microbiology staff was located on the third and fourth floors of Agriculture Hall (now Strand Agriculture Hall). Later, as the department's research program expanded, graduate students were located on the fifth floor. They were housed there in spite of hazardous access, a steep stairway more like a ladder with no handrails. Every item used for research in this one-room laboratory, called "5", had to be carried up and down these stairs.

In spite of a narrow, steep stairway, significant research was accomplished in that room over the years. Ed Sing used the laboratory's isolation unit in an attempt to infect bacteria by spraying bacteriophage into the cabinet's closed atmosphere; John Fryer started the first cell lines from Pacific salmon, and isolated the infectious hematopoietic necrosis virus; and Karl S. Pilcher carried out antigenic studies with polio and influenza viruses.

There were advantages to being located on the fifth floor. A door opened onto the roof of the building from where, on a clear day, a spectacular view was possible of the surrounding countryside and the snow-capped Cascade mountains to the east.

Dr. Walter B. Bollen found the original microscope of Emile F. Perrot, the first department chair, stored in the attic. The microscope is now preserved in Nash Hall.

During the twenty years that "5" was used by graduate students, there was concern about adequate fire escape measures, since the narrow, steep stairway was the only way to leave the floor. Students

FACULTY CHANGES, 1961-67

Early in his career, Dr. Elliker was convinced there was a critical need for a microbial geneticist for the department's teaching and research programs. His determination to establish this program led to Dr. Curtis B. Thorne joining the faculty in 1961. He came to Oregon State University from Fort Detrick in Frederick, Maryland, where Elliker had once served in the military. Dr. Thorne had obtained his doctorate in biochemistry from the University of Wisconsin under Dr. Werner Braun, author of the first microbial genetics text published in this country. Dr. Thorne remained on the Oregon State University faculty until 1963.

In 1962, Dr. Richard Y. Morita was appointed associate professor to direct research and instruction in marine bacteriology, a joint appointment by the departments of Bacteriology and Oceanic and Atmospheric Sciences. John L. Fryer, a future department chair, was hired as an instructor in 1963 to teach and conduct research in pathogenic microbiology and to develop a research program in infectious diseases of fish. He had been doing graduate work in this area at Oregon State University funded by the former Fish Commission of Oregon. Fryer was advanced in 1964 to assistant professor to develop a program in diseases of Pacific salmon. Assistant Professor Robert E. Levin was hired in 1963. He resigned in 1965. Laura Leach, the "jack-of-all-trades" for the department, retired in 1963.

In 1964, Associate Professor Dorothy K. Fraser came to the department to do research in microbial genetics and molecular biology. She became the first female faculty member on tenure track in the department. Assistant Professor Robert E. Pacha was hired as an aquatic microbiologist. William A. Koski was advanced to professor of hygiene in 1965.

At the end of the 1965 school year, Dr. Walter B. Bollen retired, ending a thirty-six-year career as a faculty member. He continued to teach soils and forestry microbiology for several years on a one-quarter time basis. In 1966, Dr. William E. Sandine and Dr. Leo W. Parks were advanced to professor.

In 1967, Dr. Campbell M. Gilmour resigned from the department to accept a position at the University of Utah. At that time, he was working in soil microbiology teaching and research, and systematics microbiology. Dr. Donald Klein of Pennsylvania State University was hired as assistant professor to succeed Gilmour. Instructor Sarah M. Robison was added to the teaching faculty.



Dr. Dorothy K. Fraser was on the Department faculty from 1964 to 1970, the first female faculty member on tenure track.

AFRICAN-AMERICAN GRADUATES

In 1964, the department presented a master of science degree to Joe N. Hobbs, one of the first two African-Americans to receive an undergraduate degree in microbiology below the Mason-Dixon line. Hobbs had received his bachelor of science degree at Southern University. Others soon followed, including several graduates that received their doctorate degrees at Oregon State University.

obtained large ropes from a surplus store, anchored the ropes to nearby radiators close to a window, and coiled the ropes on the floor. Fortunately, the fire never occurred and the ropes never had to be used. Dr. Elliker recalled later that "when the ropes were checked before the department move, it was discovered that they were so fragile that they would probably not have supported the weight of even a child."

A short time before the department moved to Nash Hall, the fifth-floor laboratory was declared too hazardous for any research work.

CHRISTMAS LETTERS

During his time as department chairman, Dr. Elliker prepared annual Christmas letters, signed by major department staff and mailed to former faculty and department alumni. He wrote the letters to update recipients on how the department was progressing and to report about current and former faculty and students.

At Christmas, 1961, Dr. Elliker wrote:

"The common refrain around here these days is where can you put him or her, where can they study? And the reason is obvious when you make a quick trip through the department. Growing presents innumerable pains."

He also wrote that there were forty-five graduate students in the department from all over the United States and five foreign countries.

Four years later, in his 1965 Christmas letter, he wrote:

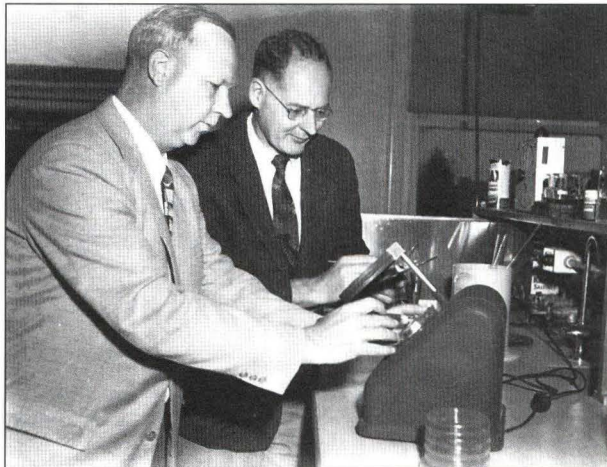
"There are many new faces around this year. Twenty-one are new graduate students, and two new post-doctorates . . . There must be fifty-seven graduate students by now. We have moved into our new and modern teaching quarters on the first floor of the Agriculture Building and they are a tremendous improvement . . . We hope, however, to vacate these premises in about three years."

Continuing pressure for more teaching and research space had resulted in this remodeling that gave the department the first floor space and part of the basement of the south wing of Agriculture Hall.

At Christmas, 1967, Dr. Elliker was also enthusiastic in his report that an appropriation for a new microbiology building had been approved by the state Legislature. "You won't believe it," he wrote, "but plans also call for two high speed elevators and air conditioning throughout. Please plan on coming back to help us break a bottle of beer over the cornerstone."

END OF THE 1960s

As the decade was ending, the Department of Microbiology and Hygiene was growing rapidly with its faculty located in five separate buildings. Its reputation, both within the professional ranks nationally and internationally and within Oregon, was reaching new heights. A growing staff, increasing enrollment and the prospects of a new building made for a bright future.



Dr. Elliker, here with Roy Stein, kept in close contact with public and private organizations interested in supporting the Department.

CHAPTER 8

BUILDING NASH HALL

For more than three decades, faculty of the Department of Microbiology and Hygiene had been cramped for space for their research and teaching responsibilities. This affected both the quality and quantity of the department programs and had a major impact on faculty morale.

In 1957, initial discussion was held about moving the department to a proposed new addition to the physics-chemistry building. Dr. Elliker did not look forward to the department being forced into a location with limited space that would stifle future expansion. No move was made, but no major alternative plan was offered by the college.

Comments from on and off campus about the department's antiquated facilities in Agriculture Hall caused Elliker to develop his major goal of securing a new building for the department. Knowing that this effort would require growth in the department, Elliker encouraged his faculty to develop their staff and graduate programs, a move that would place the department higher on the priority list for campus development.

THE NEED FOR A NEW BUILDING

In 1958, Dr. Elliker wrote to the associate dean of the Agricultural Experiment Station, enclosing an itemized list of estimates of future space requirements for the Department of Bacteriology. Space totaling some 41,650 square feet would be needed. This estimate was based on slightly more than double the department's enrollment by 1970 and corresponding increases in research activities. He projected an increase of graduate students to fifty or more in ten years. (There were sixty-five graduate students registered in the 1965-66 school year).

Elliker closed his letter by stating:

"The staff in Bacteriology feels that our department should be considered as a biological and agricultural science, and, because of close cooperation with and a high student enrollment from other departments scheduled for Cordley Hall, that we should be located in or near that building."

The 1963-64 Oregon State University annual report stated in part:

"The gains in the School of Science have been made in most cases in the face of severe space, equipment, and budget limitations. The rapidly growing Departments of Zoology and Microbiology, for example, have substandard quarters in old Agriculture Hall and staff members scattered in buildings across the campus because space is not available to centralize the work. Inadequate power supply in Agriculture Hall often prevents some electrical equipment from functioning properly. Some heavy new pieces of equipment had to be put in storage rather than use because of dangers of overtaxing weakened floors. Improved facilities are desperately needed in some instances."

Eventually, the department was scattered over five different locations on and off campus. Research laboratories and classrooms were located on two floors and

the basement of Agriculture Hall. Dr. Bollen had moved to new laboratories in the forest science building, Dr. Anderson was in the radiation center, and food and dairy microbiology moved some of its research to Withycombe Hall.

A FIRST EFFORT

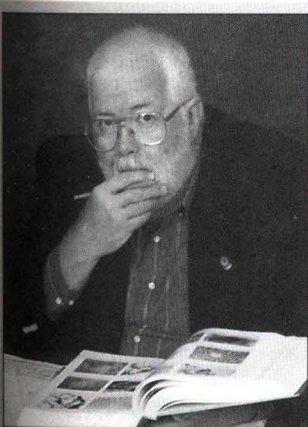
In 1962, the College of Agriculture and the Agricultural Experiment Station established a new priority list for needed space. Microbiology was at the top, together with the Department of Fisheries and Wildlife. Cordley Hall was already scheduled at that time to house botany, plant pathology, and zoology. The plan offered by the College of Agriculture was that an additional wing to Cordley Hall would meet the needs of the microbiology and fisheries and wildlife departments.

With the approval of the college administration, Dr. Elliker had preliminary plans drawn for the new wing to house fisheries and wildlife on two floors and microbiology on three floors. A trip was made to Washington, D.C., that produced a \$600,000 grant from the U. S. Public Health Service and the National Science Foundation requiring state matching funds. However, the request for matching state funds was not included in the final budget request to the state Legislature. Elliker became even more determined to develop a successful proposal in the future.

GAINING SUPPORT

During the next four years, Dr. Elliker continued to lead his faculty in expanding the department's programs through additional staff, grant-funded graduate research appointments and additional courses. One of his techniques to improve the quality of research was to have his faculty pool their returned overhead from research grants. This provided sufficient funds to purchase higher cost items of equipment to support the modern, sophisticated research of all staff. No one researcher would have been able to afford to purchase this equipment.

Dr. Elliker also saw that the department's work received more publicity through college newsletters and publications. Research results prepared by Oregon State University journalists Sam Bailey and Bob Mason were also printed in the college newspaper, *The Daily Barometer*, and the Corvallis newspaper, *The Gazette-Times*. Elliker found a willing reporter from the Corvallis newspaper to write articles about the department's work, well-illustrated with old-time photos of Agriculture



Don Overholser

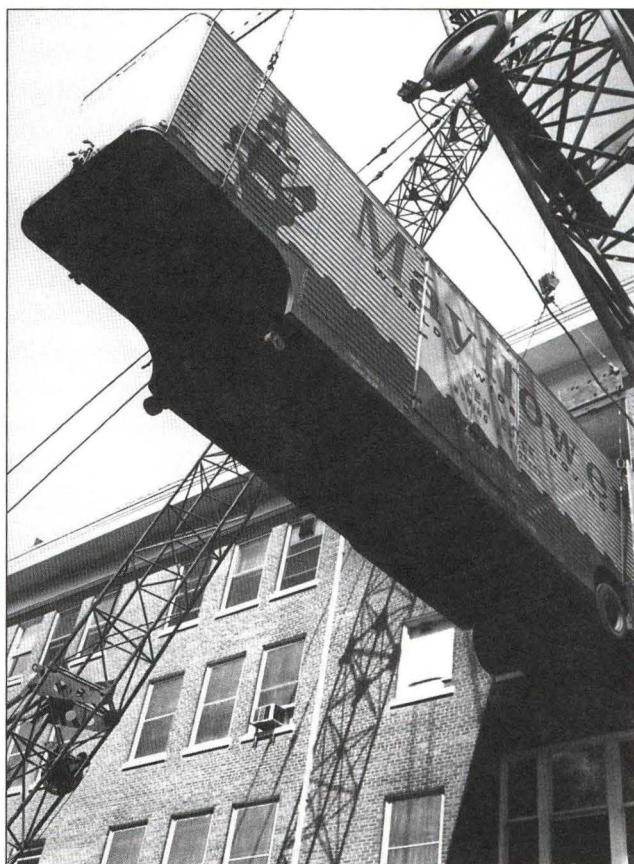


Barbara Overholser

Don and Barbara Overholser

Don Overholser served as chief undergraduate advisor, senior instructor and building manager of Nash Hall. His wife, Barbara, was department office manager and administrative assistant to two chairs—Dr. Paul R. Elliker and Dr. John L. Fryer.

Don, a native Oregonian, served in the U. S. Coast Guard and attended Oregon State University from 1957 to 1961, receiving a bachelor's degree in microbiology. He worked on his master's degree at Montana State University, but left prior to finishing it to accept a position with the Fish Commission of Oregon. He transferred to Corvallis in 1964 to work with Dr. Fryer on research involving the immune response of salmonid fish. In 1965, he transferred to the Department of Microbiology as supervising microbiologist to teach and advise undergraduate students



Moving day, June 8, 1970, with the moving van trailer raised to the fourth floor of Agriculture Hall.

under a courtesy appointment as assistant professor. Don earned his master of science degree at Oregon State University in 1968 and was appointed senior instructor.

Barbara graduated from Oregon State University in 1956 with a business education degree. She was legal secretary to former Oregon Governor A. W. Norblad and for Wendell Wyatt before he became a congressman. She also was secretary to the Oregon State System of Higher Education comptroller and administrative assistant to the mayor of Missoula, Montana. She worked part-time in several office jobs in the Department of Microbiology starting in 1965, eventually becoming office manager.

In 1970, Don supervised the move from Agriculture Hall to Nash Hall. He served as building manager for Nash Hall, where he was challenged by several major crises, including a broken four-inch waterline on the fourth floor that flooded the building, a fire and many power outages. He became an expert on finding emergency power to protect research projects.

In her role as office manager, Barbara kept the department office equipped with the most modern equipment and employed the most up-to-date processes. Under her leadership, the office staff enjoyed an excellent reputation on campus for quality and professional work.

Don and Barbara received numerous awards during their years of service. When they retired in 1992, friends, colleagues and students established the Donald L. and Barbara Gamberg Overholser Endowed Scholarship for the outstanding junior majoring in microbiology.

Hall, together with photos of antiquated features, such as time-warped doorways, floors slanted by weight and emergency fire escape ropes by the windows of the fifth floor attic. "Ramshackle OSU Ag Building Still Jammed With Activity; No Immediate Solution Likely for Dangerous Overcrowding" read one headline.

Elliker also informed Oregon dairy industry leaders about his situation. They lobbied legislators and eventually, Oregon State University President James Jensen, for state funds. Most impressive were several personal visits to the fourth floor office of Dr. Elliker by State Senator Walter Leth, then chairman of the state Legislature Joint Ways and Means Committee.

The result of these efforts came in 1965 when the department received official university approval to proceed with plans for a new building across the street and west of Cordley Hall. This building would house the Department of Microbiology and the Department of Fisheries and Wildlife.

PLANNING AND FUNDING THE BUILDING

With architects Burns, Bear, and McNeil, of Portland, Oregon, and the Oregon State University institutional coordinator Miles Metzger, a building was designed with a ground floor and five additional floors. Since a lift-slab process was followed, approval was gained to pour two extra floors under the roof that could later be raised to provide additional space.

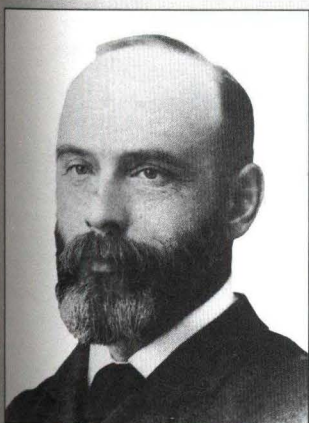
The ground floor, first floor and a portion of the second floor would house the Department of Fisheries and Wildlife, with the Department of Microbiology using the remainder of the building. A total gross area of 105,456 square feet was planned for the six-story building. In the design, large windows were avoided to reduce summer thermal heating. Many energy-saving features were added, making it one of the most energy efficient buildings on the campus. Climate control was also essential for the work of both departments.

Faculty met with architects to prepare detailed plans for research and teaching laboratories, cold laboratories, cold rooms, freezer storage, general media and culture preparation area, washrooms and many other specialty areas. Some fourteen large research laboratories were planned, each with space on one end for graduate student desks and access to other work areas, providing flexibility as future research programs were initiated. The unique design of the highly functional laboratories was later recommended by the National Institutes of Health as a model for other similar structures.

Drs. Elliker and Richard Y. Morita, professor of microbiology, made trips to Washington, D.C., to seek outside funding. Grant applications were made to three federal agencies. Eventually, on August 15, 1967, the U. S. Office of Education made available \$1.2 million for the building. The 1969 state Legislature appropriated the balance of the funds required for construction of a new building with a total cost of \$3.78 million in state and federal funds.

NAMING THE BUILDING

In all preliminary planning and funding, the new building had been temporarily named Bioscience Building. Professor Roland E. Dimick, founder and first chair of the Department of Fisheries and Wildlife, had proposed the name "Nash Hall," honoring Wallis Nash, a former member of the college Board of Regents, a strong supporter of higher education, and a personal friend of Emile F. Pernot, first head of



Wallis Nash

A Neighbor Of Darwin

From 1873 to 1877, Wallis Nash, the namesake of Nash Hall, and his second wife, Louisa, were neighbors to Sir Charles Darwin, the English naturalist who originated the theory of evolution by natural selection. During these years, the Nash family lived at "The Rookery," which stands about one-quarter mile north of the Village of Down in Kent.

Impressions of Darwin were written by Nash in several of his books, describing life in the Darwin household, as well as the character of Darwin. After the Nash family moved to Oregon, Wallis and Darwin exchanged letters until Darwin's death in 1882.

At the dedication of Nash Hall on the Oregon State University campus in 1974, Nash descendants displayed some of these letters and a portrait of Darwin by Louisa Nash.

the Bacteriology Department. Department of Microbiology faculty supported Professor Dimick's proposal. In September 1970, Charles E. Warren, acting head of the Department of Fisheries and Wildlife, presented a proposal to permanently name the building "Nash Hall" to the Oregon State University Building Names Committee.

Following a recommendation from Oregon State University, the Oregon State Board of Higher Education officially adopted "Nash Hall" in recognition of Nash's contributions to the state.

WALLIS NASH

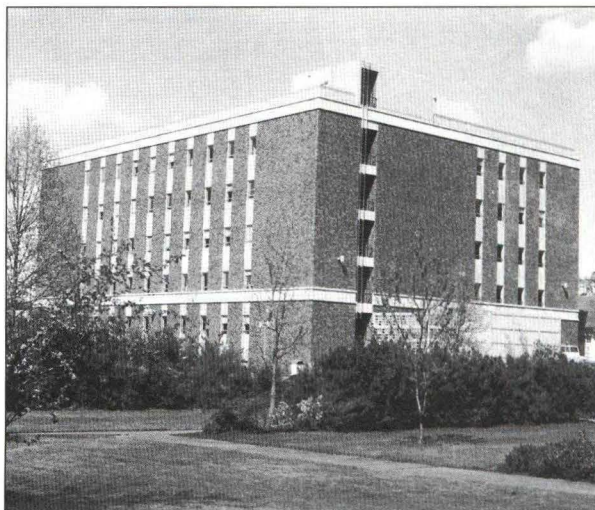
Wallis Nash was born in 1837 in England, and attended the University of London. In 1866, he married Annie Budget, who died three years later during childbirth. He married again in 1871 to Louisa A'Humity Desborough. Nine children were born from this marriage, three girls and six boys.

Nash practiced law in London and co-founded Nash and Field, a firm that exists today as Nash Field and Co. Nash represented Alexander Graham Bell in obtaining patents when Bell introduced the telephone to England. Nash's office received the first long-distance phone call in England from Queen Victoria's summer palace on the Isle Of Wight.

In 1877, Nash met with French bankers interested in acquiring land grants to build a railroad in Oregon. Through the bankers, he met T. Egerton Hogg, a former colonel in the Confederate Army. Hogg planned to build a railroad from Yaquina Bay on the Oregon Coast east to the state of Idaho where it would connect with a transcontinental railroad. In 1877, Nash accepted Hogg's invitation to visit Oregon and review this plan. His observations were published in 1878 in the book *Oregon: There and Back* in 1877, dedicated to his friend and former neighbor, Sir Charles Darwin.

When Nash returned to England, two sons and two daughters died of scarlet fever. This tragedy and the promise of a new life prompted Nash to move his family to Oregon in 1879. The family arrived in Corvallis and settled in a home arranged by Hogg where Waldo Hall now stands on the campus. He filed a homestead near the town of Siletz in the Oregon Coast Range and later built his home for his family, that now included two new sons born in Oregon.

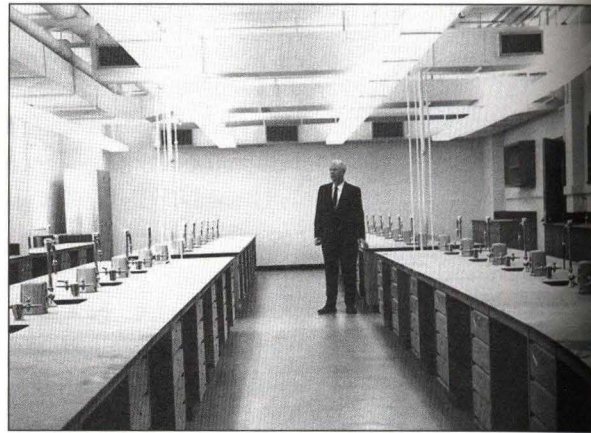
Nash and Hogg completed the railroad from the coast through the Willamette Valley and into the Cascade foothills, but the project ended in bankruptcy after two decades. Nash returned to his law practice, helped the state Legislature write railroad law and wrote another book, *A Lawyer's Life on Two Continents*. From 1885 to 1898, he was on the new Board of Regents of Oregon Agricultural College. He served as temporary president in 1886 and as secretary from 1886 to 1894. In these roles, he helped his friend, Emile F. Pernot, to develop support for bacteriology studies and research. His family contributed money to build what is now Benton Hall. In 1888, he supported establishing the Agricultural Experiment Station. He and Mrs. Nash were largely



Nash Hall, the new home of the Department of Microbiology.

responsible for recruiting Dr. Margaret Snell to Corvallis as the first professor of household economy and hygiene (home economics) on the west coast.

In 1897, Nash moved to Portland. He worked as an attorney, served as president of the Board of Trade, wrote two handbooks for Oregon settlers and was an editorial writer for the *Oregon Journal* newspaper. Nash returned to his coastal home where he died in 1926. The community of Nashville in Lincoln County bears his name as do Nash Crater and Little Nash Crater, both in the Cascade mountains of Linn County near the proposed route of the trans-Oregon railroad.



Dr. Elliker admires one of the new laboratories in Nash Hall.

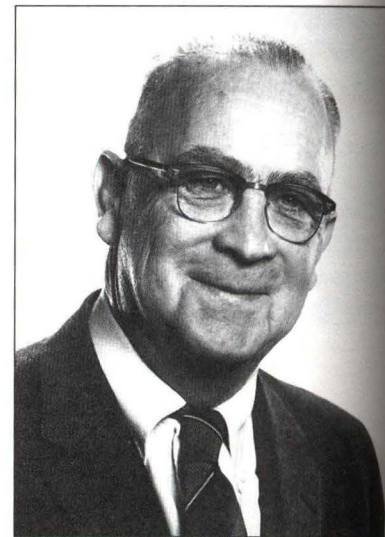
MAKING THE MOVE

Moving arrangements and installation of equipment was a major task. Dr. Elliker appointed Dr. Morita to work with the physical plant staff and the architects for this phase. Don Overholser of the department faculty was named liaison among the department, the university physical plant, and the contractor.

Overholser was also in charge of working with the private moving company to transfer all department materials from Agriculture Hall. Since Agriculture Hall had no elevators and because there was concern about the stairways collapsing from weight, Mayflower Moving and Storage proposed taking out the windows from the fourth floor of Agriculture Hall and hoisting their largest trailers with two large cranes. The trailers were loaded with equipment and supplies before being lowered to the ground and transported to Nash Hall.

Those who remained on the lower floors of Agriculture Hall were heard to breathe a sigh of relief, since the upper floors had visibly sagged with the great weight of microbiology equipment and supplies.

The entire moving operation took twice the projected thirty-six hours of the bid with only minimum breaks for rest by the movers, the crane operators and Overholser. The temperature was near 100 degrees on Saturday, June 6, 1970, when the move started.



Professor Roland E. Dimick, department head of Fisheries and Wildlife, proposed the naming of Nash Hall.

DEDICATION

While an informal open house was held in the fall of 1970, Nash Hall was formally dedicated on April 27, 1974, at an afternoon program attended by faculty, students and friends of the two departments present. Two granddaughters of Wallis Nash attended, adding a historical tie to the past.

The career of Wallis Nash was highlighted by Oregon State University Director of Publications J. Kenneth Munford. Other remarks were made by Betty E. Hawthorne, dean of the School of Home Economics; Wilbur T. Cooney, dean of the School of Agriculture; and Robert W. Krauss, dean of the School of Science. Dedication remarks were presented by Roy Young, university vice president, and acknowledgements were offered by Dr. Elliker as chair of the Department of Microbiology.

A bronze tablet at the entrance to Nash Hall was unveiled, completing the dedication program. The bronze tablet describes the man for whom the building was named:

*"Wallis Nash—1837-1926
Member, first Board of Regents, OAC, 1884-1898
Secretary to the Board 1888-1894
in whose honor Nash Hall
is appreciatively dedicated, April 27, 1974*

Wallis Nash, British-born lawyer, naturalist, merchant, artist and writer, was an early advocate of the land-grant system of public education. With remarkable vision, he recognized the great potential of the people, the institution and the natural resources of the state of Oregon, and so became one of her proud citizens.

Through Charles Darwin, his close personal friend, he brought Henry Moseley, Naturalist of the Challenger Expedition, to survey the agricultural, forest and marine resources of Oregon.

Profound interest in the education of young men and women led Wallis Nash to devote his many abilities to the development of this University, its faculty, and curricula. He was instrumental in establishing programs to serve the people of Oregon and enhance her rich and varied marine and inland resources."

CHAPTER 9

DEPARTMENT OF MICROBIOLOGY • 1968-1999

Both the world and microbiology were changing fast in 1968, and the Department of Microbiology and Hygiene, Oregon State University, Corvallis and the state of Oregon were all changing with it.

Enrollment at Oregon State was 15,794 students. Corvallis had grown to over 35,000, surrounded by populated rural areas. Oregon had passed the 2 million mark in population.

A NEW NAME AND MORE GROWTH

In 1968, a new name, "Department of Microbiology," was officially adopted, dropping "Hygiene" that had been associated with it since 1946. Hygiene courses and faculty were transferred out of the Department of Microbiology.

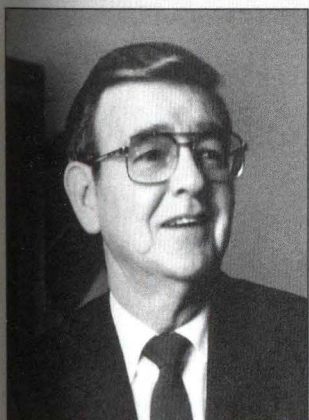
Information prepared by the department faculty for prospective students in the mid-1960s summarized its program and facilities:

"The Department of Microbiology with its able staff and well-equipped laboratories offers a broad program of research and study in both basic and applied fields of microbiology. Major fields leading to master's and doctorate degrees in microbiology include microbial physiology, microbial genetics, molecular biology, and virology, as well as marine, pathogenic, sanitary, soil, dairy and food, and industrial microbiology. Minor fields complementing the major include biochemistry, biophysics, radiochemistry, zoology, cellular biology, genetics, oceanography, botany, food science, soils and environmental health.

Equipment includes two Packard liquid scintillation spectrometers, infrared, visible, and ultraviolet recording spectrophotometers, radioactive tracer laboratories with counters, monitors, and sample preparation facilities, cold laboratories for enzyme research, a 50-liter New Brunswick Fercell Fermentor, electron microscopes, and various types of centrifuges, fraction collectors, and chromatographic and electrophoresis equipment for analytical work.



Dr. Elliker (left) congratulates Dr. Fryer (right) who received the Elizabeth P. Ritchie Distinguished Professor Award in 1972. Dr. Morita looks on.



Dr. John L. Fryer

Dr. John L. Fryer

John L. Fryer was born in Fort Worth, Texas, on July 4, 1929. His father was career navy and the family moved frequently. Fryer completed high school at Washougal, Washington, in 1948. He joined the U. S. Coast and Geodetic Survey, collecting data for nautical charts as a seaman and later as a quartermaster.

In 1950, Fryer enlisted in the U. S. Marine Corps and received both combat infantry and Sea School training. During the Korean War, Fryer served with the 7th Marines in 1950-51, seeing combat in various areas of the Korean Peninsula. On August 30, 1951, he was wounded and returned to the U. S. Naval Hospital, Oakland, California.

Upon release from the hospital in 1952, he enrolled at Oregon State College in 1953. He received a bachelor of science degree in 1956, a master of science degree in fisheries in 1957 and a doctorate in microbiology in 1964, all from Oregon State.

During his studies, he worked as the state fish pathologist for the Fish Commission of Oregon, which later merged with the Oregon Game Commission to become the Oregon Department of Fish and Wildlife. These agencies were and continue to be supportive of his research efforts.

In 1963, Dr. Fryer was invited by Dr. Paul R. Elliker of the Department of Microbiology and Robert M. Alexander of the Agricultural Experiment Station to join the department as assistant professor. Fryer and Karl

An oceanographic vessel specially equipped for biological and chemical research is available for majors in marine microbiology. The department occupies approximately 32,000 square feet of space, most of which is devoted to research."

CURRICULUM

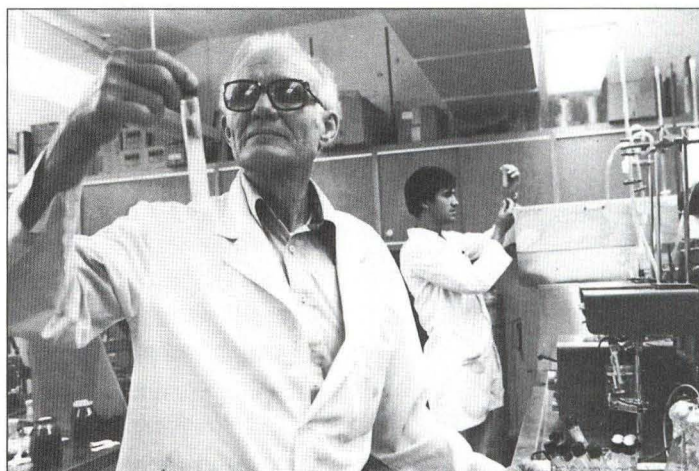
Few changes in the department's curriculum were made from 1968 to 1976. However, in 1974, courses were reorganized in industrial and environmental microbiology, as well as food, dairy, biotransformations and ecology.

RESEARCH

In 1971, Dr. Richard Y. Morita and associates were studying bacteria associated with problems at Upper Klamath Lake in south central Oregon. Activities of man in the area were accelerating the process of creating nutrients in the lake, destroying fish life and impacting aesthetics. Dr. Morita and others also spent sixty-one days in the Antarctic studying cold-loving bacteria. He had first isolated this *Vibrio bacterium* off the coast of Oregon in 1963.

Dr. Arthur W. Anderson worked on possible protein production from grass seed straw, part of a project to find alternatives to open field burning in the Willamette Valley that was facing growing public opposition. An estimated one million tons of straw were being grown annually in the grass seed fields of the Willamette Valley. In late 1971, he started a year of study of food microorganisms at the Meat Research Institute in Bristol, England.

For several years, Dr. John L. Fryer and graduate students developed a fish vaccine to protect northwest salmon and steelhead. The vaccine was administered to fish successfully in the laboratory through the diet and by injection. Other major research continued in food production and dairy microbiology.



Dr. Arthur W. Anderson conducted research on varied topics, including radiation-resistant bacteria and alcohol production from plant materials.

FACULTY CHANGES, 1968-76

After becoming tenured in 1967, Dr. Fryer was advanced to associate professor in 1968. Resignations in 1970 included Associate Professor Dorothy K. Fraser and Assistant Professor Donald A. Klein. New faculty that year included Assistant Professor Ramon J. Seidler in microbial cytology from the M.D. Anderson Hospital and Tumor Institute at Houston, Texas, and Assistant Professor of Microbial Genetics Lyle R. Brown from the University of California, at Davis.

Curtailment of both research and teaching budgets in 1971 led to only a few faculty changes. Instructor Donald D. Curran joined the department. Dr. Arthur W. Anderson took a sabbatical to England.

No major faculty changes were made in 1972. Dr. Fryer was advanced to pro-

S. Pilcher began to study infectious diseases of Pacific salmon. Much of this work was done by thesis research performed by an enthusiastic, outstanding corp of graduate students, many of whom continue to be productive researchers in the field of infectious diseases of fish. Faculty members instrumental in the success of this research program included Cathy Lannan, Drs. Karl S. Pilcher, John S. Rohovec, J. E. Sanders, and James R. Winton.

Dr. Fryer advanced to associate professor in 1970 and to professor in 1973. He was named department chair in 1976 when Dr. Paul R. Elliker retired. He held this position for the next twenty years.

Dr. Fryer participated in the planning and operation of the new \$1.5 million, state-of-the-art Salmon Disease Laboratory east of Corvallis. Dr. Fryer maintained cooperative research projects concerning infectious diseases of fish with numerous countries, principally Japan, Korea, Taiwan, Thailand and Chile. The importance of his research contributions to fish health and the aquaculture industry has been recognized worldwide by national and international awards.

Dr. Fryer retired as professor emeritus December 31, 1994, but remained as department chair until April 1, 1996.

fessor in 1973, and instructors Charles W. Roth and Robert P. Griffiths joined the department, Griffiths as senior researcher. Leo W. Parks took a sabbatical to France. In 1974, Karl S. Pilcher retired as professor emeritus and Charles Hagedorn III was added as assistant professor.

In 1975, Dr. Jo-Ann C. Leong, another future department chair, joined the faculty. Her research and instruction covered animal virology, including vaccines, RNA virus, viral pathogenesis and marine biotechnology. Dr. Lyle R. Brown was advanced to associate professor in that same year.

ELLIKER RETIRES

In 1976, Dr. Paul R. Elliker retired as professor and department chair/head, ending his twenty-nine-year career with Oregon State University, of which twenty-four years were spent serving as chair of the Department of Microbiology. Throughout his final year with the department, he was honored by his colleagues and friends, receiving the Oregon Academy of Science Award Citation for Outstanding Contributions to the Advancement of Science in Oregon. Other awards came to him following his retirement.

FRYER NAMED DEPARTMENT CHAIR

Following Dr. Elliker's retirement, Dr. John L. Fryer was named chair in 1976. As only the sixth department chair in seventy-five years, Fryer assumed the day-to-day administrative responsibilities for the department and the many contacts with other university offices. He also continued his laboratory and field research work, publishing results of his studies and teaching microbiology courses.

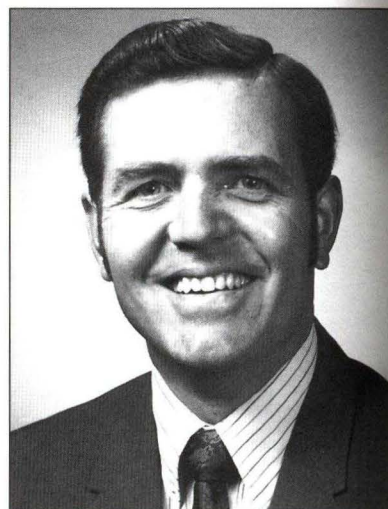
A VISIT FROM MABEL PERNOT

In 1977, soon after Dr. Fryer was appointed department chair, he invited Mabel E. Pernot, a daughter of the first department chair, Emile F. Pernot, to visit the department in its new building. The day following her visit, the seventy-two-year-old Miss Pernot wrote a letter to him:

"... a whole kaleidoscope of mental pictures and thoughts, both nostalgic and refreshing new ones, keep parading through my mind. It was a joy to observe the progress made through the years since the turn-of-the century. Especially the developments from simple humble beginnings to the present complex laboratory equipment and programs in research to aid scientists in their quest for the betterment of mankind and nature. The seriousness of the responsibilities assumed in Microbiology should never be upstaged."

FACULTY CHANGES, 1977-90

In 1977, Charles W. Roth, Robert P. Griffiths and John S. Rohovec became assistant professors, with Griffiths and Rohovec as senior researchers. In 1978, Assistant Professor Adolph J. Ferro, a physiologist, joined the department. He advanced to associate professor in 1981, to professor in 1986 and resigned in 1987. Thomas J. Rogers, an immunologist, was hired in 1978 and resigned in 1981.



Dr. Leo W. Parks served on the Department faculty from 1958 to 1986.



Dr. Jo-Ann C. Leong

Dr. Jo-Ann C. Leong

Dr. Jo-Ann C. Leong was born and raised in Hawaii. She attended the University of Hawaii for two years and then entered the University of California, Berkeley. She received her bachelor of arts degree in zoology and pre-medicine in 1964.

After receiving a scholarship to the Wistar Institute for Biology and Anatomy at the University of Pennsylvania, she worked there on the polio virus. A year later, she returned to California at Stanford Medical School as a senior research assistant. In 1966, she married Oren Leong.

Dr. Leong received her doctorate in microbiology and virology at the University of California San Francisco Medical School in 1971 under the mentorship of Nobel Laureate J. Michael Bishop and Dr. Warren Levinson, who directed her career in medical research. She entered post-doctorate studies in biochemistry, biophysics and cancer research.

She was attracted to Oregon State University by a virologist vacancy in the Department of Microbiology. Dr. Leong liked Corvallis and Oregon's quality of life. She visited the university in 1975 to present a seminar. Dr. Leong was offered the job, but turned it down because her husband was in medical school and they had a two-year-old daughter. Eventually, she accepted the position as animal virologist and assistant professor, arriving in the fall of 1975. She taught classes in virology and immunology. In 1980, she advanced

In 1979, Peter J. Bottomley joined the faculty as assistant professor, advanced to associate professor in 1984 and to professor in 1989. Dr. Arthur W. Anderson retired in 1980 as professor emeritus, ending a thirty-one-year career with the department. Ramon J. Seidler advanced to professor in 1980. In 1982, Assistant Professor Stephan L. Kaattari was added to the faculty and advanced to associate professor in 1988. James R. Winton became an assistant professor/senior researcher in 1982 and resigned in 1986.

In 1983, Assistant Professor Dennis E. Hruby and Instructor Ronald B. Froehlich became additions to the faculty. Froehlich resigned in 1985, but Dr. Hruby advanced to associate professor in 1986 and professor in 1989. John S. Rohovec was hired as associate professor/senior researcher in 1985. Carol M. B. Ramage served as an instructor for the 1985-86 school year.

Associate Professor William G. Dougherty and Assistant Professor Bruce L. Geller were added to the faculty in 1987. Robert P. Griffiths advanced to associate professor/senior researcher in 1987. The addition of Assistant Professor Stephen J. Giovannoni, Assistant Professor Katharine G. Field and Ilsa M. Kaattari as instructor occurred in 1988. Dr. Richard Y. Morita retired that same year. He became professor emeritus, after a twenty-six-year career with the department.

In 1989, Assistant Professor Janine E. Trempey was added to the faculty. Associate Professor Paul W. Reno was hired in 1990 and stationed at the Hatfield Marine Science Center. William G. Dougherty was advanced to professor in 1990.

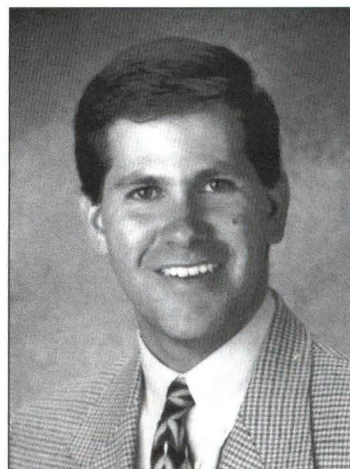
RHODES SCHOLAR

In December 1987, Knute C. Buehler was named the first Rhodes scholar from Oregon State University, one of thirty-two Americans so honored that year. Buehler majored in microbiology and graduated with a bachelor of science degree in 1986.

The Rhodes Scholarship Trust was founded in 1902 by the estate of Cecil Rhodes, a British philanthropist and South African colonial pioneer. The scholarship pays for all university expenses plus a stipend for living expenses while the recipient attends Oxford University in England for two years. The recipient must show both academic and athletic achievement to qualify for the scholarship.

At Roseburg High School, Buehler was all-conference in both football and baseball. At Oregon State University, he lettered in baseball in 1983-84 as a right-handed pitcher.

At Oxford, Buehler majored in politics and economics. He returned to Johns Hopkins to continue medical studies, after which he accepted a residency in orthopedic surgery at Oregon Health Sciences University in Portland, Oregon. He received a fellowship in joint reconstructive surgery at Scripps Clinic in San Diego, California, and in 1997 he began practicing orthopedic surgery in Bend, Oregon.



Knute C. Buehler

CURRICULUM

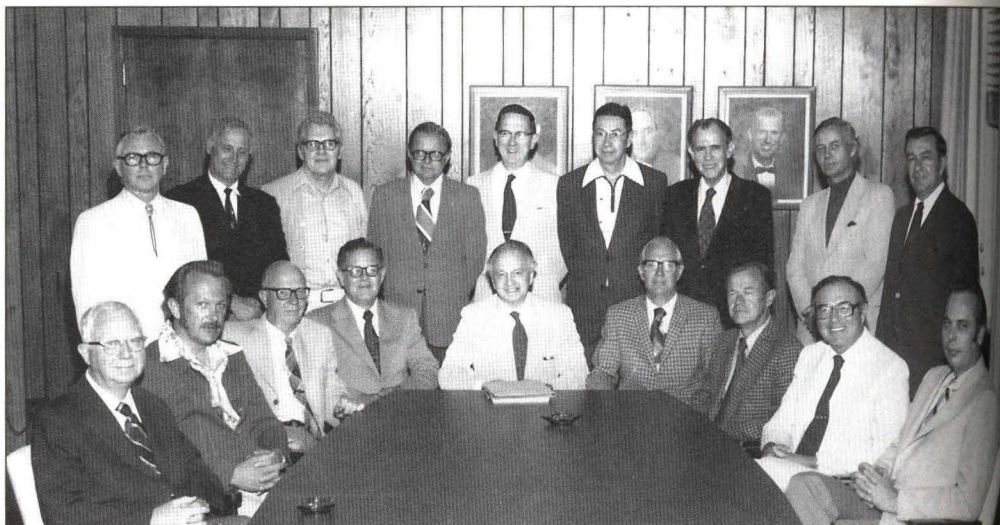
For the 1990-91 school year, new advanced-level courses were added in the department's curriculum. These included courses in research, thesis, reading and conference and projects; molecular plant virology; selected topics in molecular genet-

to associate professor, and the following year, began focusing her attention on viruses of fish.

Her background in virology and molecular biology added greatly to existing research on diseases of fish. Efforts to create vaccines for these diseases have been a big part of her research. Her work has taken her to Japan, Taiwan, China, Europe, Ireland and elsewhere with other department faculty to review viral diseases of fish and viral vaccines. The first recombinant DNA-based subunit vaccine for fish was developed in her laboratory, and the first DNA vaccine for a viral disease in fish was reported in her laboratory in 1966. Her work has produced three patents on fish disease vaccines in the United States and Canada. These patents have been licensed to private companies for production of vaccine.

In 1986, she advanced to professor. In all, fifteen doctoral students and four master of science students have received their degrees with Dr. Leong.

Dr. Leong has received numerous recognitions, including the Oregon State University Alumni Association Distinguished Professor Award in 1991 and the Distinguished Professor Award in 1993, the university's highest award. On April 1, 1996, Dr. Leong, became the seventh chair of the Department of Microbiology, the first woman to hold this position.



Dr. Elliker (third from left seated) sat with his colleagues from the College of Science for the last time as he prepared for retirement in 1976. Dean of Science Robert W. Krauss is seated fifth from left.

ics and virology; microbial cell biology; plant microbic symbiotic interaction; molecular evolution and ecology of microorganisms; molecular and cellular immunity; and current topics in control of gene expression in microbial and/or viral systems.

The 1993-94 university catalog showed the following degree programs:

Undergraduate Major

Microbiology (B.S.) (B.A.)

Minor in Microbiology

Graduate Major

Microbiology (M.A., M.S., Ph.D.)

Graduate areas of concentration

Food and Dairy Microbiology

Immunology and Virology

Microbial Ecology

General Microbiology

Microbial Genetics and Molecular Biology

Pathogenic Microbiology

A complete list of courses in the 1993-94 curriculum shows how courses offered had become more diverse and complex. The only lower division course was introductory microbiology. Upper division courses included general microbiology and laboratory, advanced general microbiology and laboratory, research, reading and conference, seminar, occupational internship, immunology and laboratory, microbial diversity and laboratory, pathogenic microbiology and laboratory, virology and laboratory, food microbiology and laboratory, dairy microbiology, microbial ecology and laboratory, microbial genetics, plasmid biology, and diseases of fish and laboratory.

Graduate courses included research, thesis, reading and conference, seminar, molecular virology, instruction in microbiology, projects, molecular plant virology, selected topics in molecular genetics and virology, microbial cell biology, plant-microbe symbiotic interactions, molecular evolution of cells and organelles, and molecular and cellular immunology.

RESEARCH

During the past thirty years, research has continued to be a vital part of the



Dr. Karl S. "Steve" Pilcher

Dr. Karl S. Pilcher

Karl S. "Steve" Pilcher was born in 1908 in Memphis, Tennessee. He was raised in Washington state and married his wife, Katherine, in 1931. They had two children. He attended the University of Washington where he received his bachelor of science degree in 1932 and his doctorate in 1939.

Following graduation, Dr. Pilcher worked for twelve years with Cutter Laboratories in California, serving as director of research in 1947-51.

He came to the Department of Microbiology in 1951 as an assistant professor to supervise instruction and research in pathogenic bacteriology and virology, as well as medical technology.

Retired Department Chair Paul R. Elliker recalled Pilcher's arrival: "Steve represented a most valuable addition to the staff in every way with his wealth of experience in pathogenic, virology, and immunology. . . He gave up a very responsible and prestigious position as research director at Cutter Laboratories to initiate a much different type of career with modest salary in the Department."

Dr. Pilcher advanced to associate professor in 1952 and to professor in 1956. His research ranged from diseases of fish with Dr. Fryer and others to projects involving animal and fowl viruses. He retired as professor emeritus in 1974 and died in 1982.

Department of Microbiology program. As with graduate courses, the research has evolved into three broad groups: applied and environmental; physiology, metabolism, and genetics; and virology, pathogenic, and immunology.

Research in applied and environmental microbiology focuses on food and dairy microbiology to keep the department a leader in this area. Research in microbial ecology and molecular evolution of cells and organelles are also a part of this research group. With research in physiology, metabolism, and genetics, work has been directed at the broad fields of microbial diversity, microbial genetics, plasmid biology, and microbial cell biology. Finally, research in virology, pathogenic, and immunology has included work in these three areas, as well as diseases of fish, molecular virology, molecular plant virology and molecular and cellular immunology.

OTHER PROGRAMS

Faculty from the Department of Microbiology work cooperatively with other university departments and many hold adjunct appointments. Research is conducted with biochemistry and biophysics, botany and plant pathology, genetics, veterinary medicine, food science and technology, and fisheries and wildlife departments.

All microbiology faculty are active members in the Oregon State University Center for Gene Research and Biotechnology. The center includes all highly qualified scientists who use techniques of molecular and classical genetics, as well as protein and nucleic acid chemistry. The center includes a central services laboratory with modern equipment available for faculty and students working with molecular biology.

The Molecular and Cellular Biology program is a new interdisciplinary graduate program that integrates recent advances in methods and instrumentation to solve problems in both basic and applied biology. More than forty active research faculty participate in this program from many departments in the university.

FACULTY CHANGES, 1991-98

Don Overholser retired as senior instructor emeritus in 1992. Stephan L. Kaattari was advanced to professor in 1992 and resigned in 1993. Ilsa M. Kaattari was advanced to senior instructor in 1992 and resigned in 1993. In 1993, Bruce L. Geller and Stephen J. Giovannoni were advanced to associate professor. Susan M. Williams was hired as an instructor that same year and advanced to senior instructor in 1995. Jeri Bartholomew was hired as instructor/senior researcher in 1994 and advanced to assistant professor/senior researcher in 1995.



Oregon State University's reputation in Pacific salmon disease research led to Dr. Fryer (back row, third from right) attending the First International Conference on the Biology of Pacific Salmon, held in Russia in 1978.



Helen A. Hays

Helen A. Hays

One of the more unique individuals to contribute to the Department of Microbiology is Helen A. Hays, who has been associated with the department for more than forty-five years.

She received a bachelor's degree in bacteriology in 1940 from the University of Illinois and spent a year working at the Mayo Clinic in Rochester, Minnesota. She returned to Illinois as a bacteriologist with the State Department of Public Health Laboratory from 1943 to 1948. Helen worked for the Klamath County Health Department before moving to Corvallis in 1952.

She began graduate classes in microbiology at Oregon State University while working part-time as a technical assistant to Dr. Paul R. Elliker in his dairy research projects, working with cultures and testing germicides used in sanitation. She became a Microbiologist II in 1955 and received her master of science degree in 1956. Other assignments included undergraduate student advising and teaching a microbiology course for non-majors. Helen retired from the department in 1981.

In 1990, she and her husband, Dale, established the Helen Alford Hays Women in Microbiology Scholarship, for undergraduates at Oregon State University and offering a first priority for women. The scholarship now offers two or three partial scholarship awards annually.

Professor William G. Dougherty resigned in 1995 and William E. Sandine retired as distinguished professor emeritus in 1996. Associate Professor Robert P. Griffiths also retired in 1996.

During 1997, Dr. Anthony J. Vella came to the department as an assistant professor to work in immunology, and Dr. Daniel D. Rockey joined the faculty as assistant professor in human health. In addition, two faculty members transferred in 1997 to the Department of Microbiology from the Department of Agricultural Chemistry. Dr. George F. Rohrmann joined the microbiology faculty as a professor, and Dr. L. Walter Ream transferred as an associate professor. Dr. Theo Dreher joined the faculty as professor in 1998, also from the Department of Agricultural Chemistry, and Instructor Susan M. Williams resigned.

DR. JOHN L. FRYER RETIRES

On December 31, 1994, Dr. John L. Fryer retired as chair of the Department of Microbiology, but he remained until March 31, 1996, when his replacement was appointed.

As department chair, Dr. Fryer had guided the department while becoming a world leader in research of infectious diseases of fish. His colleagues from Oregon State University and research institutions from throughout the world, including many of his former graduate students, honored him at a banquet.

Today, Dr. Fryer serves as distinguished professor emeritus of microbiology and director of the Center for Salmon Disease Research. In this role, he continues to write and work in his field of diseases of fish.

DR. JO-ANN C. LEONG APPOINTED CHAIR

On April 1, 1996, Dr. Jo-Ann C. Leong, distinguished professor of microbiology and a member of the department faculty since 1975, was appointed chair of the Department of Microbiology. She is the seventh department head and chair and the first woman to hold this position.

DEPARTMENT FACULTY TODAY

Research Faculty

Over the years, research faculty have been selected either to enhance or expand an existing research program, or to bring new expertise to the department for new programs. In addition to teaching advanced courses, faculty are expected to direct and advise the work of graduate students, to conduct their own research in their field and to publish results of their work.

Current Faculty includes Dr. Jo-Ann C. Leong, distinguished professor and department chair; professors Peter J. Bottomley, Lyle R. Brown, Theo Dreher, Dennis E. Hruby, and George F. Rohrmann; associate professors Bruce L. Geller, Stephen J. Giovannoni, L. Walter Ream, Paul W. Reno, and Janine E. Trempey; and assistant professors Jeri Bartholomew, Katharine G. Field, Daniel D. Rockey, and Anthony J. Vella.

Instructors

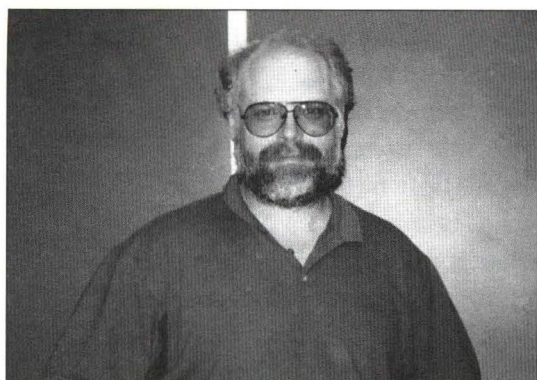
A variety of assignments are performed by instructors in the department. They

teach introductory microbiology courses, including lectures and laboratories for students from all colleges on the campus. They may also teach selected microbiology laboratory classes for upper-division students in the department. Other assigned duties may include advising students, assisting with recruitment and registration and serving on department, College of Science and university committees.

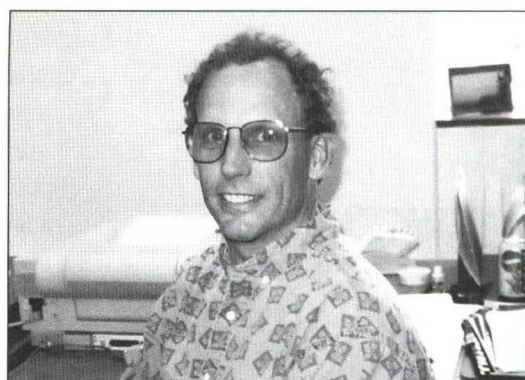
The current instructor is Dr. Mary E. Burke.

Other Staff

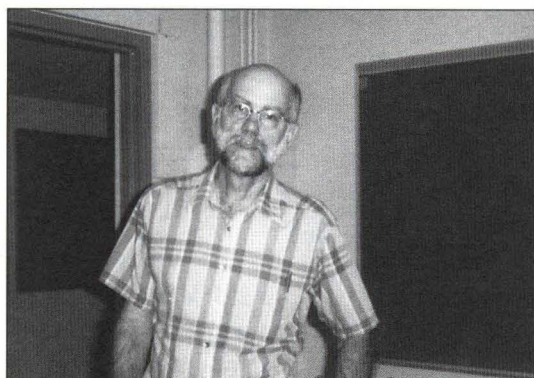
Many others support the research and educational programs of the department. These include research associates, research assistants, graduate students, postdoctorate students and visiting professors. In addition, there are classified employees who provide the administrative support that keeps the department operating efficiently.



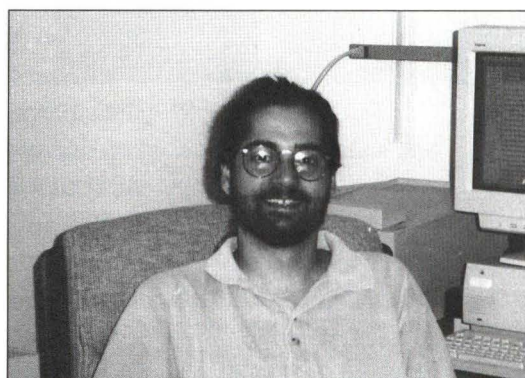
Dr. L. Walter Ream



Dr. Daniel D. Rockey



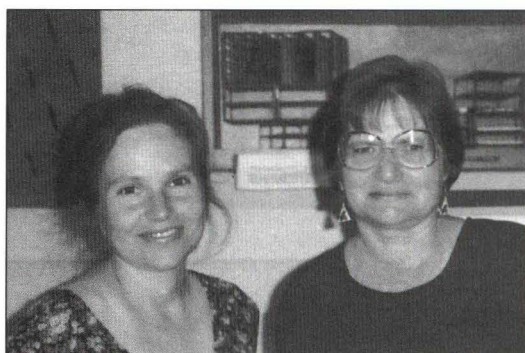
Dr. George F. Rohrmann



Dr. Anthony J. Vella



Dr. Katharine G. Field



Dr. Susan M. Williams (left), former instructor, and Dr. Mary E. Burke, instructor.

CHAPTER 10

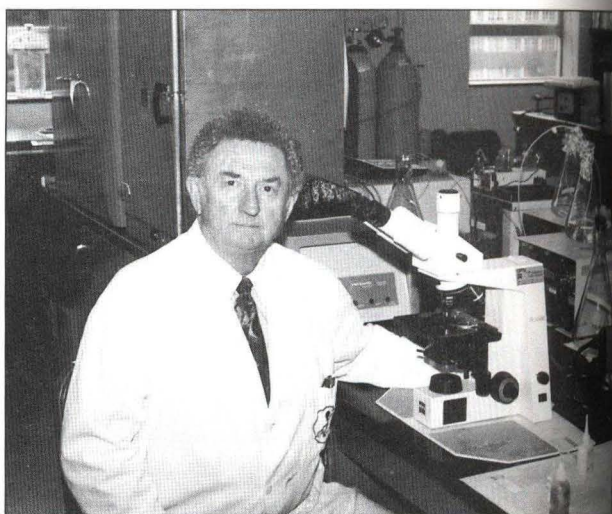
APPLIED AND ENVIRONMENTAL RESEARCH

Microbiology research at Oregon State University began with projects that searched for specific answers to immediate problems. In his first reports, Emile F. Pernot focused on problems of goat and hog diseases, fungus in wheat and poultry diseases. Because the department had been created as a service department to the other agriculturally oriented schools, the direction of research for these early years was in applied and environmental research.

In later years, the department broadened its research programs to include basic research and more specialized projects in cooperation with other sciences. In recent years, important discoveries were made by Dr. Arthur W. Anderson in identifying and naming radiation-resistant bacteria, "red bug" (*Micrococcus radiodurans*), and in finding uses for straw wastes. Today, the environmental and applied research continues to be a major part of the department's research program.

DAIRY AND FOOD MICROBIOLOGY RESEARCH

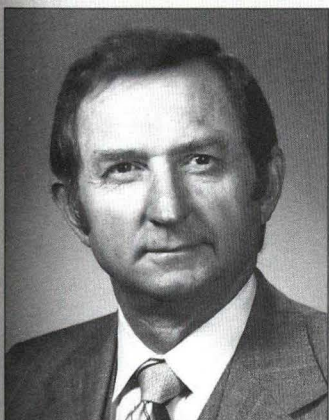
Microbiology research in dairy and food production has long been a major part of the university's program, particularly under the initial direction of Dr. Paul R. Elliker, and then with the leadership of Dr. William E. Sandine until his retirement in 1996. The foundation for the reputation of the department came from published results of this research and the technical assistance that department staff were able to offer the dairy industry.



Dr. William E. Sandine

Current research is in five different areas:

1. Use of ribosomal RNA probes to isolate new strains of *Lactococcus cremoris* from nature.
2. Development of enzyme and genetic probes to enumerate bifidobacteria in fermented dairy products.
3. Characterization and use of *Propionibacterium bacteriocins* (Microgard™) to extend the shelf life of perishable refrigerated foods.



Dr. William E. Sandine

Dr. William E. Sandine

Dr. William E. "Bill" Sandine completed his undergraduate studies in Iowa State College and his master's work at North Carolina State University, receiving his degree in 1955. During his graduate studies, he became aware of the international reputation of Dr. Paul R. Elliker in food and dairy microbiology. He met Dr. Elliker at a professional gathering and was encouraged to come to Oregon State University in 1955.

In 1958, he obtained his doctorate at Oregon State University in physiology and taxonomy of lactic acid bacteria. He was appointed instructor for the department in 1958 and in 1959 completed post-doctoral studies in microbial physiology at the University of Illinois. He returned to Oregon State University in 1959 as assistant professor to assume part of Dr. Elliker's research and teaching program in food and dairy microbiology. In 1962, he advanced to associate professor and to professor in 1966.

After a year as assistant to the director of the Agricultural Experimental Station, he returned to the department in 1968. During the next several decades, Dr. Sandine developed a productive research program in dairy microbiology, first with the help of Dr. Elliker and later on his own. His work led to a number of patents. He developed MicrogardTM, a shelf-life extender for refrigerated foods, such as cottage cheese, sour cream and yogurt. The product was

4. Studies on the genetics of *Leuconostoc* and ways to improve them for use in manufacture of fermented dairy products.
5. Design of new bulk starter media for use by the fermentation industry to grow bacteria for inoculation of food products, especially milk for the manufacture of cheese.

The Department of Microbiology is planning to recruit a new staff person to manage the food and dairy microbiology research.

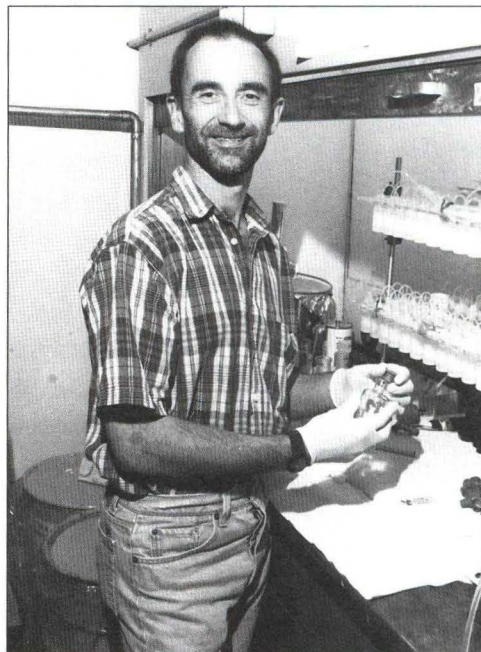
ENVIRONMENTAL MICROBIOLOGY RESEARCH

Research in the area of environmental microbiology includes microbial ecology, bioremediation and microbial diversity. This work is conducted by Dr. Peter J. Bottomley.

Current studies are directed at the process of nitrogen fixation as it occurs in legume rhizobia symbiotic associations. Special focus is on the population diversity and ecology of soil populations of *Rhizobium leguminosarum*. A second research area is the influence of soil physical characteristics on microbiology mediated transformations of xenobiotic compounds.

This research has highlighted a subpopulation of *Rhizobium leguminosarum* that is a highly successful ecotype distributed widely throughout Oregon and has not been found when screening strains in international populations. The research is examining the relative importance of differences in the physical adsorptive characteristics and microbial population differences of the surface and subsurface soil.

Research in this area is designed to help modern day agriculture meet its goal of increasing or sustaining crop productivity while maintaining the quality of the environment. With growing concerns and criticism on the use of chemicals used in agriculture, this research will help determine the validity of these concerns. While much research has shown that many chemicals may be degraded by soil microorganisms, some chemicals may escape the soil environment without being degraded.



Dr. Peter J. Bottomley

MOLECULAR EVOLUTION AND ECOLOGY OF PROKARYOTES RESEARCH

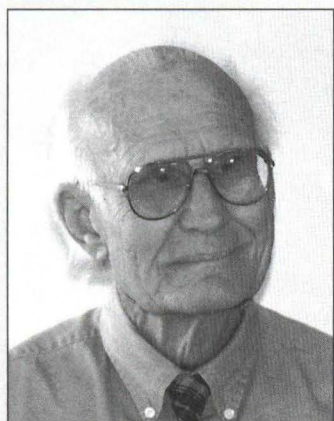
Within this area of microbiology research, attention is directed at molecular evolution, ribosomal RNA and microbial ecology. Specific focus is on the genetic diversity of marine and freshwater bacterioplankton. This research is being done by Dr. Stephen J. Giovannoni.

The goal of this research is the adaption of molecular evolution theory to analyses of the distributions and activities of prokaryotes in nature. Financial support for this project comes from the National Science Foundation's Joint Global Oceans Flux Studies program. Faculty is undertaking a long-term study to investigate dynamic

patented and licensed to an Oregon company. He also developed a new method for growing bacteria that was patented.

In 1974-75, Dr. Sandine traveled to New Zealand on a sabbatical to work with the country's dairy industry. In 1983, he received an honorary doctorate (Doctor Honoris Causa) from the National University of Tucuman in Argentina.

In 1994, Dr. Sandine received the Oregon State University Distinguished Professor Award, the university's highest award for faculty. He retired as professor emeritus in 1996 and moved to California. At the time of his retirement, he was the senior faculty member of the department and had published more than 200 professional papers.



Dr. Arthur W. Anderson

Dr. Arthur W. Anderson

Dr. Arthur W. "Andy" Anderson was born in 1914 in Lisbon, North Dakota, and completed his undergraduate work at North Dakota State College in 1943. He was a commanding officer of a ship in the U. S. Navy during World War II.

Following his discharge, he obtained a master of science degree in 1947 at the University of Wisconsin, majoring in dairy microbiology and chemistry. For two years, he conducted research on bacterial nutrition and vitamins under a fellowship awarded by the University of Wisconsin Alumni Research Foundation.

changes in oceanic microbial populations, and their influence on carbon flux in the open ocean. The research has led to the discovery of a new group of organisms that live in the open ocean just beneath the photic zone.

In other projects, faculty also is studying bacterial diversity in Oregon's freshwater systems, and the biodiversity of lactucci, used for the manufacture of cheeses.

Research in these areas is important because the biochemistry of natural ecosystems is a key issue of international concern and study. Work at Oregon State University is contributing significantly to resolving the activities of specific bacterioplankton species.

THE SOURDOUGH BREAD INCIDENT

During the late 1960s, Department Chair Paul R. Elliker received a phone call from the Western Regional U. S. Department of Agriculture Laboratory at Albany, California. The laboratory had isolated organisms from the unique and world-famous San Francisco sourdough bread. The Oregon State University Department of Microbiology was asked to identify the sourdough bacillus.

Professors William E. Sandine and Arthur W. Anderson were assigned to plan the project. They developed a conservative budget of \$49,190 and research began.

Several major San Francisco newspaper columnists heard about the project and protested that the research would rob San Francisco of one of its unique secrets—what makes the sourdough bread taste so good. They also wondered why if such a project was necessary was it being done out-of-state in Corvallis, Oregon?

A San Francisco baker wrote that "to most San Franciscans, the city's sourdough French bread is as popular as its cable cars, is becoming as popular a San Francisco export as topless dancing, which also started here. Soon, the special flavor of the bread may be exported around the world in test tubes."

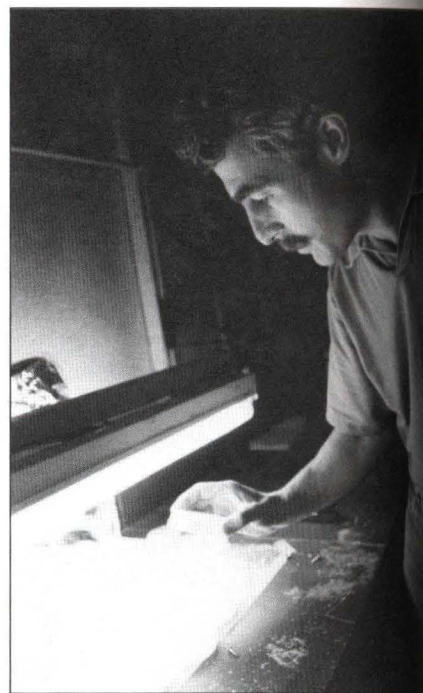
One columnist wrote:

"It could be, so perversely do events move these days, that one day the best San Francisco French sourdough bread will be obtainable only in Corvallis, Oregon."

Time magazine picked up the story, Dr. Elliker recalls, and criticized the cost of the study in its prominently displayed column, "The Nation," between features on Richard Nixon, Spiro Agnew and New York Mayor John Lindsay. That caused a flood of critical letters to the Department of Microbiology, Oregon State University, the U.S. Department of Agriculture laboratory, and the U. S. Secretary of Agriculture.

The Department of Microbiology responded to its critics with a "white paper" that gave the brief history of the project, a reminder of its original objectives and a review of benefits of past research. The furor soon died.

The research on the sourdough bacteria was successfully completed. The bacterium was identified as a new species, *Lactobacillus sanfrancisco*, one that could be used safely in food manufacture with no hazard to the consumer.



Dr. Stephen J. Giovannoni

In 1949, he joined the faculty at Oregon State University, completing his doctorate there in 1952. He served for a year as assistant professor at the University of California at Berkeley. Dr. Anderson returned to Oregon State University in 1953 as assistant professor, advanced to associate professor in 1961 and to professor in 1964.

Dr. Anderson taught classes in food microbiology and other topics, in addition to his research. One major project involved the first isolation, naming and initial research on radiation-resistant bacteria, *Micrococcus radiodurans*. For this work, he received the Basic Research Award from the Agricultural Research Foundation at Oregon State University in 1959 and the Governor's Northwest Scientist Award in 1962. This work led to his providing cultures and research advice throughout the world, and participating in science conferences in Sweden, Austria and Russia. Dr. Anderson spent two postdoctoral sabbaticals in England during his twenty-five-year career with the department.

His research included converting waste straw remaining after harvesting grass seed in the Willamette Valley into proteins, making alcohol from plant materials such as straw and producing cooking gas from swine manure. Just before retiring, he was in the news with the growing national interest in "gasohol." He was the author and co-author of some 150 professional papers.

Dr. Anderson retired in 1980 as professor emeritus. After moving to Salem, Oregon, he continued his research on using straw to grow mushrooms commercially.

JAMES M. CRAIG MEMORIAL LECTURES

Since 1987, the Oregon State University Department of Microbiology, the Department of Food Science and Technology and Oregon State University College of Veterinary Medicine have sponsored the James M. Craig Memorial Lecture in Applied and Environmental Microbiology. This annual fall lecture is supported by contributions from Dr. Craig's wife, Reva, and two sons, Leland Craig (DDS, Manhattan Beach, California) and Morrie Craig (Ph.D., Professor of Veterinary Medicine, Oregon State University).

Each year, a committee, chaired by Dr. John L. Fryer and representing the three departments, invites a speaker to the university whose research focuses on applied microbiology in areas similar to those pursued by Dr. Craig. Other committee members include Norman Hutton, Department of Veterinary Medicine, and Floyd Bodyfelt, Department of Food Sciences.

James Morrison Craig was born in Drayton, North Dakota, in 1916. He received his bachelor of science degree from San Jose State University in 1938, his master's degree from Stanford University in 1948 and his doctorate from Oregon State University in 1960. He was professor of microbiology at San Jose State from 1948 until his death in 1985.

Dr. Craig was an outstanding scientist and educator, devoted to teaching and research in microbiology. He was recognized internationally for his work on botulism and for his many contributions to applied microbiology.

Guest lecturers have included Dr. Mel W. Ecklund, National Marine Fisheries Service, Seattle, Washington; Dr. Leroy E. Hood, Bowles professor and chairman, Division of Biology, director of the Cancer Center, California Institute of Technology, Pasadena, California and member of the National Academy of Sciences; Dr. Flossie Wong-Stael, chief, Molecular Genetics of Hematopoietic Cells Section, National Cancer Institute, Bethesda, Maryland; Dr. Michael P. Doyle, Food Research Institute, University of Wisconsin, Madison, Wisconsin; J. Michael Bishop, M.D., director of the G. W. Hooper Research Foundation and 1989 winner of the Nobel prize in physiology, University of California, San Francisco and member of the National Academy of Sciences; Dr. Norman Pace, Department of Biology, Indiana University, Bloomington, Indiana and member of the National Academy of Sciences; Dr. Bernard N. Fields, Department of Microbial and Molecular Genetics, Harvard Medical School, Cambridge, Massachusetts and member of the National Academy of Sciences; and Dr. Todd R. Klaenhammer, director of the Southeast Dairy Foods Research Center, North Carolina State University, Raleigh, North Carolina.

CHAPTER 11

PHYSIOLOGY, METABOLISM, AND GENETICS RESEARCH

Much of the microbiology research undertaken at Oregon State University in physiology, metabolism and genetics is basic research. It may be independent or it may support another field of research within the department or university.

Starting in 1962, the department began research in marine microbiology that led to the discovery of cold-loving bacteria. Research in microbial genetics had been conducted at Oregon State University for some time, but it expanded greatly starting in the 1970s.

CONTROL OF GENE EXPRESSION RESEARCH

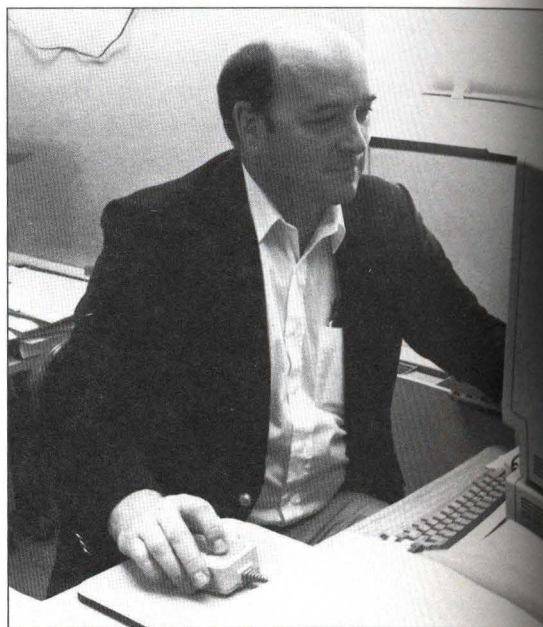
This important area of microbiology research includes studies on gene expression, transcription and gene transfer. The work is being done by Dr. Lyle R. Brown.

Research is focused on three areas of interest:

1. Analysis of mechanisms controlling the expression of nitrogen fixation genes of *Rhizobium meliloti*.
2. Integrated global control of genes induced in response to changes in respiration during anaerobic growth (growth where there is no air or free oxygen) in *Escherichia coli*.
3. Modification of the alfalfa nodulation response by introduction of a foreign dominant gene into transgenic plants.

Research has shown that redox control, carbon sources, metabolism rate and nitrate repression all alter the steady state levels of foreign gene expression during anaerobic growth. When coupled with knowledge on the mechanisms of gene regulation during growth transitions, this knowledge may provide targets for the design of new classes of antibiotics.

This research will provide key information on the mechanism used to integrate gene expression control during changes in environmental conditions. It will also provide insight into the role of plant hormone productions on the forming of plant-bacterial interactions.



Dr. Lyle R. Brown



Dr. Lyle R. Brown

Dr. Lyle R. Brown

Dr. Lyle R. Brown, a fifth-generation Oregonian, was born in Burns, Oregon. He attended Willamette University and Tulane University in New Orleans. He completed post-doctorate work at the Department of Bacteriology at the University of California, Davis, and worked two years in the departments of biochemistry and biophysics.

Dr. Brown came to Oregon State University in 1970 as assistant professor to direct the Microbial Genetics program in the Department of Microbiology. He advanced to associate professor in 1976 and to professor in 1986. For the first ten years, Dr. Brown did basic research. He later helped develop the concept of working partnerships between universities and industrial organizations, although this concept was first used at other universities before it was applied at Oregon State University.

Much of his work defines genetic switches that cause genes to be turned on or off under all growth conditions. He also contributes to studies of molecular structure of enzymes. He does significant work on the plant genetic engineering project that he undertook outside of the university.

Dr. Brown serves as a consultant for the National Institutes of Health to review grant requests. He travels internationally, including four months on a nitrogen-fixation research project in Ireland.

RESEARCH ON BACTERIOPHAGE INFECTION AND LACTOCOCCAL VACCINES

Research in this area of microbiology centers on lactococcal phages, and the use of lactococcus as a delivery system for vaccines. The studies are being done by Dr. Bruce L. Geller.

Researchers also are looking at the mechanism of phage infections in the gram positive bacterium *Lactococcus lactis*. They have cloned and sequenced a gene from *Lactococcus lactis* that is required for phage infection. The goal of this project is to reconstruct strains of *L. lactis* to be phage-resistant, without adversely affecting their viabilities and fermentation characteristics.

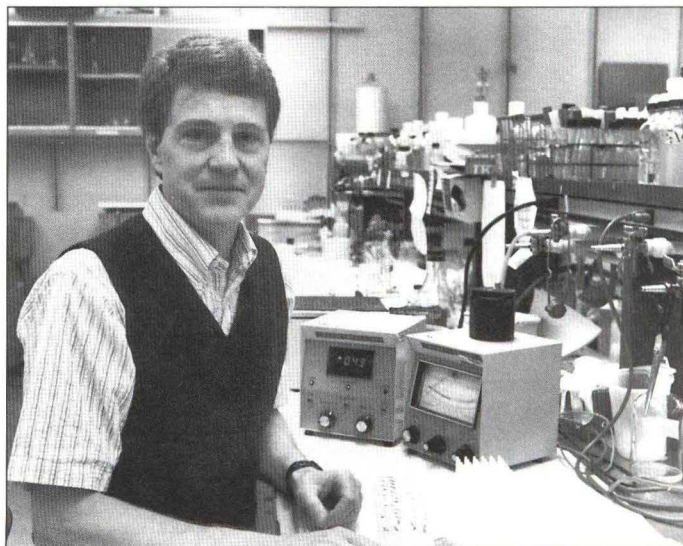
Bacteriophage infection of *L. lactis* is a major problem in fermented dairy foods. Overcoming this problem will be helpful in reducing losses.

Researchers also are attempting to genetically reprogram lactococcus to express antigens from pathogenic microorganisms. The reprogrammed lactococcus are being tested in animals as vaccines.

MICROBIAL GENETICS AND MOLECULAR MICROBIOLOGY

This research program includes studies on bacterial stress responses and the molecular genetic mechanisms (e.g. gene transcription, post-translational modifications) regulating gene expression as it relates to these responses. This work is being done by Dr. Janine E. Trempey.

Focus of the program is to analyze molecular mechanisms which permit cells to respond to, then recover from, environmental stresses and to correspondingly analyze



Dr. Bruce L. Geller

how these adaptation responses might influence the health of humans. Environmental stresses examined in this analysis include extreme temperatures, changes in air quality and moisture content, exhaustion of nutrients and exposure to DNA damaging agents such as certain chemicals or ultraviolet light.

Several practical applications have developed from this research including engineering of bacterial strains for their use as cloning hosts in biotechnology applications; cloning of genes involved in pathogenic mechanisms and the subsequent use of their gene products for vaccine development; engineering bacterial strains for their use in probiotic food applications; and developing novel biopolymers, using molecular genetic approaches, for their use as natural food thickeners and stabilizers.

RESEARCH PATENTS

When research by Oregon State University staff results in a product or process that has commercial application, it may be patented by the university. Since

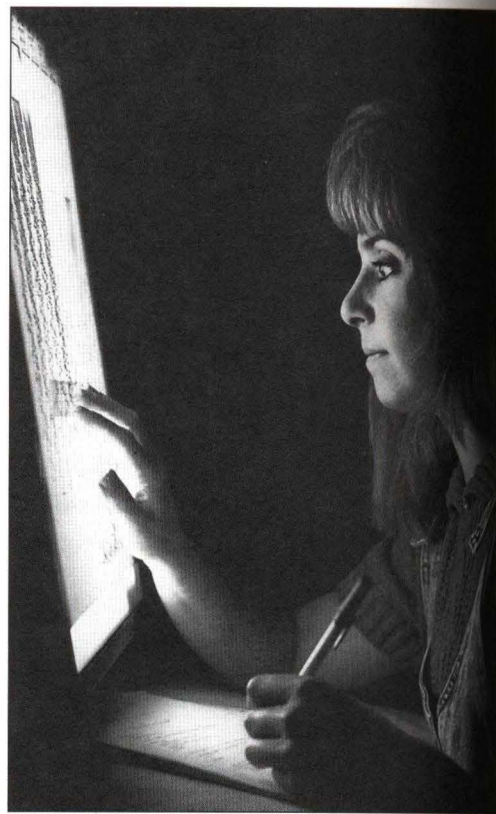
the university cannot compete with private enterprise in the manufacturing of the product or sale of the process, Oregon State University licenses the right to use the fruits of its research to private businesses.

The agreement between the university and the private business usually calls for a royalty, based on net sales, to be paid to the university. Of this royalty, 40 percent goes to fund the Technology Transfer program, 30 percent to the department and 30 percent is shared by the inventors.

Patents by current and former staff of the Department of Microbiology were among the first applied for at Oregon State University. Department of Microbiology staff have had the most patents issued to date of any university department.

Dr. William E. Sandine has received twenty-one patents and two patents have been awarded each to Dr. John L. Fryer and Dr. Lyle R. Brown. Dr. Jo-Ann C.

Leong has three patents, former department faculty member Dr. William G. Dougherty has two patents, and Dr. Paul R. Elliker and Dr. Adolph J. Ferro each have one patent. Patents are pending for Dr. Dennis E. Hruby and Dr. Stephen J. Giovannoni, and former faculty member Dr. Stephan L. Kaattari.



Dr. Janine E. Trempy

FUTURE RESEARCH

Increasing interest in gene expression and molecular genetic mechanisms will keep these studies a major part of the department's research program in the future.

CHAPTER 12

PATHOGENIC MICROBIOLOGY, VIROLOGY, AND IMMUNOLOGY RESEARCH

Growth of much of this area of microbiology research at Oregon State University began in the 1950s. It was then that cooperative research began with the former Fish Commission of Oregon and the Oregon Game Commission to study infectious diseases of Pacific salmon and other species of fish and shellfish. This research program transferred to the university in the early 1960s.

Research on diseases of fish is important, both from an economic and environmental standpoint. In addition, certain species or strains of feral fish are listed as endangered species. The diseases being studied may cause major mortality of fish, most of which are important commercial species.

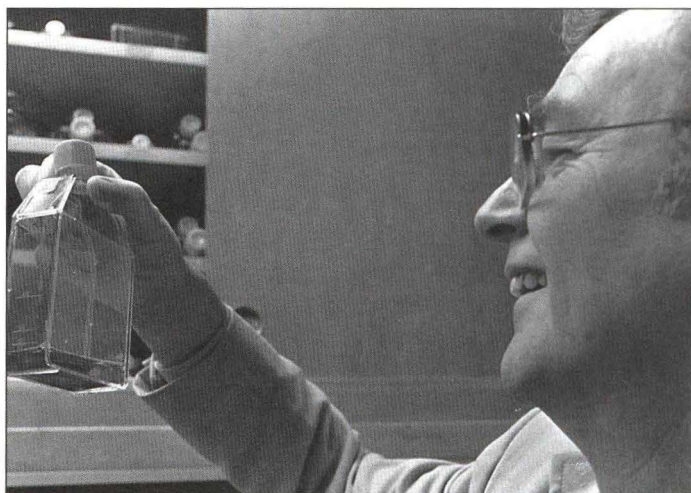
Today, research in pathogenic microbiology, virology and immunology is a major part of the department's program.

INFECTIOUS DISEASES OF SALMONID FISH

For over thirty-five years, the department has researched infectious diseases of fish, emphasizing diseases caused by bacteria and viruses, and the methods for their prevention and control. This effort has made the department a leading research institution in this field, bringing it international attention and recognition. The research was brought to the Department of Microbiology in 1963 by Dr. John L. Fryer when he transferred from the former Fish Commission of Oregon to the Department of Microbiology. Dr. Fryer directed the program until he retired in 1996. Robert W. Schoning, then director of research and later director of the Fish Commission of Oregon, was the major force in this move.

Richard Holt has worked with Dr. Fryer since 1967 on infectious diseases of fish.

Holt, a senior fish pathologist with the Oregon Department of Fish and Wildlife, was assigned to research at Oregon State University. His research work began when he was a graduate student working on his master of science and doctorate degrees. He then became a full-time research assistant with the Department of Microbiology. Finally, he was a research pathologist with the Oregon Department of Fish and



Dr. Fryer led research on diseases of salmonid fish, bringing international fame to OSU.



Salmon Disease Lab

Salmon Disease Laboratory

Dr. John L. Fryer transferred to Oregon State University his fish disease research from the former Fish Commission of Oregon in 1963. Soon, that agency and the Oregon State Game Commission (since merged as the Oregon Department of Fish and Wildlife) funded construction of a Fish Disease Laboratory at Oregon State University that operated from 1967 until 1990.

In 1990, a new Department of Microbiology Salmon Disease Laboratory was completed on the east side of the Willamette River just outside Corvallis, designed to study diseases of salmonid fish. This \$1.5 million state-of-the-art facility was funded by the Bonneville Power Administration and constructed in cooperation with the university. The 6,000-square-foot laboratory is equipped with tanks of different sizes so that large numbers of experimental animals may be held for their entire life cycle. Controlled water supply, an ancillary dry laboratory, office space and a small conference room complete the facility. With its studies on freshwater species, the Salmon Disease Laboratory at Corvallis complements studies of saltwater species conducted at the Hatfield Marine Science Center at Newport, Oregon.

Since opening in 1990, the laboratory has been visited by scientists from throughout the world, representing Japan, South Korea, Peoples Republic Of China, Taiwan, Thailand, India, Egypt, United Kingdom, Ireland, Norway, Chile and Canada. Donald G. Stevens has been manager of the laboratory since it opened.

Wildlife at Corvallis, supervising the department's fish pathology program.

Much of this research has been directed toward *Renibacterium salmoninarum*, the causative agent of bacterial kidney disease in salmonids. Development of a vaccine for immunization of the fish in hatcheries has been a major result of these studies. Cooperative work has been conducted with scientists in Ireland, Japan, Taiwan and Korea.

Other research on infectious diseases concerns the life history of the parasite, *Ceratomyxa shasta*; the epizootiology of infectious hematopoietic necrosis virus; and more recently, the discovery and identification of a rickettsia, which has been named *Piscitrickettsia salmonis*. This is the first rickettsia isolated and described from fish.

Dr. John S. Rohovec, who worked with Dr. Fryer for many years, devoted his research to the viral disease erythrocytic inclusion body syndrome, infectious hematopoietic necrosis virus, gliding bacteria and the immune response in fish. Dr. James R. Winton is another major long-time contributor to work in the fish disease laboratories. Winton, currently with the Northwest Biological Science Center in Seattle, Washington, continues to be a strong collaborator and shares information and facilities with the fish disease researchers at Oregon State University.

DISEASES AND HOST RESPONSES TO INFECTIOUS AGENTS OF FISH AND MARINE INVERTEBRATES

This area of research focuses on viral, bacteria, marine invertebrates and salmon. Dr. Paul W. Reno directs the effort from the Hatfield Marine Science Center.

The interaction between the host and agency in the etiology of disease is being investigated. Three disease agents are being studied: infectious pancreatic necrosis affecting many aquatic animals, *Renibacterium salmoninarum* of salmon and trout and *Nadelpora canceri*, a parasite of Dungeness crab.

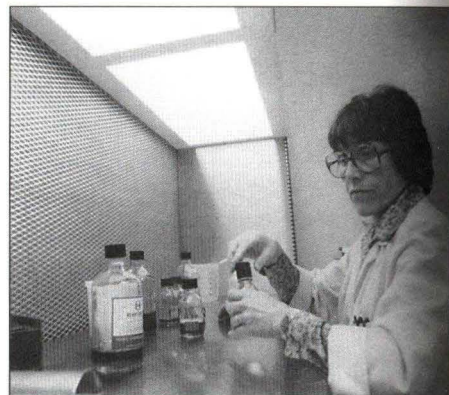
To date, much of the basic information has been learned, including the ranges of some diseases, how they develop and the impact of vaccines against the viruses.

HATFIELD MARINE SCIENCE CENTER

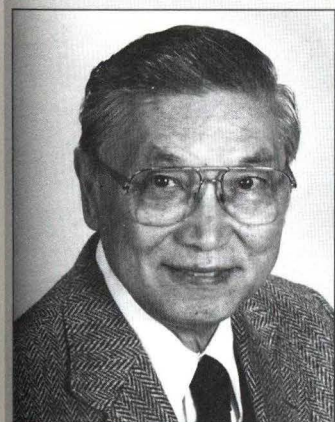
In 1965, a marine science center opened on the Oregon coast at Newport, funded by the federal government, state of Oregon and the National Science Foundation. The Port of Newport provided the site with a ninety-nine-year lease and Oregon State University agreed to run the facility.

In 1972, Dr. John V. Byrne, later president of Oregon State University, was appointed acting director, vesting responsibility for the first time in one individual. In 1977, Dr. Lavern Weber was named the first director in residence, a position he holds today. In 1983, the Oregon State Board of Higher Education changed the name to the Mark O. Hatfield Marine Science Center in honor of the man who was governor of the state when it was established, and who later served as United States Senator from Oregon.

The center has been both a scientific and public success. Today, the center offers three major programs: public information, education



For nineteen years, Cathy Lannan researched fish cell cultures at the Hatfield Marine Science Center, becoming internationally known for her work.



Dr. Richard Y. Morita

Dr. Richard Y. Morita

Dr. Richard "Dick" Yukio Morita was born in 1923 in Pasadena, California, the second child of first-generation Japanese in the United States. His father had served in the U. S. Army during World War I and acquired U.S. citizenship.

Following the start of World War II in 1941, he and his family, and other Japanese-American families living on the west coast, were interned at the Gila Bend Relocation Center in Arizona. He and his brother later were allowed to attend the University of Nebraska, where he studied microbiology. Eventually, he was drafted and assigned to the 442nd Regimental Combat Team in the Italian Campaign.

After discharge, he graduated from the University of Nebraska in 1947 with a joint major in bacteriology and chemistry. In 1949, he received his master of science degree from the University of Southern California and in 1954 his doctorate at the University of California Scripps Institution of Oceanography. He participated in several Pacific Ocean expeditions, including the Trans-Pacific Expedition that provided for his first visit to Japan.

Dr. Morita married Dr. Toshiko Nishihara in 1953. They had three children. After graduation, he joined the faculty at the University of Houston, returned to the University of Nebraska to teach, and was recruited in 1962 by Oregon State University.

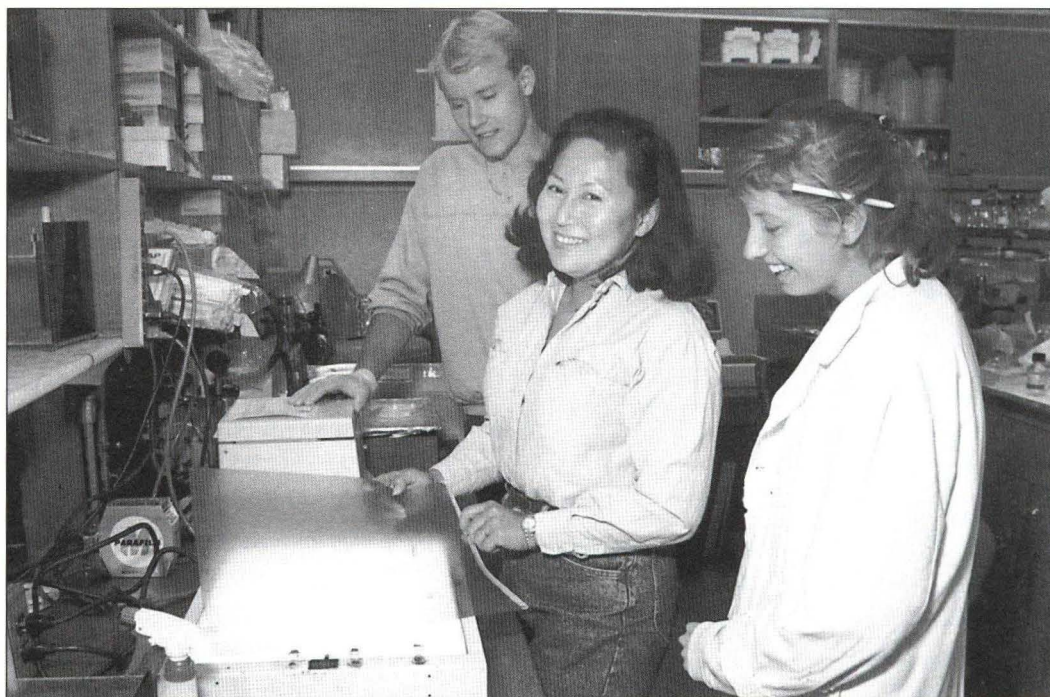
at all levels from kindergarten through college graduate programs and marine resources research. Federal agencies participating in research include the Environmental Protection Agency, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Bureau of Land Management and the U. S. Fish and Wildlife Service. Oregon State University is

a major participant in research and educational programs, including the Department of Fisheries and Wildlife, College of Oceanic and Atmospheric Sciences, College of Forestry and College of Science, including the Department of Microbiology.

Dr. John L. Fryer established a fish health laboratory at the center in 1973 to study infectious diseases of fish in saltwater. Graduate students studied bacterial and viral pathogens. Later, faculty were successful in obtaining a grant to build a new fish disease wing. Dr. James R. Winton was one of the first graduate students in this research. Later, he joined the staff to guide the construction of the laboratory and the program before resigning in 1986 to join the U. S. Fish and Wildlife Service.



Hatfield Marine Science Center



Department Chair Jo-Ann C. Leong still works with students.

From 1974 until 1993, Cathy Lannan worked in the Fish Health Program, collecting fish cell cultures and managing a central depository of about fifty fish cell cultures that were initiated by Dr. Fryer when he was a graduate student in the early 1960s.

In 1990, Associate Professor Paul W. Reno, with his background in virology, was assigned to the Coastal Oregon Marine Experiment Station's program at the Hatfield Marine Science Center. His academic affiliation is with the Oregon State University Department of Microbiology, but his work is funded by the experiment station to support applied research and to offer extension services on fish health matters. He works with Professor Robert E. Olson, who is affiliated with the university's Department of Fisheries and Wildlife. Dr. Reno has conducted research on

There, he held a joint appointment with the Department of Microbiology and the College of Oceanic and Atmospheric Sciences.

He established his reputation with the co-discovery of barophiles, pressure-loving bacteria. He also discovered psychrophiles, cold-loving bacteria, and the concept of "starvation-survival," how bacteria survive for long periods while lacking energy.

Dr. Morita served for a short time as program director for biochemistry at the National Science Foundation and took a sabbatical to James Cook University in Australia as the Senior Queen Elizabeth II Fellow. He chaired the Nash Hall building committee.

Dr. Morita has written one book and co-edited two others, written forty-eight chapters in various books, 134 scientific papers, and edited three books. He received many awards, including the King Frederick IX Medal and Ribbon, the 1972 Oregon State University Sigma Xi All Campus Research Award, the 1984 Milton Harris Research Award from the College of Science, and the 1988 Fisher Scientific Company Award for Applied and Environmental Microbiology. His highest scientific honor was being elected in 1990 an Honorary Member of the American Society of Microbiologists, only one of forty-nine honorary members at that time in the 47,000-plus member organization.

He retired on December 31, 1988, as professor emeritus of microbiology and oceanography and was appointed distinguished visiting professor at Kyoto University, Japan. He continues his scientific writing in retirement. In 1996, a genera of bacteria, *Moritella*, was named in his honor for his contributions to marine microbiology.

major pathogens of both salmonid fishes and economically important shellfishes.

ANIMAL VIROLOGY

This area of research has been directed at vaccines, RNA virus, viral pathogenesis and marine biotechnology. The work is directed by Dr. Jo-Ann C. Leong, chair of the Department of Microbiology since 1996.

Researchers are seeking to develop effective, safe and inexpensive viral vaccines for fish in molecular cloning. Disease-resistant transgenic fish have been developed. Efforts are being made to better understand the basis for immune reactivity to the vaccines through work on fish immune modulators. In addition, work has begun to isolate and characterize these genes in fish and use proteins as immune adjuvants.

Viral pathogens for both wild and farm-reared salmon are reducing stocks of the fish already threatened by over-fishing and habitat loss. Learning how to form effective, inexpensive vaccines that will be accepted by the fishing industry is important to the future of the fish.

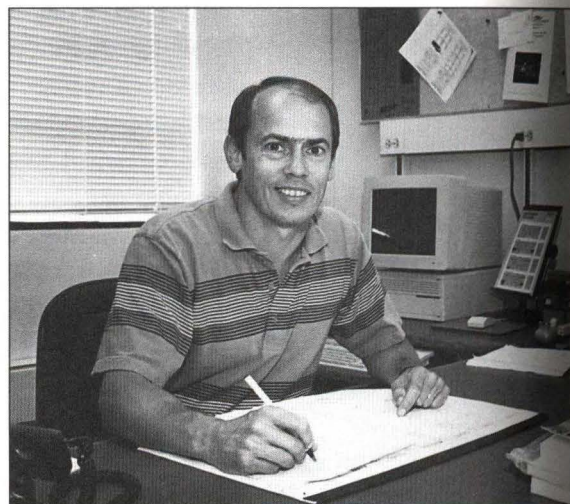
VIROLOGY

Vaccine virus, gene expression and expression vectors are involved in this area of research, directed by Dr. Dennis E. Hruby.

The research uses molecular biological approaches to dissect the replicative cycle of a mammalian poxvirus vaccine virus as a model to study. By studying these mechanisms, insights are gained into the normal pathways of the viruses.

PLANT VIROLOGY

Plant viruses, proteinases and transgenic plants were studied under the direction of Professor William G. Dougherty from 1987 until he left the department in 1995. Focus of this research was to better understand how proteinase and capsid protein function. Researchers also test how proteins might be targeted to generate plants resistant to tobacco etch virus, a member of the potato virus Y group. Three amino acids were identified which likely form the catalytic triad.



Dr. Dennis E. Hruby

CHAPTER 13

THE NEXT 100 YEARS

Much has changed since Professor Emile F. Pernot first looked through his microscope and began taking photographs back in 1899.

As the twentieth century draws to a close, Oregon continues to be one of the fastest growing states in the nation. Oregon's population is nearing 3 million and some 45,000 residents now live in Corvallis.

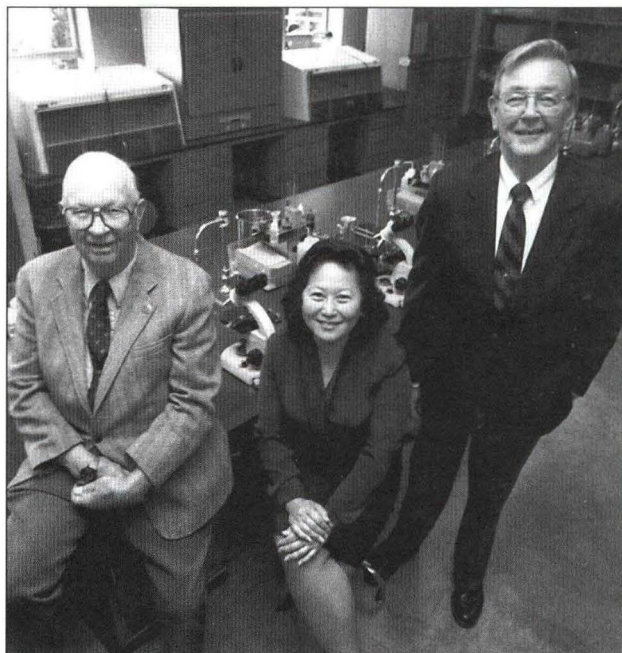
University enrollment has been stable in the past decade, held in check partly by registration limitations set by the Legislature and the continuing rise in the cost of a college education. Annual enrollment currently averages 14,000.

During the 1997-98 school year, the Department of Microbiology included 150 undergraduate students and 15 graduate students. There are 15 faculty members, all with broad interests in basic and applied microbiology. Strong research partnerships with private industry and government continue.

In these first one hundred years, 508 students have received graduate degrees in microbiology and 1,381 have received undergraduate degrees.

The Department of Microbiology is jointly administered by both the College of Science and the College of Agricultural Sciences. In 1931, the Department of Microbiology was transferred to the College of Science. However, research programs which found funding within the Agricultural Experiment Station led the department to develop strong ties with the College of Agricultural Sciences. Now, the department enjoys the distinction of being one of four departments "shared" between these two colleges. The department maintains its academic degree program in the College of Science and its strong research program in the College of Agricultural Sciences. Department Chair Jo-Ann C. Leong works closely

with Dr. Frederick H. Horne, dean of the College of Science since 1986 and Dr. Thayne R. Dutson, dean of the College of Agricultural Sciences and director of the Agricultural Experiment Station since 1993.



Three Department Chairs, representing half of the Department's one hundred years, look to the future. Drs. Elliker, Leong, and Fryer (from left to right).



Staff in Main Office Microbiology: (front row, left to right) Gayle Jolliffe, Carlene Pelroy, Camille Partridge, Lynn Wyatt, (back row) Karen Shutz, Cindy Fisher, Marilyn Wallace, Peggy Peterson—Office Coordinator, SDL.

Microbiology Staff

No history of the Department of Microbiology would be complete without recognizing the many management service and classified staff who contributed to the success of the teaching and research programs. They have performed a variety of tasks that make the department operate, from paying bills to managing files, from typing letters and reports to ordering supplies; from washing and sterilizing glassware to testing water samples. The list of these very important jobs is endless.

Some have worked only a short time while spouses were enrolled at Oregon State University, others worked entire careers with the Department of Microbiology. While not all were as diverse in their skills and long in their employment as Laura Leach with her thirty-nine years, all were important. Martha Porter worked for the department for twenty-five years from 1948 to 1973. She oversaw the media making and helped many students with their studies, always showing a strong personal interest. Ruth Baines worked for twenty years as bookkeeper, office manager and secretary to the department chair.

They are an important part of the microbiology program and their work makes a difference in people's lives through the education and research work accomplished at Oregon State University.

A list of former long-time and current microbiology staff appears in the appendix.

DISTINGUISHED PROFESSOR PROGRAM

Beginning in 1988, Oregon State University has recognized the most outstanding members of its faculty through a Distinguished Professor Program. Recognition is given to those individuals who have achieved national and/or international stature as a result of their contributions to scholarship and research, and whose work has been notably influential in their fields of specialization. Recognition also may be given based on outstanding performance in teaching, publication of notable textbooks or other scholarly activity that contributes substantially to instruction.

The title of distinguished professor is awarded for both past accomplishments and for expectation of future extraordinary work. Distinguished professors possess this title for as long as they remain on campus and receive a modest stipend until they are awarded emeritus status. Nominations are made annually by deans, directors, department heads and chairs. An advisory committee makes recommendations to the university provost who makes the selection.

Since 1988, there have been nineteen awards presented. Three were received by faculty in the Department of Microbiology: 1990, Dr. John L. Fryer; 1993, Dr. Jo-Ann C. Leong; 1994, Dr. William E. Sandine.

FACULTY AWARDS

Over the years, a number of major awards have been presented to faculty of the Department of Microbiology. These have included both career development and individual recognition awards.

National Institutes of Health Career Development Awards were presented to Dr. Lyle R. Brown from 1972 to 1976, to Dr. Adolph J. Ferro from 1979 to 1984 and to Dr. Dennis E. Hruby from 1985 to 1990.

In 1996, Dr. Janine E. Trempey was named the Oregon Professor of the Year, honored by The Carnegie Foundation for the Advancement of Teaching and the Council for Advancement and Support of Education. Dr. Trempey was selected from a group of nominees representing all institutions of higher education in Oregon, both public and private. She was recognized for her extraordinary dedication to teaching, her use of innovative teaching approaches to enhance science literacy among non-science and science undergraduate students and her use of a team-work approach to bring together students with diverse educational experiences to work together to solve real world problems of a microbial nature.



Dr. Frederick H. Horne, Dean of the College of Science.

100TH ANNIVERSARY

Throughout the 1998-99 school year, the Oregon State University Department of Microbiology celebrates its 100th anniversary. A number of events and gatherings will recognize this milestone.

Several professional symposiums and programs will bring outstanding speakers to the campus, including former students and faculty, to discuss the evolution and future of microbiology.

Scholarships

Over the past one hundred years, a number of scholarships have been established for the Department of Microbiology. Some date back many years, such as the Joseph E. Simmons Memorial Scholarship established in 1952. Scholarships also have been established to honor other department chairmen, including Drs. P. R. Elliker and J. L. Fryer.

Other scholarships are rooted in the past, such as the Mark H. Midlekauf Memorial Scholarship in memory of the Department of Bacteriology faculty member who lost his life in World War I, and the Paul Copson Memorial Scholarship in memory of former Department Chair Godfrey V. Copson's son, who died in a drowning accident.

Unique is the Donald L. and Barbara Gamberg Overholser Endowed Scholarship established in 1992 by friends, colleagues and students when they both retired. The Helen Alford Hays Women in Microbiology Scholarship was founded in 1990 by Helen Hays and her husband, Dale. With her nearly thirty-year association with the department as a graduate student and Microbiologist II, she wanted to encourage women to seek a career in microbiology.

Other scholarships have been established by former students and their families. A complete list appears in the appendix.

In the late summer of 1999, former and current students, retired and current faculty, research and educational associates and friends of the department will gather at the university. Detailed information and a schedule of planned events will be announced.

Copies of this 100th anniversary history, *Under the Microscope*, will be available for purchase. The department's accomplishments of the past 100 years will be highlighted through the university's public information office and through professional and scientific publications.

THE NEXT 100 YEARS

The simple science of bacteriology has grown to become much more complex, extending from basic studies in all sciences to productive and beneficial immediate applications in many areas of our lives.

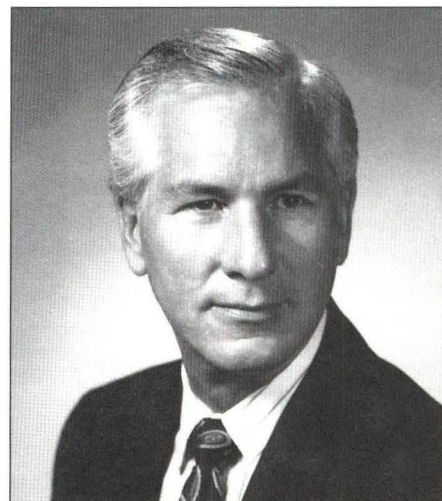
The biotechnology revolution owes its foundation to work done in microbiology departments where gene cloning was made possible by the discovery of bacterial restriction enzymes and plasmid DNA. Microbiology continues to be an exciting field for individuals of diverse interests, and it will remain a cornerstone for modern biological research.

Trained microbiologists will continue to make dramatic discoveries that will help us preserve the foods we grow and keep safe the foods that we prepare, develop the medicines and vaccines we need for both infectious and non-infectious diseases, and monitor and remediate the environment we live in. The Department of Microbiology faculty will be involved in the characterization of new microorganisms in extreme environments such as Antarctica, deep ocean vents and below the earth's crust. They will contribute to the basic knowledge of such biological processes as the immune response, the function of the cell membrane and the production of different products by specialized prokaryotic and eukaryotic cells. The department will always have faculty in virology, immunology, microbial genetics, and physiology. These disciplines will be further represented by scientists who will use microbial genetics in food microbiology and pathogenic microbiology.

As with all knowledge, the rate of new microbiology knowledge continues to escalate. Computer technology, new research equipment and the curiosity of new researchers all are contributing to this explosion of information. In addition, our shrinking world is bringing researchers from all countries closer to share their knowledge and cooperative studies.

With more research focused on outer space, the future limits of microbiology are most certainly boundless. At the same time, studies in the much smaller world of microorganisms continue to offer new and exciting information.

No one can clearly predict what exciting discoveries await microbiologists during the next 100 years. Most certainly, a great number will have a tie to Oregon State University Department of Microbiology as undergraduate alumni working in some closely related field, as graduate alumni searching out new challenges in their field



Dr. Thayne R. Dutson, Dean of the College of Agricultural Sciences and Director of the Agricultural Experiment Station.

Graduate Students

Almost without exception, past and present research faculty and staff of the Department of Microbiology believe that the most satisfying part of their career has been working with graduate students. While completing a particular research project and reporting it to the scientific community has brought a sense of accomplishment, it seldom equals watching a graduate student develop into a professional and begin a career.

As one researcher stated: "After I retire, there is no laboratory to go to, there is really nothing for me to do of a scientific nature. But, the people that I have trained are still out there doing it."

or as faculty members teaching the scientists of the next generation and conducting original research. Certainly, this research will be of the same outstanding nature that has brought international recognition to Oregon State University and the Department of Microbiology during this first 100 years.



Oregon State University and the Department of Microbiology are prepared for the twenty-first Century.

APPENDIX

Personal Interviews, 1995-98

Dr. Arthur W. Anderson
 Joy Asbury
 Dr. Lyle R. Brown
 Dr. Paul R. Elliker
 Cindy Fisher
 Dr. John L. Fryer
 Dr. Bruce L. Geller
 Dr. Stephen J. Giovannoni
 Claudia Gradin
 Helen A. Hays
 Dr. Richard Holt
 Cathy Lannan
 Dr. Jo-Ann C. Leong
 David Livingston,
 Endex Engineering of Corvallis
 Dr. Richard Y. Morita
 J. Kenneth Munford
 Barbara Overholser
 Don Overholser
 Camille Partridge
 Carlene Pelroy
 Dr. Paul W. Reno
 Dr. William E. Sandine
 Dr. Janine E. Trempy
 Susan M. Williams

Manuscript Review (in addition to the advisory committee)

Jean Fuller Anderson
 Dr. Peter J. Bottomley
 Dr. Dennis E. Hruby
 Peggy Peterson

Bibliography

- American Society for Microbiology, Office of Education and Training. Microbiology in Your Future, 5th Edition. Washington, D.C., 1985.
- Arscott, G. H. A Historical Review of the Feed-Mixing Facility of the Department of Poultry Sciences. Department of Poultry Science, Oregon State University, Corvallis, 1966.
- Bollen, W. B. and Staff in Microbiology. History of the Department of Microbiology at Oregon State University, Corvallis, 1968.
- Castle, Darlene, Brenda Eddleman, Meg Hughes, Riley Hughes, and Dave Thompson. Yaquina Bay 1778 - 1978. Lincoln County Historical Society, Newport, 1979.
- Clark, Cleon L. History of the Willamette Valley and Cascade Mountain Wagon Road. Deschutes County Historical Society, Bend, 1987.
- Craig, Reva. Personal Correspondence on Craig Memorial Lectures, 1996.
- Dixon, Bernard. Power Unseen - How Microbes Rule the World. W. H. Freeman & Co. Ltd., New York, 1994.
- Elliker, Paul R. Personal Papers and Recollections of Career. Otter Rock, 1995.
- Lechevalier, Hubert A. and Morris Solotorovsky. Three Centuries of Microbiology. McGraw-Hill Book Co., New York, 1965.
- Lee, Jennifer A. An Oral History with Walter B. Bollen, Soil Microbiologist, Teacher, Native Oregonian. Monograph No. 4, Oral History Program, Horner Museum, Oregon State University, Corvallis, 1989.
- Lee, Jennifer A. An Oral History with Mabel E. Pernot. (Unpublished). Oral History Program, Horner Museum, Oregon State University, Corvallis, 1986.
- McArthur, Lewis L. Oregon Geographic Names, 6th Edition. Oregon Historical Society Press, Portland, 1992.
- McBride, James Noland. Science at a Land Grant College: The Science Controversy in Oregon 1931 - 1942 and the Early Development of the College of Science at Oregon State University. Master's Thesis, Oregon State University, Corvallis, 1976.
- Milestones In Microbiology. Thomas Brock, Editor. Prentice-Hall, Inc., Englewood Cliffs, N. J., 1961.
- The Morning Oregonian, February 3, 1927, Portland.
- Nash, Wallis. Oregon: There and Back in 1877. Reprint: Oregon State Monograph. Oregon State University Press, Corvallis, 1976.
- Oregon Agricultural Experiment Station. Information Sheet: Oregon Agricultural Experiment Station. Corvallis, 1992.
- Oregon Blue Book, 1995-96, Secretary of State. Salem, 1995.
- Oregon State Agricultural College, Bulletin: "The Memorial Union." Edwin T. Reed, College Editor. Corvallis, 1930.
- Oregon State University, Annual Catalogs, 1890 - 1996. Corvallis.
- Oregon State University, Department of Microbiology. Graduate Studies in Microbiology. Corvallis, 1988.
- Oregon State University, Department of Microbiology. Staff correspondence, reports, and notes. 1899 - 1997.
- Oregon State University Graduate School. Graduate Council Review of Graduate Program, Oregon State University Department of Microbiology. Corvallis, 1989.
- Oregon State University. The 1996 Oregon State University Fact Book. Corvallis, 1996.
- Oregon State University Hatfield Marine Science Center. 1995 - 1996 Annual Report. Newport, 1996.
- Portland, Oregon City Directories, 1901 - 1930.
- Rogers, Pamela. Oregon State University Mark O Hatfield Marine Science Center 1965 - 1988 - The First Two Decades. Newport, 1988.
- Simmons, J. E. "Bacteriological and Sanitary Problems of Wartime." Contributions of Biological Sciences to Victory: Fifth Annual Biology Colloquium, April 3, 1943. OSC Chapter of Phi Kappa Phi, Oregon State College, Corvallis, 1945.
- Smith, Kenneth G.V., and R. E. Dimick. "Darwin's 'American' Neighbor." Journal of the Society of Bibliography of Natural History, (1976), 8 (1): 78-82.
- The Universal Almanac, John W. Wright, General Editor. United Press Syndicate, Kansas City, 1995.
- Wilson, Sally Jackman. "It Was A Matter of Doing It Himself, the Hard Way," Oregon Stater, February - March 1960, Corvallis.

APPENDIX

Organizational Structure Of Microbiology Studies, Oregon State University

<u>Years</u>	<u>Department Name</u>	<u>School/College</u>
1899-1902	Independent courses offered	
1902-1918	Department of Bacteriology	
1918-1919	Department of Bacteriology	Service Department
1919-1920	Department of Bacteriology	School of Agriculture
1920-1922	Department of Bacteriology	Service Department
1922-1932	Department of Bacteriology	Basic Arts & Sciences
1932-1946	Department of Bacteriology	School of Science
1946-1961	Department of Bacteriology and Hygiene	School of Science
1961-1968	Department of Microbiology and Hygiene	Schools of Science/Agriculture
1968-present	Department of Microbiology	Colleges of Science/Agricultural Sciences

Department Chairs/Heads, Microbiology Studies, Oregon State University

<u>Name</u>	<u>Period</u>	<u>Years</u>
Emile F. Pernot	1899-1910	11
Theodore D. Beckwith	1912-1918	6
Godfrey V. Copson	1918-1949	31
Joseph E. Simmons	1949-1951	2
Paul R. Elliker	1952-1976	24
John L. Fryer	1976-1996	20
Jo-Ann C. Leong	1996-present	3

Note: Within the College of Agricultural Sciences, departments are managed by department heads. Within the College of Science, departments are managed by department chairs.

History Of Institution Name Changes

<u>Years</u>	<u>Name</u>
1856-1858	Corvallis Academy
1858-1868	Corvallis College
1868-1872	Corvallis College and Agricultural College (of the State)
1872-1876	Corvallis State Agricultural College
1876-1879	State Agricultural College (Corvallis College)
1879-1882	Corvallis College and State Agricultural College
1882-1885	Corvallis College and Oregon State Agricultural College
1885-1888	Corvallis and Oregon Agricultural College
1888-1896	State Agricultural College of the State of Oregon
1896-1908	Agricultural College of the State of Oregon
1908-1927	Oregon Agricultural College
1927-1937	Oregon State Agricultural College
1937-1961	Oregon State College
1961-present	Oregon State University

Oregon State University Department Of Microbiology Scholarships—Science

Thomas R. Aspitarte Memorial Scholarship

Established in 1987 by family and friends of Dr. Aspitarte. Tom received his master of science and doctorate degrees in microbiology in 1953 and 1959, respectively, at Oregon State University. The scholarship is designated for a junior or senior studying environmental microbiology.

Paul Copson Memorial Scholarship

Established in 1965 for junior and senior students in microbiology in memory of Paul Copson, son of June Seely Copson, class of 1915, and Godfrey V. Copson, class of 1911 and chair of microbiology from 1918-1949.

Margaret Dowell-Gravatt, M.D., Scholarship

Established in 1988 by Dr. Margaret Dowell-Gravatt, a staff physician at Oregon State University Student Health Center for sophomore, junior, and senior students in microbiology, zoology or pre-health with a first priority for female, ethnic minorities.

J. L. Fryer Scholarship

Established in 1994 in honor of Dr. J. L. Fryer, upon his retirement as department chair, by his colleagues, friends and former students to aid the Salmon Disease Laboratory in the study of diseases of fish.

Helen Alford Hays Women in Microbiology Scholarship

Established in 1990 by Helen and Dale Hays for undergraduate students in microbiology, with a first priority for women. Helen worked for the Department of Microbiology from 1955 to 1981, when she retired. Helen taught introductory microbiology and provided technical assistance to Dr. Paul Elliker when he served as department chair.

Mark H. Middlekauf Memorial Scholarship

Established in 1982 by Ruth M. Tyson to honor the memory of her brother and to aid junior and senior students in microbiology. Mark Middlekauf received his degree in bacteriology in 1916 and taught in the department before resigning to serve in the U.S. Army during World War I. He lost his life in France during that conflict.

Donald and Barbara Gamberg Overholser Scholarship

Established in 1992 upon the retirement of Donald and Barbara Overholser, long-time associates with the Department of Microbiology, by their friends, colleagues and former students, as an endowed scholarship fund in their names to be given to an outstanding junior student majoring in microbiology.

Joseph E. Simmons Memorial Scholarship

Established in 1952 for junior students in microbiology by friends and colleagues of Professor Simmons who served on the department faculty from 1921 to 1951. He was department chair from 1950 until his death in 1951. The scholarship was established to honor Professor Simmons' untiring efforts on behalf of students, his interest in developing the Department of Bacteriology and his direct and indirect contributions to his field of science.

N. L. Tartar Research Fellowship

Established in 1977 for graduate students in microbiology in memory of Nicholas L. Tartar, M.D., a long-time friend of Oregon State University and Oregon Health Sciences University. The award funds graduate research in the departments of chemistry and microbiology. A similar award is received by Oregon Health Sciences University.

Harriet M. Winton Scholarship

Established in 1995 by Mrs. Harriet M. Winton in appreciation for the education received by her son, Dr. James R. Winton, from the Department of Microbiology while he studied viral diseases of Pacific salmon.

Oregon State University Department Of Microbiology Scholarships—Agricultural Sciences***Charles Eckelman Memorial Fellowship***

Established in 1983 for graduate students by Mrs. Clara Marie Eckelman at the time of her husband's death. The fellowship helps these students studying a science beneficial to the dairy industry. Fellowship recipients must be enrolled in the College of Agricultural Sciences or in the Department of Microbiology with an emphasis on the dairy industry. Qualified applicants in the following majors will be considered: animal science, agricultural business management, agricultural and resource economics, food science and technology, or microbiology.

Charles Eckelman Memorial Scholarship

Established in 1983 for junior and senior students by Mrs. Clara Marie Eckelman at the time of her husband's death. The scholarship is used to help these students studying a science beneficial to the dairy industry. Scholarship recipients must be enrolled in the College of Agricultural Sciences or in the Department of Microbiology with an emphasis on the dairy industry. Qualified applicants in the following majors will be considered: animal science, agricultural business management, agricultural and resource economics, food science and technology, or microbiology.

Paul R. Elliker Scholarship in Microbiology and Food Science

Established in 1994 by Dr. Paul R. Elliker, retired chair of the Department of Microbiology, to be given in alternate years to a worthy qualified undergraduate major in microbiology or food science. With the knowledge that food is now America's top business, one objective of this scholarship is to emphasize the major role played by microbiology in food safety (offered through the Agriculture Research Foundation).

Department Of Microbiology Faculty 1899-1997***Current Faculty As Of October 1, 1998***

Bartholomew, Jeri	Since 1994	(Intr./Sr. Res.-1994, Asst. Prof./Sr. Res.-1995)
Bottomley, Peter J.	Since 1979	(Assist. Prof.-1979, Assoc. Prof.-1984, Prof.-1989)
Brown, Lyle R.	Since 1970	(Assist. Prof.-1970, Assoc. Prof.-1975, Prof.-1986)
Burke, Mary E.	Since 1985	(Assist. Prof.-1985, Instr.-1991, Sr. Instr.-1992)
Dreher, Theo	Since 1998	(Prof.-1998)
Field, Katharine G.	Since 1988	(Assist. Prof.-1988)
Geller, Bruce L.	Since 1987	(Assist. Prof.-1987, Assoc. Prof.-1993)
Giovannoni, Stephen J.	Since 1988	(Assist. Prof.-1988, Assoc. Prof.-1993)
Hruby, Dennis E.	Since 1983	(Assist. Prof.-1983, Assoc. Prof.-1986, Prof.-1989)
Leong, Jo-Ann C.	Since 1975	(Assist. Prof.-1975, Assoc. Prof.-1980, Prof.-1986, Distinguished Prof.-1993, Dept. Chair-1996)
Ream, L. Walter	Since 1997	(Assoc. Prof.-1997)
Reno, Paul W.	Since 1993	(Assoc. Prof.-1993)
Rockey, Daniel D.	Since 1997	(Assist. Prof.-1997)
Rohrmann, George F.	Since 1997	(Prof.-1997)
Trempey, Janine E.	Since 1989	(Assist. Prof.-1989, Assoc. Prof.-1996)
Vella, Anthony J.	Since 1997	(Assist. Prof.-1997)

Former Faculty

Anderson, Arthur W.	1949-1980	(Instr.-1949, Assist. Prof.-1953, Assoc. Prof.-1959, Prof.-1960, retired as Prof. Emeritus-1980)
Anderson, Carl L.	1950-1968	(Prof. and Director of Hygiene, transferred-1968)
Beckwith, Theodore D.	1912-1919	(Prof./Dept. Chr.-1912, resigned-1919)
Berry, James A.	1921-1929	(Instr.-1921, resigned-1929)
Bollen, Walter B.	1929-1965	(Assist. Prof.-1929, Assoc. Prof.-1937, Prof.-1948, retired as Prof. Emeritus-1965)
Charlton, David B.	1929-31, 1934-37	(Instr.-1929, resigned-1931, Instr.-1934, resigned-1937)
Copson, Godfrey V.	1912-1949	(Instr.-1912, Assist. Prof.-1915, Prof./Dept. Chr.-1920, retired-1949)
Curran, Donald D.	1971-1983	(Instr. -1971, resigned-1983)
DeHaven, Glen	1909-1910	(Assist.-1909, terminated-1910)

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Dougherty, William G.	1987-1995	(Assoc. Prof.-1987, Prof.-1990, resigned-1995)
Elliker, Paul R.	1947-1976	(Prof.-1947, Dept. Chr.-1952, retired as Prof. Emeritus-1976)
Ferro, Adolph J.	1978-1987	(Assist. Prof.-1978, Assoc. Prof.-1981, Prof.-1986, resigned-1987)
Fraser, Dorothy K.	1964-1970	(Assoc. Prof.-1964, resigned-1970)
Froehlich, Ronald B.	1983-1985	(Instr.-1983, resigned-1985)
Fryer, John L.	1963-1994	(Instr.-1963, Assist. Prof.-1964, Assoc. Prof.-1968, Prof.-1973, Dept. Chr.-1976, Dist. Prof.-1990, retired as Prof. Emeritus-1994, remained as Dept. Chr. until March 1996)
Gerhardt, Phillip	1949-1952	(Assist. Prof.-1949, resigned-1952)
Gilmour, Campbell M.	1951-1967	(Assist. Prof.-1951, Assoc. Prof.-1956, resigned-1967)
Griffiths, Robert	1973-1996	(Instr.-1973, Assist. Prof.-1977, Assoc. Prof.-1987, retired-1996)
Gross, Noel H.	1932-1939	(Instr.-1932, laid off-1939)
Hagedorn, Charles, III	1974-1979	(Assist. Prof.-1974, resigned-1979)
Halverson, William V.	1921-1929	(Prof.-1921, resigned-1929)
Hays, Helen A.	1959-1981	(Instr.-1959, Microbiologist II-1960, retired-1981)
Horton, George D.	1913-1915	(Instr.-1913, resigned-1915)
Kaattari, Ilsa M.	1983-1993	(Instr. -1983, Sr. Instr.-1992, resigned-1993)
Kaattari, Stephan L.	1982-1993	(Assist. Prof.-1982, Assoc. Prof.-1988, Prof.-1992, resigned-1993)
Klein, Donald A.	1967-1970	(Assist. Prof.-1967, resigned-1970)
Koski, Arthur	1950-1968	(Inst.(Hygiene)-1950, Assist. Prof.-1953, Instr.-1960, Prof.-1965, transferred-1968)
Langton, Clair V.N.	1928-1965	(Prof.(Hygiene Dept. Head)-1928, Director of Phys. Ed.-1936-64, Prof.-1964, retired-1965)
Levin, Robert E.	1963-1965	(Assist. Prof.-1963, resigned-1965)
McBurney, Ralph	1915-1916	(Instr.-1915, resigned-1916)
Middlekauf, Mark H.	1916-1917	(Instr.-1916, resigned-1917)
Morita, Richard Y.	1962-1988	(Assoc. Prof.-1962, Prof.-1964, retired as Prof. Emeritus-1988)
Morris, Henrietta	1935-1959	(Assoc. Prof. (Hygiene)-1935, died-1959)
Overholser, Donald L.	1988-1992	(Sr. Instr. 1988-1992, retired as Sr. Instr. Emeritus-1992)
Pacha, Robert E.	1964-1969	(Assist. Prof.-1964, Assoc. Prof.-1969, resigned-1969)
Parker, Richard B.	1950-1951	(Instr.-1950, resigned-1951)
Parks, Leo W.	1958-1986	(Assist. Prof.-1958, Assoc. Prof.-1962, Prof.-1966, resigned-1986)
Pernot, Emile F.	1899-1910	(Prof.-1899, resigned-1910)
Peterson, E.G.	1911-1912	(Prof.-1911, resigned-1912)
Pilcher, Karl S.	1951-1974	(Assist. Prof.-1951, Assoc. Prof.-1952, Prof.-1964, retired as Prof. Emeritus-1974)
Ramage, Carol M. B.	1985-1986	(Instr. -1985, resigned-1986)
Robison, Sarah M.	1964-1970	(Temp. Instr.-1964, Instr.-1967, transferred out-1970)
Rogers, Thomas J.	1978-1981	(Assist. Prof.-1978, resigned-1981)
Rohovec, John S.	1977-1995	(Assist. Prof.-1977, Assoc. Prof.-1985, Prof.-1991, resigned-1995)
Roth, Charles W.	1973-1983	(Instr.-1973, Assist. Prof.-1977, resigned-1983)
Rudert, Frank J.	1940-1942	(Instr.-1940, resigned-1942)
Sandine, William E.	1958-1996	(Instr.-1958, Assist. Prof.-1959, Assoc. Prof.-1962, Prof.-1966, Distinguished Prof.-1994, retired as Distinguished Prof. Emeritus-1996)
Seidler, Ramon J.	1970-1986	(Assist. Prof.-1970, Assoc. Prof.-1975, Prof.-1980, resigned-1986)
Simmons, Joseph E.	1918-1951	(Instr.-1918, Assist. Prof.-1920, Assoc. Prof.-1926, Prof.-1938, Dept. Chr.-1949, died-1951)
Thorne, Curtis B.	1961-1963	(Prof.-1961, resigned-1963)
Vass, Alonzo F.	1912-1916	(Instr.-1912, Assist. Prof.-1913, laid off-1916)
Whitaker, Leslie C.	1918-1921	(Assist.-1918, Instr.-1920, resigned-1921)
Williams, Susan M.	1993-1998	(Instr.-1993, Sr. Instr.-1995, resigned-1998)
Winton, James R.	1982-1986	(Assist. Prof.-1982, resigned-1986)

APPENDIX

Non-faculty Staff, OSU Department Of Microbiology

Current Staff As of February 1, 1998

<u>Name</u>	<u>Position</u>	<u>Years</u>
Fisher, Cindy	Laboratory Technician	1981-present
Joltiffe, Gayle	Accounting Technician	1997-present
Partridge, Camille	Laboratory Technician	1980-1991
	Microbiologist	1994-present
Pelroy, Carlene	Word Processing Technician	1977-present
Peterson, Peggy	Office Specialist	1994-present
Starns, Tammy	Office Specialist	1997-present
Stevens, Donald	Salmon Disease Lab Mgr.	1988-present
Wallace, Marilyn	Word Processing Tech.	1992-present
Wyatt, Lynn	Office Manager	1997-present

Past Staff (With 4+ Years)

<u>Name</u>	<u>Position</u>	<u>Years</u>
Asbury, Joy	Accounting Technician	1981-1997
Baines, Ruth	Accounting Clerk	1953-1973
	Secretary	
	Office Supervisor	
Casper, Bonnie	Accounting Clerk	1975-1993
	Purchasing Assistant	
Mulligan, Mary Lou	Cisar Laboratory Aide	1968-1972
	Laboratory Assistant	
Day, Rebecca	Office Specialist	1987-1993
Fryer, Mary Bielman	Secretary 1,2,3	1961-1967
Eddy, Helga	Goodrich Accounting Clerk	1968-1975
Gradin, Claudia	Laboratory Technician	1970-1995
	Microbiologist	
Hathaway, Laura Pauline	Laboratory Technician	1955-1970
Hays, Helen A.	Microbiologist II	1955-1959
		1960-1981
Hoffman, Joy	Laboratory Aide	1974-1979
Johnstone, Paula	Laboratory Aide	1985-1990
Kumpula, Billie Ann	Clerk-Stenographer	1956-1960
LaBaun, Jean	Accounting Clerk	1973-1981
	Office Supervisor	
Lannan, Cathy	Microbiologist	1979-1993
Leach, Laura Grimms	Laboratory Assistant	1924-1963
	Laboratory Technician	
	Microbiologist II	
Lytz, Pamela	Laboratory Assistant	1974-1978
MacQuaid, Bruce	Laboratory Technician	1972-1980
Mills, Clara Hoeffner	Laboratory Helper	1957-1966
Morris, Ione	Laboratory Helper	1953-1957
Overholser, Barbara	Secretary	1965-1992
	Administrative Assistant to Dept. Chair	
	Office Manager	
Overholser, Donald	Microbiologist	1965-1988
	Supervising Microbiologist (Courtesy Assistant Professor)	
Porter, Martha	Domestic Worker	1948-1973
	Laboratory Assistant	
	Laboratory Technician	
Smith, Shelia	Laboratory Assistant	1976-1980
Sparks, Neomi	Secretary	1973-1981
Whiteman, Linda	Assist. to Dept. Chr.	1992-1997
Zook, Connie	Clerical Assistant	1975-1984
	Secretary	

*Oregon State University Microbiology Department Graduate School Graduates***- 1910 -**

DeHaven, Glen, M.S.

- 1913 -

Copson, Godfrey Vernon, M.S.

- 1922 -

Bollen, Walter Beno, M.S.

- 1930 -

Sprague, Aileen, M.S.

- 1934 -

Williams, Margaret Elaine, M.S.

- 1937 -

Gross, Noel Harden, M.S.

- 1940 -

Brandon, Gatlin, M.S.

McBee, Richard Harding, M.S.

Steel, George Franklin, M.S.

Weeks, Owen Bayard, M.S.

- 1942 -

Shapiro, Irving Milton, M.S.

Takalo, David Swain, M.S.

- 1950 -

Tanner, William Scott, M.S.

- 1951 -

Coldwell, Arthur Lawrence, M.S.

Johns, Elvy Earl, Jr., M.S.

Parker, Richard Bennett, M.S.

- 1952 -

Anderson, Arthur Wallace, Ph.D.

Estabrooks, Ray Gilbert, M.S.

Evenson, Margery Ann, M.S.

MacGregor, Dugal Roy, M.S.

Miller, Donald Duane, Ph.D.

Mills, Herman Edwin, M.S.

- 1953 -

Aspitarte, Thomas Robert, M.S.

Cahill, Gwendolyn, M.S.

Fletcher, Donald Warren, M.S.

Lu, Kuo Chin, Ph.D.

Noller, Eric Charles, M.S.

- 1954 -

Ingalsbe, Carol Koenekamp, M.S.

Keesling, James Worth, M.S.

Okano, Yoko, M.S.

Roberts, Jack Ellsworth, M.S.

Smith, Vincent Norris, M.S.

Trosper, Frances Ramona, M.S.

- 1955 -

Butterworth, Earl McKenzie, Ph.D.

Hamilton, Archie Young, M.S.

Hannesson, Gudlaugur, M.S.

MacGregor, Dugal Roy, Ph.D.

Soike, Kenneth Fieroe, Ph.D.

- 1956 -

Damsky, Leon Joseph, M.S.

Edwards, Elisabeth Joan, M.S.

Folston, Beverly Jeannine, M.S.

Hays, Helen Alford, M.S.

Klungsoyr, Sigrid, M.S.

Parker, Richard Bennett, Ph.D.

Roberts, Jack Ellsworth, Ph.D.

Watkins, Sprague Hammond, M.S.

- 1957 -

Duggan, Dennis Edward, M.S.

Parrish, Gordon Lee, M.S.

Skaar, Roger Wayne, M.S.

- 1958 -

Buckely, Patricia Myers, M.S.

Chandra, Purna, Ph.D.

Forteny, Kenneth F., M.S.

Sandine, William E., Ph.D.

Stern, Ivan J., Ph.D.

Stern, Maxine L., M.S.

Yusha, Alexander, M.S.

- 1959 -

Aspitarte, Thomas R., Ph.D.

Deeney, Anne O., M.S.

Nordan, Harold, Ph.D.

Rash, Kenneth, M.S.

Roa, Pedro Dante, M.S.

Seitz, Eugene, M.S.

- 1960 -

Bhatt, Rajanikant P., M.S.

Evenson, Vera, M.S.

Wu, William G., M.S.

Zimmerman, Robert A., Ph.D.

- 1961 -

Bowen, James M., Ph.D.

Cavane, William L., M.S.

Corlett, Donald Alexander, M.S.

Duggan, Dennis E., Ph.D.

Gawel, Len J., M.S.

McCarthy, Charlotte M., M.S.

Roa, Pedro D., Ph.D.

- 1962 -

Allen, Lois K., M.S.

Brown, Willie C., M.S.

Knittel, Martin D., M.S.

Lee, Jong S., M.S.

Pigg, Carrie J., M.S.

Saunders, Grady F., M.S.

Saunders, Priscilla P., M.S.

Seitz, Eugene Walter, Ph.D.

Sing, Edmond L., M.S.

Spence, Kemet D., M.S.

Starr, Patricia R., M.S.

Turner, Nikki E., M.S.

- 1963 -

Auborn, Karen Roberts, M.S.

Bradford, Erlene B., M.S.

Kilbourn, Joan P. P., Ph.D.

Lee, Jong S., Ph.D.

Neal, John L., Jr., M.S.

Purkerson, Lorus L., M.S.

Turner, Jan R., M.S.

- 1964 -

Bhatt, Rajanikant P., Ph.D.

Buckley, Patricia M., Ph.D.

Burton, Sheril D., Ph.D.

Deeney, Anne O., Ph.D.

Dutiyabodhi, Pisawat, M.S.

Fryer, John L., Ph.D.

Gwinn, Darrel D., M.S.

Hobbs, Joe N., Jr., M.S.

Kerwar, Suresh S., Ph.D.

Mathemeier, Paul F., M.S.

McGregor, Sandy, M.S.

- 1965 -

Amend, Donald F., M.S.

Chen, Chin-Sin C., Ph.D.

Citti, James E., Ph.D.

Dyer, John K., M.S.

Elliott, Lloyd F., Ph.D.

Keng, Jiun Guang, M.S.

Knittel, Martin D., Ph.D.

Krabbenhof, Kenneth L., Ph.D.

Langridge, Patricia, M.S.

Lewis, Norman F., M.S.

Mayeux, Jerry V., Ph.D.

Pigg, Carrie J., Ph.D.

Robison, Sarah M., M.S.

Sorsoli, Wayne A., Ph.D.

Spence, Kemet D., Ph.D.

Turner, Jan R., Ph.D.

Vedamuthu, Ebenezer R., Ph.D.

Wagner, Sally A., M.S.

Wang, Wei-Sheng, M.S.

Wullstein, Leroy H., Ph.D.

- 1966 -

Albin-Schroder, Inga A., M.S.

Albright, Lawrence J., M.S.

Gawel, Len J., Ph.D.

Haight, Roger D., Ph.D.

Hayes, Sidney J., III, M.S.

Kogut, Clara M., M.S.

Nazeeri, Patsy Lundsteen, M.S.

Nishikawa, Sumie S., M.S.

Pack, Moo Y., Ph.D.

Ricard, Jaques Louis, Ph.D.

Shang, Janie C., M.S.

South, Dorothy J., Ph.D.

Spangler, William J., Ph.D.

Tu, Ching-Ming, Ph.D.

- 1967 -

Cowan, Judith, M.A.

Hauser, Bruce A., M.S.

Henning, David R., Ph.D.

Holmes, Beverly A., M.S.

Kenis, Paul O., M.S.

Kurahara, Carole M., M.S.

Laudermilk, Patricia J., M.S.

Mathemeier, Paul F., Ph.D.

McCain, Bruce B., M.S.

McCullough, Marian, M.S.

McFeters, Gordon A., Ph.D.

Nandan, Rajiva, Ph.D.

Paterno, Visitacion A., M.S.

Quinn, Dorothy J., M.S.

Sanders, James E., M.S.

Stiebers, Anita, M.S.

Tolls, Terry N., M.S.

Weimer, Mary, M.S.

- 1968 -

Adams, Bruce G., Ph.D.

Albright, Lawrence J., Ph.D.

Anderson, Gerry C., Ph.D.

Au, Frederick H. F., Ph.D.

Botsford, James L., Jr., Ph.D.

Brown, Ruth E., M.S.

Brown, Willie C., Ph.D.

Bulla, Lee A., Jr., Ph.D.

Burnison, Bryan K., M.S.

Dyer, John K., Ph.D.

Frost, Gary D., M.S.

Kimble, Charles E., M.S.

Ley, Ronald D., M.S.

Miller, Wayne W., M.S.

Monner, David A., Ph.D.

Neal, John Lloyd, Jr., Ph.D.

Niedermeyer, Glenn J., M.S.

Nims, Linda J., M.S.

Nishikawa, Sumie S., Ph.D.

Overholser, Donald L., M.S.

Porter, Bruce W., Ph.D.

Porter, Sook H., M.S.

Radich, Paul C., M.S.

Robertson, James M., Ph.D.

Rothman, Stanley, M.S.

Shearer, Judith A., M.S.

Smerda, Susan M., M.S.

Washam, Clinton J., Ph.D.

Wingfield, William H., Ph.D.

- 1969 -

Anders, Eugene A., Ph.D.

Balstraz, Edwina G., M.S.

Jakubowski, Walter, M.S.

Li, Ching-Yan, Ph.D.

Orth, Donald S., M.S.

Shikashio, Tommy, Ph.D.

Walter, Leslie A., M.S.

Wehr, Nancy B., M.S.

Whinery, Janet, M.S.

- 1970 -

Brantner, Carol J., M.S.

Carlson, Rene V., M.S.

Carnegie, John W., Ph.D.

Cooper, Mary F., M.S.

Craig, James M., Ph.D.

Freitas Leitao, Mauro Faber de, M.S.

Gould, Rowan W., M.S.

Harrison, Michael J., M.S.
 Kimble, Charles E., Ph.D.
 McCain, Bruce B., Ph.D.
 McKay, Larry L., Ph.D.
 Nitsos, Peggy K., M.S.
 Pfeifer, Donald K., M.S.
 Radich, Ruth E., M.S.
 Rockhill, Robert C., M.S.
 Rust, Patricia J., M.S.
 Wehr, Carl T., Ph.D.

- 1971 -

Berg, Ronald W., M.S.
 Buettner, Michael J., Ph.D.
 Gillespie, Paul A., Ph.D.
 Hayes, Sidney J., III, Ph.D.
 Kleeman, Karl T., Ph.D.
 Ley, Ronald D., Ph.D.
 Miller, Alexander, Ph.D.
 Miller, Carol A., Ph.D.
 Orth, Donald S., Ph.D.
 Park, Jerry E., M.S.
 Staley, Thomas E., Ph.D.
 Wieler, David Issac, M.S.
 Wise, John A., Ph.D.

- 1972 -

Blaine, James W., Ph.D.
 Burnison, Bryan K., Ph.D.
 Chugg, Lee R., Ph.D.
 Cisar, John O., Ph.D.
 Eldridge, James P., Ph.D.
 Griffiths, Robert P., Ph.D.
 Hayasaka, Steven S., M.S.
 Holt, Richard A., M.S.
 Nakamura, Kenji D., Ph.D.
 Needleman, David S., M.S.
 Nelson, Jim S., M.S.
 Paterson, William D., Ph.D.
 Paul, Kala L., M.S.
 Rockhill, Robert C., Ph.D.
 Stroup, John R., M.S.
 Vangnai, Somsak, Ph.D.
 Weber, George H., Ph.D.
 Wicklow, Marcia C., Ph.D.

- 1973 -

Abe, Patrick M., M.S.
 Barta, James J., M.S.
 Daly, Charles, Ph.D.
 Frey, Kurt L., M.S.
 Gasper, Ekkehart, Ph.D.
 Geesey, Gill G., M.S.
 Haworth, Stephen R., Ph.D.
 Jacobson, Gunnard K., Ph.D.
 Jones, Larry P., Ph.D.
 Lekprayoon, Chayavoot, M.S.
 McAllister, Philip E., II, Ph.D.
 McCoy, Ralph H., Ph.D.
 Muniz, Juan F., M.S.
 Park, Jerry E., Ph.D.
 Schwartz, James, M.S.
 Williams, Robert R., M.S.

- 1974 -

Bailey, Richard B., Jr., Ph.D.
 Banowetz, Gary M., M.S.
 Berg, Ronald W., Ph.D.
 Felton, Mack, Ph.D.
 Goodrich, Thomas D., M.S.
 Klubek, Brian P., M.S.
 LaChance, Michele C., M.S.
 Latimer, Joan Marie, M.S.
 Lee, Donald Royce, Ph.D.
 McMichael, John Seiple, Ph.D.
 Molskness, Theodore A., Ph.D.
 Mosley, Elder Bishop, M.S.
 Muralidhara, K. S., Ph.D.
 Peterson, Paul Edward, M.S.
 Trewyn, Ronny William, Ph.D.

- 1975 -

Beach, Peter G., M.S.
 Engelking, Henry Mark, M.S.
 Fuller, David W., Ph.D.
 Johnson, Keith A., Ph.D.
 Jones, Margaret Carol, Ph.D.
 Kelly, Michale D., M.S.
 Nyiendo, Joanne A., Ph.D.
 Ransom, David P., M.A.
 Rohovec, John S., Ph.D.
 Speckman, Calvin, Ph.D.
 Sriranganathan, Nammalwar, Ph.D.

- 1976 -

Geesey, Gill G., Ph.D.
 Goodrich, Thomas D., Ph.D.
 Gulstrom, Tim J., M.S.
 Hayasaka, Stephen, Ph.D.
 Leach, Roy D., Ph.D.
 Minelli, Michael P., M.S.
 Nkanga, Enefiok J., M.S.
 Tebbit, Guy L., Ph.D.

- 1977 -

Gould, Rowan W., Ph.D.
 Hazen, Ronald E., M.S.
 Morrow, Jan E., M.S.
 Mulcahy, Daniel M., Ph.D.
 Neal, William D., M.S.
 Nicholas, Ann H., Ph.D.
 Nkanga, Enefiok J., Ph.D.
 Novtisky, James A., Ph.D.
 O'Leary, Patrick J., M.S.
 Stevens, Donald G., M.S.
 Seward, Robert A., II, M.S.
 Yu, Pak-Lam, M.S.

- 1978 -

Bagley, Susan T., Ph.D.
 Banowetz, Gary M., Ph.D.
 Causey, Stewart C., M.S.
 Dunn, Joseph E., Ph.D.
 Hough, Susan C., M.S.
 Miranda-Chavez, Alcibiades, M.S.
 Rowse-Eagle, Debra H., M.S.
 Udey, Lanny R., Ph.D.
 Woodward, Barton C., M.S.

- 1979 -

Caldwell, Bruce A., M.S.
 Chen, Wen-Pin, Ph.D.
 Fowlkes, Charles E., M.S.
 Hays, Philip R., Ph.D.
 Huggins, Susan Peters, M.S.
 Hunter, Valerie A., M.S.
 Lenz, Susan P., M.S.
 Price, Virginia, Ph.D.
 Ransom, David P., Ph.D.
 Sanders, James Edward, Ph.D.
 Stott, Diane E., M.S.
 Talbot, Henry W., Ph.D.
 Yamamoto, Deborah Keiko, M.S.

- 1980 -

Bolf, Ronald B., M.S.
 Daniell, Suzanne D., M.S.
 Durrin, Linda K., M.S.
 Edwards, Susan T., M.S.
 Hedrick, Ronald P., Ph.D.
 Huggins, Alan, Ph.D.
 Jenkins, Michael B., M.S.
 Kibbey, Heather J., M.S.
 Lamka, Karla G., M.S.
 McCoy, Edward L., M.S.
 Philippon-Fried, Marie, M.S.
 Yang, Niann Luu, M.S.

- 1981

Adams-Burton, Catherine R., M.S.
 Gonzales, Robert A., Ph.D.
 Hickok, Ruth E., M.S.
 Kurath, Gael, M.S.
 LeChevallier, Mark W., M.S.
 Libby, Randell T., Ph.D.
 Nelson, Jay A., Ph.D.
 O'Leary, Patrick J., Ph.D.
 Orberg, Paulo K., M.S.
 Reed, Margaret A., M.S.
 Winton, James R., Ph.D.
 Wulf, John J., M.S.
 Yorgey, Peter S., M.S.

- 1982 -

Bauer, Nancy J., M.S.
 Donnelly, Raymond P., M.S.
 Groberg, Warren J., Jr., Ph.D.
 Izuagbe, Yakubu S., Ph.D.
 Marchitto, Kevin S., Ph.D.
 Rivas, Victor G., M.S.
 Salih, Mohammed A., M.S.
 Williams, Robert R., Ph.D.
 Willrett, Douglas L., Ph.D.

- 1983 -

Amy, Penny S., Ph.D.
 Beaty, Jon S., Ph.D.
 Calomiris, Jon J., M.S.
 Dohman, Thomas P., M.S.
 Greenwood, John D., M.S.
 Henick-Kling, Thomas, M.S.
 McCammon, Mark T., Ph.D.
 Nelson, Jim S., Ph.D.

Nishibuchi, Mitsuaki, Ph.D.
 Saedi, Mohammad S., M.S.
 Salerno, Laurel F., M.S.
 Tullo, Daniel D., M.S.

- 1984 -

Arakawa, Cindy K., M.S.
 Bottema, Cynthia D. K., Ph.D.
 Chen, Martin F., Ph.D.
 Eschelbach, Matthew M., M.S.
 Getchell, Rodman G., M.S.
 Hartel, Peter G., Ph.D.
 Hiu, Stephen F., Ph.D.
 Hsu, Ya-li, Ph.D.
 Jenkins, Michael B., Ph.D.
 Jones, Ronald D., Ph.D.
 Kuhl, Sarah J., Ph.D.
 Radke-Mitchell, Lyn, M.S.
 Rodriguez, Russell J., Ph.D.
 Salama, Maysoon, M.S.
 Shigeno, Debra Sue, M.S.
 White, Michael W., Ph.D.
 Wong, Scott, M.S.

- 1985 -

Aumen, Nicholas G., Ph.D.
 Hwang, Eun Ju, M.S.
 Jones, Paul A., M.S.
 Kurath, Gael, Ph.D.
 Michaels, Nancy J., M.S.
 Nielsen, Brent L., Ph.D.
 Orberg, Paulo K., Ph.D.
 Zaldivar, Mercedes, M.S.

- 1986 -

Demezas, David H., Ph.D.
 Huang, Manley T. F., Ph.D.
 Hughes, Jeffrey A., Ph.D.
 Khosravi, Lewa, Ph.D.
 Lewis, Thomas A., Ph.D.
 Matalon, Marcelo E., M.S.
 Rajagopal, S.N., Ph.D.
 Salih, Mohammed A., Ph.D.
 Tsai, Huai-jen, Ph.D.
 Walker, Helen M., M.S.
 Watanabe, Robin A., M.S.
 Weinrich, Scott L., Ph.D.

- 1987 -

Gambie, Jay E., M.S.
 Holt, Richard A., Ph.D.
 Low, Christopher S. F., Ph.D.
 Lu, Yuanan, M.S.
 Moffitt-Westover, Cheryl L., M.S.
 Parker, Ricardo, Ph.D.
 Roseman, Nancy A., Ph.D.
 Song, Yen-Ling, Ph.D.
 Valdivia de Capo, Blanca, M.S.
 Villarreal, Elcira C., Ph.D.
 Weinrich, Scott L., M.S.

- 1988 -

Barrie, Rosemary J., M.S.
 Bartholomew, Jeri L., Ph.D.
 Engelking, Henry M., Ph.D.

Feyerheisen-Koener, Josette, Ph.D.
 Gelford, Inga, M.S.
 Gilmore, Robert D., Jr., Ph.D.
 Irwin, Michael J., Ph.D.
 Lindburg, Katherine, Ph.D.
 Manning, Donald S., Ph.D.
 Moyer, Craig, M.S.
 Pipoppinyo, Somsak, M.S.
 Rhodes, Albert N., M.S.
 Roberti, Kellee A., M.S.
 Tower, Paula A., Ph.D.
 Tripp, Ralph A., Ph.D.
 Tsuji, Masayoshi, Ph.D.

- 1989 -
 Amthor, Kerstin, M.S.
 Arkoosh, Mary, Ph.D.
 Avedovech, Richard M., Jr., Ph.D.
 Dashti, Narjes H., M.S.
 Gradin, Joseph L., Ph.D.
 Holmes, Harvey T., Ph.D.
 LaPatra, Scott E., Ph.D.
 Miner, Jeffrey N., Ph.D.
 Piacentini, Stephen C., M.S.
 Rockey, Daniel D., Ph.D.
 Tamin, Azaibi, Ph.D.
 Turaga, Prasad, Ph.D.
 Yamada, Masahiko, M.S.

- 1990 -
 Britschgi, Theresa, M.S.
 Evans, Paul D., Ph.D.
 Gander, Lise M. K., M.S.
 Kanchanakhan, Somkiat, M.S.
 Valladao, Marilin, M.S.
 Xu, Li, M.S.

- 1991 -
 Black, Margaret E., Ph.D.
 Schaefer, Tim, Ph.D.
 Shanks, Carol A., M.S.
 Valyasevi, Ruud, Ph.D.
 Yap, Kathryn H. M., M.S.

- 1992 -
 Benkerroum, Noredine, Ph.D.
 Cheng, Hsin-Hua, M.S.
 Child, Stephanie J., Ph.D.
 DeKoning-Loo, Jenefer, Ph.D.
 Drongesen, Jeffrey E., M.S.
 Kasornchandra, Jiraporn, Ph.D.
 Leung, Kam T., Ph.D.
 Mason, Carla, Ph.D.
 Rutherford, Gregory J., M.S.
 Tenglesen, Leslie, Ph.D.
 VanSlyke, Judy, Ph.D.
 Wiens, Gregory, Ph.D.
 Wyckoff, Herbert A., Ph.D.

- 1993 -
 Faessler, Patrick C., M.S.
 Gutenberger, Susan K., Ph.D.
 Salama, Maysoon Subhi, Ph.D.

- 1994 -
 Chen, Donald Darwin, M.S.
 Cheung, Kuen, M.S.
 Lee, Pei-Yu, Ph.D.
 Lindbo, John A., Ph.D.
 Monteville, Marshall Reno, M.S.
 Ortega, Henry William, M.S.
 Ravanello, Monica Paola, Ph.D.
 Strain, Steven Ray, Ph.D.
 Teo, Alex Yeowlim, M.S.
 Whitehead, Stephen S., Ph.D.
 Whitehead, William E., Ph.D.
 Wood, Patricia Ann, Ph.D.

- 1995 -
 Haddad, Michael Alexander, M.S.
 Levata-Jovanovic, Marina, M.S.
 Ormonde, Patricia A., M.S.
 Piganelli, Jon Darren, Ph.D.
 Shapiro, David A., Ph.D.

- 1996 -
 Dierksen, Karen P., Ph.D.
 Mauel, Michael John, Ph.D.
 Mourich, Dan Vincent, Ph.D.
 Musafija-Jeknic, Tamara, M.S.
 Phillips, David, M.S.
 Trobridge, Grant David, Ph.D.

- 1997 -
 Bruslind, Linda, Ph.D.
 Chiou, Pin Wen, Ph.D.
 Ebel, Wolfgang, Ph.D.
 House, Marcia Lynn, Ph.D.
 Wallace, Stacey Ellen, Ph.D.
 Wright, Terah Diane, M.S.

- 1998 -
 Gray, Diane Renee, M.S.

Note: Listings of graduates and undergraduates were prepared from the best available university records. Please contact the Department of Microbiology with any additions or corrections.

Oregon State University Microbiology Department Undergraduate School Graduates

- 1908 -
Elrod, DeWalt Quinn, B.S. Thesis
- 1910 -
Hess, Ruth J., B.S. Thesis
Jackson, Laura E., B.S., Thesis
- 1923 -
Prouty, Charles Clarence
- 1933 -
Kerr, Maurice Paul
- 1935 -
Gross, Noel Harden
- 1937 -
Hazen, Quinten Douglas
- 1939 -
Rearden, Donald
- 1940 -
Hanna, Jean Lavelle
- 1941 -
Craner, Carlton Hubert
Doty, Charlotte Louise
Takalo, David Swain
- 1942 -
Baucke, Robert Ulfred
Cook, Richard Ernest
- 1943 -
Countryman, Jean Louise
Haller, Ellen R.
Lambrecht, William Anthony
- 1944 -
Kelley, Kathryn Ann
- 1945 -
Cain, Patricia E.
DePenning, Coral Beth
Doherty, Alice Winifred
Kingston, Mildred G.
Purtzer, Bette V.
Shaffer, Ruth E.
- 1946 -
Weatherford, Judith Anne
- 1947 -
Dunham, Barbara Anne
Evenson, Margery Ann
Kimmell, Jerre Geanne
Parsons, Eleanor Jeanne
Preble, Samuel Hale
Van Arsdell, Anita M. Teter
- 1948 -
Filz, Colleen Dougherty
Hansen, Arthur William
Sarazin, Margaret E.
Walker, Lila Lee
- 1949 -
Fultz, Donna Jean
Garrett, Virginia Ruth
Keesling, James Worth
Watson, Gerald Harvey
Wilson, Barbara Jane
- 1950 -
Baker, Jean
Buren, Nancy L.
Parker, Richard Bennett
Pixley, Audrey Evelyn
Rebagliati, Carla Chita
Smith, Vincent Norris
Wagstaff, David Gesell
- 1951 -
Cahill, Gwendolyn
Estabrooks, Ray Gilbert
Estabrooks, Robert G.
Fletcher, Donald Warren
Frith, Harry Cornelius
Lee, Tot Earl
Mills, Herman Erwin
Ogden, Wilbur Lee
Wellman, Eugene Alvin
- 1952 -
Hebert, Beverly Jean
Koontz, Marion Tull
Kosai, Masayoshi
Noller, Eric Charles
Trosper, Frances Ramona
- 1953 -
Boland, Thomas Gerald
Countryman, Joan Lucia
Okano, Yoko
Rose, Bill Horace
Skaar, Roger Wayne
Stoner, John Caldean
Suhr, Barbara Ann
- 1954 -
Busch, Bonnie Marily
Damsky, Leon Joseph
Deeney, Hugh Jerome, Jr.
Duryee, Frances Louise
Edwards, Elizabeth Joan
Folston, Beverly Jeannine
Hamilton, Archie Young
Lundgren, David Lee
Sono, Francis Yayoi
Watkins, Sprague Hammond
- 1955 -
Black, Minerva Kay
Helser, Sally Rose
Huskey, James Edward
Kohler, Gordon Dale
Lindell, Gary Arthur
Thompson, Delores Evelyn
Vortouni, Leo Aran
- 1956 -
Armstrong, Joan Dennis
Hahn, Patricia Kaoh
Stone, John Harry
- 1957 -
Fukuda, David Shuichi
Luther, Mary Faythe
McBurney, Janet Elaine
Mihata, Ronald Tamosu
- Palmer, Fred Eugene
Wetten, Madeleine Carmen
Whang, Sukoo Jack
- 1958 -
Rash, Kenneth Edward
- 1959 -
Chisum, Patricia Ann
Corlett, Donald Alexander, Jr.
Gawel, Len Joseph
Griep, Sheila A.
Lal, Prabhu
Purkerson, Lorus Lee
Waterhouse, Joanne P.
- 1960 -
Chapman, James David
Fisher, Clark Alan
Moran, Ardith Louise Stewart
Neal, John Lloyd, Jr.
Niedra, John
O'Brien, Terence John
Saunders, Grady Franklin
Saunders, Priscilla Prince
Spence, Kemet Dean
- 1961 -
Bennett, Robert William
Castric, Peter Allen
Gwinn, Darrel Dean
Johnson, Sandra Sue
McGregor, Sandy
McMorris, Joanmarie
Miller, Judy Lynne
Overholser, Donald Lee
Roberts, Karen Joyce
Turner, Jan Ross
Turner, Nikki Lynn
- 1962 -
Ford, Eleanor Gay
Hendricks, Elizabeth Ann
Lowe, Robert George
- 1963 -
Alber, Donna Marie
Hauser, Bruce Allen
Mendenhall, Sherry Ann Hilton
Mitzel, John Richard
Nelsen, Sharon Louise
- 1964 -
Allen, Aurelia Juanita
Anderson, Gerry Charles
Baker, Leona Georga
Baxter, James Francis
Broughton, William Hart
Dornlas, Edward Albert
Fieber, Diana Annette
Hayes, Sidney Joseph
Kerr, Barbara C.
Mahaney, Carole Gene
Marshall, Trudie
Miller, Judy Harmon
Nazeeri, Patsy
- Quinn, Dorothy Jean
Settergren, Mary Gertrude
Stanley, Helen Frances
Walter, Leslie Alva
- 1965 -
Byers, Karen Maureen
Clasby, Robert Charles
Colonna, Robert
Cookson, Clifford Roger
Damm, Linda Lee
Galloway, James W.
Hansen, Elizabeth Catherine
Hedges, Nancy Ellen
Holmes, Janice Rae
Kienle, Dona Lee
Koerner, Peggy Gail
Miller, Wayne Warren
Miyahira, Richard S.
Oji, Raymond T.
Smith, Terry Lee
Snyder, Judith C.
Thompson, Judith Ann
Tolls, Terry Norman
Williams, Juanita Leonore
- 1966 -
Bumgardner, Judith Ann
Ehlke, Theodore Allen
Landry, Lee Edgar
Leighton, Terrance James
Miller, Mary Lou
Ness, Terence Milton
See, Thomas Evert
Shaner, Coralie Ann
Troutd, Jean Ann
Vandewater, Judy Gay
Weider, Linda Lorraine
Widdowson, Terry Ellen
- 1967 -
Brightman, Lorraine D.
Cate, Stephen H.
Folston, Wendy M.
Geertgens, William W.
Gould, Rowan W.
Hollenbeck, James M.
Ives, Merlyn M.
Klote, Linda F.
Lau, Ellie Y. S.
McCartney, Don S.
McCoy, Judith A.
Pacha, Jeanette L.
Petrey, Susan C.
Ragland, Willis E.
Richter, Carol J.
Robertson, Terry G.
Schnore, Elizabeth
Shook, John H.
Tsutsumi, Steven H.
Verhoeven, Margaret A.
Wood, Duane G.
Yankus, Rozillah A.
Young, Christine L.
- 1968 -
Beal, James C.
Cole, Faith Ann
Engle, Alice J.
Harrison, Michael J.
Henderson, Cynthia S.
Herring, Steven L.
Johnson, James K.
Lin, Nancy L.
Lytle, John D.
Miller, Dale E.
Miller, Lawrence R.
Rouse, Charles H.
Wassermann, Lawrence J.
- 1969 -
Barta, James J.
Boeck, Regina A.
Broschart, Kathryn
Felix, Paula L.
Garmon, Franklin C.
Hamlin, Alice Anne
Hiatt, William R.
Holtett, Marcia E.
Inman, Carl Douglas
Keniston, Richard C.
Kudrna, Robert D.
McCluskey, William
Nelson, Jim Steele
Ngai, Timothy N.
Peterson, Joel Edward
Petrsek, Stanley
Sawyer, Valerie Lee
Shiroyama, Tamotsu
Sokolow, Robert
Utt, Nancy Rae
Zeiler, Bruce Denston
- 1970 -
Baker, Ellen
Eubanks, Nancy M.
Hytowitz, Allan N.
Kelso, Richard L.
Laidlaw, Robert
Peters, James Edward
Probasco, Thomas C.
Roberts, Marlene Kay
Schulmerich, Edward
Snyder, Gary Dale
Supboonrod, Surang
Udey, Lanny Richard
Welty, Anne V.
Wright, Sandra E.
- 1971 -
Bentley, Susan Kay
Bund, Catherine Denise
Chia, Teresa Wai-Lan
Friend, Ernest Allen
Gloor, Louis Ortmann
Grabenhorst, Danna J.
Hazen, Ronald Eugene
Loh, Tien-Chu
Lundy, Daniel Wayne

Petrotta, Therese Frances
 Purves, Robin Bruce
 Ruddick, John Henderson
 Stevens, Alan Mark
 Teramura, Dinah J.
 Tuckey, Janette K.
 VanHoeter, Lorene
 Wilpan, Sheldon A.
 Yunck, John Richard

- 1972 -

Allen, Jack E.
 Anusewicz, John S.
 Buckley, Barbara M.
 Burns, Sharon
 Carr, James B.
 Collins, Floyd W.
 Demo, Diane M.
 Enyart, Carol A.
 Exall, John S.
 Geist, Gregory D.
 Greenley, Dale R.
 Hansen, Kris L.
 Hayes, Steven C.
 Hess, Yvette E.
 Jeffery, Mark B.
 LaChance, Michelle C.
 Livingstone, Donald B.
 Maclean, Bruce K.
 Moshberger, Mary J.
 Peterson, Patricia L.
 Pope, Carlene L.
 Powelson, Steven
 Riverman, Moreen T.
 Sablan, Mildred T.
 Sandberg, Greg K.
 Shaw, James D.
 Takacs, Sandra L.
 Tuchscherer, Tyson N.
 Wood, Laura L.

- 1973 -

Ashley, Joel G.
 Atento, Lourdes R.
 Bartley, LeAnn M.
 Brandenburg, Janice L.
 Bridenbaugh, Mary A.
 Brown, Carol
 Burson, Lynda M.
 Carpenter, Ruth E.
 Chaffin, Gary A.
 Costello, James S.
 Davis, Jacque L.
 DeLap, Janine M.
 Dominguez, Stephen E.
 Fiscali, John B.
 Foland, Michael A.
 Fung, Pak Tuen
 Gradin, Joseph L.
 Gribskov, Douglas A.
 Groberg, Warren J.
 Gulstrom, Timothy J.
 Hansen, Ralph S.
 Harris, Diane
 Henry, Linda S.

Herbert, Greg L.
 Hruby, Dennis E.
 Johns, Chester T.
 Johnson, Patricia M.
 Kashiwada, Arlene M.
 Katterson, Kathy J.
 Kelm, Ronald S.
 Knapp, Virginia
 Knoper, Jane A.
 Lee, Donna D.
 Lowe, Brian W.
 Mace, Dyke C.
 McDaniel, Patricia A.
 Meisler, Sheri J.
 O'Connor, Mary E.
 Piper, Penny L.
 Portmann, Marsha A.
 Rehder, Rebecca A.
 Reynolds, George M.
 Shuffield, Sandra G.
 Sims, Samuel M.
 Skinner, Joan D.
 Sollars, Rolin V.
 Sudduth, Robert M.
 Toolson, Kathleen
 Turnbull, Floyd A.
 Woodward, Janet R.
 Worley, Randy A.
 Wright, Margaret A.
 Yung, Yee-Ping

- 1974 -

Adams, Steven Douglas
 Bailey, Gloria Jean
 Bailey, Scott Alexander
 Baranoff, Alexander Eugene
 Berg, James Carl
 Bleha, Diane Louise
 Burgin, Ronald Glen
 Bye, Kristine
 Caldwell, Bruce Alan
 Calkins, Peggy Louise
 Chan, Harriet Bick-Har
 Coffey, Susan Marie
 Collier, Robert Douglas
 Curry, Timothy Andrew
 Doe, Robert Harold
 Drake, Nancy Carol
 Eby, Christina Marie
 Eddy, Victoria Jean
 Edwards, Sherrie Horning
 Erickson, Michael Dale
 Funatake, Gary Kay
 Gilbert, Richard Walter
 Haag, Steven Michael
 Halim, David Husien
 Heuschkel, Melinda Sue
 Hill, Nancy Jean
 Holtzclaw, Pamela Sue
 Johnson, Sally Jo
 Knapp, Mary Patricia
 Linford, Eric James
 Malstrom, Darrell Wayne
 Matlock, Susan Marie

Mays, Edwin Leroy, Jr.
 McCann, Timothy J.
 McNaught, Kenneth A.
 Micik, James William
 Moore, Mary Frances
 Munyon, James Robert
 Nelson, Susan Kay
 Nichols, Rodney Scott
 Nock, Paul Webster
 Okita, Gayle Suzanne
 O'Leary, Patrick J.
 Orchard, Michael James
 Petersen, James G.
 Peterson, Susan Marie
 Power, Vincent Searle
 Sawyer, Gary Alan
 Schulz, David Charles
 Stranberg, Virginia Ann
 Talbot, William Harper
 Taylor, Allen Whitfield
 Teramura, Gayle Teresa
 Terpin, Lynne Marie
 Tolle, Jerry Lee
 Tso, Chee Wah
 Waarvick, Christopher Eric
 Wan, Angel Miu-Ling
 Wang, Jan-Hwa
 White, Wendy Michele
 Yu, Pak Lam Ben

- 1975 -

Adcock, Kim Allyn
 Allen, Donald Ray
 Ambrosion, Craig Nathan
 Ankarberg, Helen E.
 Barnwell, John W.
 Bingham, Alan Kent
 Britain, Gerald Leroy
 Carr, Mary Elizabeth
 Chloupek, Susan Leslie
 Cote, Kenneth Duane
 Dority, Deri Carolyn
 Dunlap, Paul Vernon
 Evans, H. Lee
 Fagel, Deborah Ellen
 Ford, April Diane
 Gale, Deborah Joyce
 Garrett, Signe Ann
 Glendinning, Cynthia L.
 Haas, Ingrid Elizabeth
 Hedrick, Ronald Paul
 Hessler, Steven George
 Holbrooke, Marsha Marie
 Hudziak, Robert Michael
 Jack, Elizabeth Anne
 Jewett, Patricia Anne
 Joplin, Heidi Joanne
 Kanetoki, Tsunetada Ken
 Kinney, Gail Marie
 Krause, Charles E., II
 Kwan, Elizabeth
 Lowery, Arthur Newton
 Marlowe, Robert Lane
 McGraw, Michael Alan

McLean, Thomas Cutts
 Morrison, Angela Mary
 Naemura, Laurie Gertrude
 Nelson, Frederick J.
 Nyden, Bruce Brent
 Olson, Cynthia Sue
 Pandian, Verson E.
 Pierce, Dianne Margurette
 Price, Jacquelyn Ann
 Ramsey, Linda Diane
 Ranzoni, Marc William
 Reher, Phillip Gale
 Reid, Reilly O.
 Rice, Michael James
 Roberts, Ruth Evelyn
 Roelke, Melody Elizabeth
 Rouse, Kim Jeanette
 Stahl, Brian Robert
 Tanaka, Susan Sueko
 Tasto, Mary Anna
 Van Tongeren, Valerie
 Wallin, Candace Eileen
 White, Thomas H.
 Williams, Gary Joe
 Willis, Peter Cory
 Yamamoto, Deborah K.
 Young, Emmett Roree
 Zerr, Kent Scott

- 1976 -

Abbott, Paul L.
 Asche, Patricia S.
 Atherton, Claudia E.
 Banks, Laura L.
 Beavers, Kathryn L.
 Bolduc, Emilie C.
 Booth, Michael W.
 Bremer, Kathy C.
 Brimhall, Belinda A.
 Brown, Kenneth E., Jr.
 Brown, Sandra K.
 Cabe, Linda M.
 Canady, Randy M.
 Carlson, Ray E.
 Carson, Julie B.
 Caspers, Mark E.
 Clark, Sheldon R.
 Culwell, Donna J.
 Daniell, Suzanne D.
 Daniels, Cynthia J.
 Dietrich, Michael W.
 Doenges, Michael G.
 Donohoe, Bruce W.
 Epling, Ruth E.
 Finley, Loren C.
 Fisher, Wanda L.
 Fitzgerald, Donna M.
 Foiles, Peter G.
 Frassetto, Eugene A.
 Gallagher, Daniel L.
 Gilmore, Barbara
 Green, Marc A.
 Harms, Karen R.
 Hicks, Joelynn

Hutchinson, Vannin M.
 Jose, Ramon M.
 Juilfs, Michael E.
 Jung, Craig R.
 Lawrence, Shelley K.
 Libby, Ronald M.
 Mach, Tuan L.
 McKnight, Gary L.
 Meyer, Charles E.
 Miller, Deborah J.
 Neal, William D.
 Nicholas, Philip A.
 Nye, Christy A.
 Nygaard, Michael D.
 Oberg, Ronald K.
 Otto, Catherine N.
 Peters, Brenda L.
 Reed, Thomas R.
 Riccio, Edward S.
 Rice, Jacqueline
 Rodriguez, Jane K.
 Sadewick, Gary A.
 Seabaugh, Robert C.
 Sharman, Ronald M.
 Smieja, Linda L.
 Smith, Martin W.
 Stafford, Carolyn J.
 Staver, Michael J.
 Stott, Diane E.
 Stratton, Craig H.
 Taylor, Jo Kristina
 To, Esther S. K.
 Troyer, Edwin A., Jr.
 Tse, Tan Lee D.
 Webb, Gordon V.
 Werst, Kurt C.
 Wittig, Heike
 Yoshinaga, Derrick H.
 Yugawa, Thal I.
 Zollner, Bernard J.

- 1977 -

Allison, Daniel S.
 Andrew, Michael Paul
 Aona, Georgia Frances
 Barnes, Debra Elaine
 Barnes, Gary Crafton
 Bolf, Ron Bruce
 Bratcher, Michael Eugene
 Buehler, Mark James
 Burns, Lesley Ann
 Carlson, Eric Valdemar
 Carter, Brian D.
 Corliss, Kerry Lee
 Crosby, Debbie Kaye
 Early, Patrick Ray
 Flemm, Gail Marie
 Gambee, Jay Edwin
 Haack, Kathy Jo
 Henderson, Gregory William
 Higley, Debra Anne
 Hisaw, Frederick L., Jr.
 Housley, Regina Mae
 Howard, Merrill Payson

APPENDIX

Hughes, Debra Ellan
 Hughson, Daniel Lee
 Ishida, Brian Yoshihisa
 Johnsen, Debra Rae
 Kaufman, Randy Wayne
 Kibbey, Heather Jean
 Kiest, K-Lynn
 Lashway, Elizabeth Kathleen
 Lindley, Kerry Lynn
 McKenzie, Barry Allan
 Mooers, Darrell Paul
 Namba, Michael S.
 Nelson,
 (Fromwiller) Patrice A.
 Parker, Debra Lee
 Porter, (Johnson) Pamela Jay
 Reif, Donald L.
 Rose, Constance J.
 Schwab, James R.
 Schwartz, Victor A.
 Shukle, Cynthia L.
 Smith, Hollis A.
 Spencer, Victoria Ann
 Strong, Beatrice S.
 Swan, Ingrid C.
 Upton, Susan J.
 Vallancour, Cathy S.
 Van Beveren, Jeff E.
 Weis, John H.
 Westlein, Susan L.
 Wienert, William J.
 Wise, Kim P.
 Witt, Katherine A.
 Wong, Steven D.
 Yang, John H.

- 1978 -

Adams, Catherine Ruth
 Bakkensen, Laurie Jean
 Barry, John Winston
 Besel, Susan Cheryl
 Blomberg, Paul Lynn
 Carlson, Marilyn Elaine
 Carpenter, Jan A.
 Collins, Bruce Patrick
 Compton, Gary L.
 Curtner, Debra Ann
 Detwiler, Kevin Robert
 Devore, Jeffrey E.
 Eisenhut, David V.
 Eldred, (Erkkila) Mary Lou
 Eltzroth, Roberta C.
 Greene, Jerome E.
 Hall, Shelley Cathleen
 Hannon, Jeffrey A.
 Hanson, Gary Wayne
 Harding, R. Michael
 Hedtke, Sandra Rae
 Hendrix, Pamela Yvonne
 Hollander, William H.
 Hopper, Patricia Sue
 Huegelmann, Karen Amanda
 Kawamoto, Karen
 Kelley, Patsy Ellen
 Klosterman, William J.

Kranick, Barbara Prahar
 Kropf, Leisa J.
 Lamping, Dawn Marie
 Laurinat, Larry William
 LeChevallier, Mark William
 Loosley, Judith Marian
 MacDonald, Diane Lynn
 Markeson, Daniel James
 Mayfield, Mary Beth
 Morrow, Cynthia Ann
 Naas, Bonnie Sue
 Palm, Harry Douglas
 Parker, Barbara Leigh
 Pierce, Bartram J.
 Pituksuteepong, Niramom
 Quinn, Toni A.
 Rieck, Ellen Kathleen
 Riley, James David
 Silen, Joy Lenore
 Silver, Lauren
 Stoner, John Timothy
 Tanabe, James Takao
 Thomas, Julia Carol
 Vazquez, Guillermo William A.
 Virden, Steven Charles
 Wilkinson, Lauretta Jayne
 Williams, Peggy Annette
 Wyman, Michael Bruce

- 1979 -

Allen, Carol Marie
 Anker, Douglas Rees
 Atchison, Holly
 Barfknecht, Karin Ann
 Bellinghausen,
 Michael Francis
 Bentley, Robert Wells
 Boughton, Patricia Ann
 Bowman, Sandra Brooke
 Broeffle, Loree Caye
 Caldwell, Dan Gordon
 Cameron, Daniel Robert
 Campbell, Robert J.
 Creed, Kelly Louise
 Dilschneider,
 Raymond Eugene
 Dohman, Thomas Philip
 Dye, Kathie Linn
 Fowke, Robert Andrew
 Frolander, Elizabeth Anne
 Gallagher, Laura Ann
 Gherrity, Patrick Walker
 Gilmont, Robert Russell
 Gray, Jonathan Lee
 Grothaus, Julia Allen
 Hafdahl, Barbara Lynn
 Hanna, Rodney Michael
 Hanson, Danny Melvin
 Hardison, Susan Eileen
 Harrold, Patricia Anne
 Heine, Kyra Pauline
 Heller, Richard
 Henderson, Lorna Jean
 Holzgang, Larry Robert
 Houde, John Neil

Hunnicut, Gary R.
 Kay, William Allen
 Kelley, Constance Osher
 Kelly, Joseph Patrick
 Kester, Terry Dewain
 Kiyokawa, Gerald Lee
 Kondo, Jeffery Keith
 Kroner, Philip Anton
 Kronstead, James Warren
 Larsen, Ronald Rion
 Lee, Austin John
 Leslie, Mary Virginia
 Libby, Debora Ann
 Luck, Timothy Gene
 MacDonald, Margaret Russell
 Mallon, Margaret Mary
 Morrow, Debra A.
 Morrow, Ingrid Karla Maria
 Nakamura, Midori
 Norris, Martin Robert
 Player, Mary E.
 Rahimi, Mitra Baradaran
 Rohrberg, Susan Diane
 Schaaf, Karen Frances
 Schor, Michael William
 Scott, Judith Lynn
 Senechal, Patricia Lynn
 Shigeno, Debra Sue
 Smith, James Robert, III
 Smith, Madalyn Corinne
 Snyder, Ramona Lee
 Ulman, Carrie Lynn
 Vitt, Susan Ann
 Vorphal, Welsey Norman
 Wheeler, Tina Leslie
 Williams, Rhonda Marlene
 Willoughby, Elizabeth Eva
 Woodruff, Janice Rae
 Zielske, David Robert

- 1980 -

Anderson, William Howard
 Armentrout, Teresa Kim
 Bolz, Gudrun Karin
 Bontrager, Lori Santilli
 Borg, Carl Edward
 Braukmann, Patricia Ann
 Broich, William Alfred
 Campbell, Lisa Jean
 Cheever, Jodi Marie
 Dunham, Holly Jean
 Dunten, Charlene Ann
 Farmer, Pamela Frances
 Ford, Janet Renee
 Geist, H. Dean
 Gustafson, Charles M.
 Hallin, Mary Jean
 Hansen, Dan Roland
 Heineck, Carol Ann
 Horn, Rebecca M.
 Hutchcroft, Jill E.
 Joseph, Cecilia Maureen
 Kobayashi, Loraine Miek
 Kuhl, Katharine Lynn
 Lien, Elizabeth Anne

Martin, Teresa Ann
 Molsberry, Grant Steven
 Ollivant, Dan E.
 Ostlund, Denise Louise
 Pecevich, Jennifer Ponas
 Poulos, Teri Lynne
 Roner, Michael Robert
 Ross, Mary Jane
 Sadri, Touti Mahtab
 Scherzinger, Jerome H.
 Scheuermann, Trina Ann
 Shaw, Katherine Mae
 Short, Kevin Allen
 Sichling, Anne Sabine
 Smith, Betty Elaine
 Smith, Carin Alane
 Smith, Roderick R.
 Stalley, Jeffery Alan
 Stewart, Shelley Dorice
 Styskel, Marli Susan
 West, Dale Arlin
 Yoshihara, Faye Mariko
 Yu, Eileen Rose

- 1981 -

Anderson, Curt Bradford
 Anderson, Valerie Lynelle
 Baker, Martha Anne
 Calhoun, Kenneth Lee
 Chiappe, Sandra Judith
 Clemmons, Judith Ann
 Coddington, Michael Ray
 Demezas, David H.
 Edmondson, Lynn Louise
 Falley, Scott Wayne
 Foland, Carolyn Hurst
 Ford, Kristine Anne
 Gabourel, Allison Jo
 Hursh, Debra Ann
 Irwin, Patricia Lorraine
 Jolma, Eva Ingrid
 Kang, Kyung-Ae
 Kuehnert, Calie Jean
 Lattin, David Gordon
 Lester, Robert Jon
 Lindblad, Nancy J.
 McCafferty, Leslie Ann
 McGehee, Otto Wayne
 Moon, Barbara Gwenn
 Nordlund, Joanne Cecile
 Prestis, Brenda Lynn
 Rae, Madeline Aann
 Rose, Barbara Jean
 Roth, Melissa Lee
 Saugen, Ann Marie
 Schimel, Susan Marlene
 Schutt, Debra Deanne
 Seger, Joyce Marie
 Setniker, Melissa Charlene
 Terry, James Michael
 Thoming,

Christopher Spring
 Wood, Scott Denison
 Yahnke, Barbara Jo

- 1982 -

Baca, Steve
 Barfknecht, Kim Allison
 Bender, Randall Craig
 Berman, Frederick William
 Coddington, Kent Douglas
 Dannen, Kim Douglas
 Di-Tomasso, John Paul
 Erbes, Kim Lorene
 Eslami, Maryam P.
 Fullhart, Julianne
 Gentry, Bradford David
 Gettis, Valerie Ann
 Giddens, Billie Carol
 Giffoni, Joseph Peter
 Harfst, Patrick Lee
 Jackimec, John Michael
 Jackson, Donna Christine
 Johnson, Jeffrey Keith
 Kurtz, Patti Marie
 McMIndes, Joan Susan
 McNabb, Todd A.
 Moffett, Ginnie Lee Tehani
 Moreno, Edward Matt
 Morita, Peter Wayne
 Mueller, Donald Harry
 Orle, Karina Anna
 Roberts, Arthur William
 Rowe, Amy Elizabeth
 Sadri, Soghra
 Schlehofer, Thomas Joseph
 Schlingman, Dyrk Herman
 Schrank, Nancy Kay
 Shimizu, Cathleen Nobue
 Smith, David Foster
 Strough, Lila Sue
 Tigner, Lori Ann
 Vockert, Stephen Paul
 Wade, Jennie Ann
 Waite, Bruce Kevin
 Warzyn, Michelle Faith
 Weeden, Yvonne Marie
 Wickman,
 Kathleen Suzanne
 Zittlosen, Russell Howard

- 1983 -

Baker, Colleen Jane
 Ball, Marilyn
 Bartels, Cathy Lee
 Biggs, Kerri Lynn
 Bustamante, Patricia Del
 Chandler, Pamela Jane
 Christensen, Laurel A.
 Cornell, Kenneth Allison
 DePriest, Penni Sue
 Dinger, Sheryll Eva
 Domenighini,
 James Michael
 Draper, Tracy Ann May
 Dudley, Karol Lee
 Edling, Michelle Emilie
 Ford, Kristine Anne
 Gabourel, Candice Mary
 Garrett, Philip Wistar

APPENDIX

Graham, Molly Dawn
 Hammer, Peggy Sue
 Haskell, Catherine Jean
 Hedges, Daryl Ellsworth
 Iredale, Bruce Joseph
 Jensen, Mark Edward
 Jordan, Marilyn Marie
 Jordan, Wendy Sue
 Kracke, Margaret Ann
 Krantz, Karen Louise
 Lebeck, Benjamin Paul
 Lobb, Linda Jean
 Lorenz, Robert Todd
 Lowes, Michael Douglas
 Maier, David Kent
 Mason, Sherie Lynn
 McBroom, Susan Marie
 Menache, Lynda Ann
 Nelson, Bryan Wayne
 Nogami, Anne Kiyoko
 Norland, Joanne Cecile
 Obeidi, Osama M.
 Poage, Dona Jo
 Rask, Bart Paul
 Retzlaff, Betty Jean
 Rush, Sherry Lynn
 Schutt, Debra Deanne
 Scotto, Lisa Anne
 Small, Christopher Lyle
 Smith, Sean K.
 Stanley, Steven Everette
 Stroud, Mark Richard
 Tokita, Mari L.
 Vitt, Susan Ann
 Walker, Helen Marguerite

- 1984 -

Albeke, Gregory Christian
 Beemer, Kyle Richard
 Belozor, Marylou Lucille
 Betancur, Carmen Lucia
 Bistodeau, Nancee Diane
 Britt, Deborah Elaine
 Cornforth, Teresa Mary
 Curry, Susan Elizabeth
 Dekker, Elise Louise
 Eisenhut, Abigail Lee
 Elgarguri, Awad Mohamed
 Gage, Julie Ruth
 Gowen, Paul Curtis
 Haberman, Joseph J.
 Hodges, Walter Milo
 Holmes, Carri Lyn
 Jepsen, Katrina Lynn
 Kathrein, Julie Marie
 Keaton, Christopher Mark
 Kennedy, Christopher Paul
 Kile, Luann Gail
 Mackewicz, Carl Eddy
 Marsh, Lisa Margaret
 McDonald, Jeffrey Howard
 Melrose, Jennifer Elizabeth
 Meyers, Rhonda Lynn
 Neal, Randall Howard

Norton, Douglas Dean
 Ozga, David Andrew
 Palanuk, Sharon Lee
 Petersen, Michelle Ann
 Raible, Patricia M.
 Redfern, Kember Lee
 Reeve, Paula Andrea
 Ryles, Ashley Marie
 Schildbach, William Martin
 Schulke, James William
 Shepard, Margaret Rose
 Smith, Shonda Yvonne
 Stankus, Seth John
 Staudaher, Michael V.
 Stevens, Todd Owen
 Stewart, Catherine Ann
 Swartz, Cheryl Ann
 Uchiyama, Pamela Joyce
 Wampler, Randall L.
 Wanner, Holly Gaye
 Weddle, Kristen Mary
 Wilson, Elizabeth M.
 Yasuda, Malcolm K. M.

- 1985 -

Bailes, Kathryn Ann
 Bangs, Peter Lawrence
 Barnes, Janette Lynn
 Blanchard, John I.
 Cannon, Elizabeth Susan
 Cerul, David Edward
 Colwell, Gregory William
 Dowdy, Valerie Lynn
 Elott, Kathryn Susan
 Fear, William F.
 Fellows, Jeffery Nolan
 Gelford, Inga Leigh
 Hamilton, Andrew Shawn
 Haynes, Jennifer A.
 Irving, Michael Louis
 Jones, Diane Michelle
 Klappenbach, Kurt Michael
 Loo, Deryk Thoms
 Madarang,
 Samuel Eijansant
 Magnuson, Sharon Ann
 Mason, Carla Lynn
 Meza, Thalia G.
 Nwosu, Julius Ukwu
 Onjukka, Samuel Timothy
 Ostermeier, Mark Alan
 Parkins, Jeffrey Scott
 Peplinski, Andy Raymond
 Rasmussen, Mark John
 Rhodaback, Lorie Jane
 Rush, Janet Mary
 Saldana, Tina Marie
 Scheuble, Todd Leslie
 Sullivan, Ann Patricia
 Tally, Deborah Jean
 Trainer, Kimberly Patricia
 Verdon, Kevin W.
 Warnke, Janice Marie
 White, Thomas R.

Wilhelm, Larry John
 Willard, Sherri Juliana
 Zulauf, Michael Henry

- 1986 -

Armstrong, Karen Jeanne
 Austin, Harry Anthony
 Barbour, Katherine Anne
 Berlin, Marcus Alexis
 Boechler, Janita Marie
 Buehler, Knute Carl
 Cary, Susan Marie
 Cleall, Wayne John
 Clemons, Aaron Arthur
 Cook, Jon Clifton
 Creson, Jennifer Rose
 Danley, Phillip Anthony
 DeKoning, Jenefer Jean
 de la Cruz, Anna Liza Arcois
 Gilbertson, Krista Jean
 Goates, Judy Kay
 Golbek, Sharon Jeanne
 Haddad, Karen Racheal
 Hoffman, Peter Donald
 Howard, Eric D.
 Inhara, Bradley Takashi
 John, Timothy Dale
 Johnstone, Brian Harold
 Jones, Harper Llewellyn
 Kelleher, Susan Marie
 Landowski, Terry Hinz
 Machida, Steven Masuo
 Maio, Susan Marie
 Mitchell, Darrel Waite
 Morales, Nancy Renata
 Morgans, Donna Lynne
 Nelson, Todd Anthony
 Nordquist, Katrina Marie
 Nygaard, Kristi Lynn
 Omstead, Carl Albert
 Ormond, Carla Diane
 Piacentini, Stephen Carl
 Pope, Edward Ernest
 Prince, Valerie Jean
 Raby, Deirdre Leigh
 Ruben, Elise Diane
 Schildbach, Joel Friedrich
 Sharp, Mark Douglas
 Smith, Carrie Suzanne
 Strasburger, Jennifer Ann
 Taaffe, Julia Catherine
 VanBuren, Harriet Wilma
 Vedananda,
 Sunanda Kumuduma
 Vreeland, Rochelle Dianne
 Weller, Linnea Michelle
 Williams, Shirley Ann
 Wilson, Jeffery James
 Wong, Ben Harold
 Wyatt, Anita Joy
 Zandonatti, Michelle Ann

- 1987 -

Alcorn, Stewart Wyland
 Allison, Renee Deanna

Auman, Patricia Lynn
 Barrington, Robert Andrew
 Beals, Matthew Clifford
 Beer, Mary Elizabeth
 Brown, Angela Lynn
 Bugge, Michelle Kimberly
 Butz, Nola Dawn
 Carpenter, Jerilee Ruth
 Carr, Margaret Anne
 Chai, Lorene Vanessa
 Cotton, Christopher D.
 Cottrell, Marilyn Valladao
 Daniel, Laura Jean
 Davey, Heather Marie
 Davidson, Timothy Arthur
 Dehlinger, Sarah Leigh
 Dougherty, John Peter
 Down, Stephanie Jo
 Edgerton, Jeffrey Alan
 Emmenegger,

 Eveline Jacqueline
 Esselstyn, James Matthew
 Fadel, Hala R.
 Fox, Glenda Mae
 Gass, Teri Frances
 Gillett, Christopher Scott
 Hagedorn, Janita Marie
 Hartanto, Lena Poespawati
 Huntington, Mark Allen
 Idzerda, Evelyn Myrtle
 Kabozu, Godfrey L.
 Kim, Sean Song-Pyo
 Klein, Tracy Marie
 Kramer, Jeffrey Maurice
 Latham, Catherine Jean
 LaVallee, Patricia Ann
 Lynch, Patrick Clarence
 Meyer, Thomas Fulton
 Miller, Jill Elaine
 Miller, Rex Frank
 Munjar, Timothy Alan
 Nusser, Kevin Dean
 Oberg, Lisa Anne
 Pratt, Denise Alane
 Roth, Bruce Leonard
 Rutt, Kerri Beatrice
 Smith, Bret Lowell
 Soumokil, Ryan Douglas
 Specht, Catherine Marie
 Sterrett, Craig Brian
 Swanson, Teela Grace
 Thielen, James Adrian
 Turner, Steven Michael
 Van De Wetering, Stan J.
 VanWinkle, Gary Wayne
 Walton, Ronald Eugene

- 1988 -

Adams, Michaelle Marie
 Agin, Gina Linn
 Backman-Woods,
 Caryn Elizabeth
 Baird, Allison Michelle
 Baune, Wanda K.

Behling, Robert George
 Bock, David Alan
 Bouzar-Ouadah, Djaouida
 Burgess, Elisa Anneli
 Carlson, David Anthony
 Casebier, Julia Theresa
 Collins, Debra Marie
 De Vera, Ronald C.
 Dennison, Karen Marie
 Dolph, Barbara Lee
 Fields, Julia Dawn
 Forsythe, Markus Ludwig
 Gilkey, Leslie Lynne
 Halsey, Kimberly Helen
 Hanson, Patricia Kay
 Harry, Jo Beth
 Henderson, Linda Ann
 Kautai, Theresa Akeiti
 Lackey, Sue Ann
 Madden, James Leslie
 McDowell, Mary Margaret
 Mulrooney, Donna Michelle
 Orava, Robert Scott
 Parsons, David Paul
 Pond, Jeffrey Alan
 Pound, Darcie Kathleen
 Shook, Leah Ann
 Taubel, Diana L. Nunez
 Tan, Mein Lee
 Teramura, Janette Mieko
 Tran, Anh Ai
 Walker, Janelle Denise
 Watson, Andrew Mark
 Whitney, Daniel Richard

- 1989 -

Black, Emily Mary
 Bugge, Mitchell Ward
 Carnegie, Susan
 Chan, Peggy Pik-Ki
 Coutinho, Christabel D.
 Crum, Sharon Marie
 DeFrang, Caroline Ruth
 Lee, Matthew Elliot
 Massey, Michael Dennis
 Nesbit, Catherine Ann
 Ouchida, Lisa Hisako
 Parrish, Angela Michelle
 Read, Beth Louise
 Relf, Rebecca
 Reynolds, Pamela Louise
 Saberiyan, Amireh G.
 Salemi, Mehdi
 Saltzstein, Rae Marie
 Sanchez, Lynn Ysidro
 Savage, Gael Rene
 Sirmon, Thaddeus Peter
 Sisemore, Scott Linsy
 Smith, Holly Alane
 Storm-Dickerson,
 Antonette Lucille
 Uhden, Karen Lee
 Williams, Lucy Irene
 Wood, Nathaniel David
 Yung, Francis Man-Chin

APPENDIX

- 1990 -

Ablan, Jenny Lynn
Baker, Denise Jane
Bhat, Arun
Bhoothalingom, Carl Easwar
Braun, Robin Marie
Candelaria, Linda Esther
Childers, John Leroy
Christensen, Jeffrey Paul
Condon, Brian Christopher
Cook, Bret Alan
Coyle, Jean Marie
Danielson, Daniel Lee
Gardner, Michael Paul
Gilbert, Elizabeth Alice
Hisam, Ernest William
Hustead, David Leo
Jones, Cynthia Lou
Kong, Yuk Ling
Letain, Tracy Eva Marie
Loch, Christie Frances
MacArthur, Tammi Jean
Martin, Stacy Jo
McCutcheon, Steven Robert
McMenamin, Timothy Edward
Miller, Letrisa Marie
Moghaddam, Mehroosh F.
Morris, Daniel Riley
Mourich, Dan Vincent
Niday, Shirley Ann
Rogers, Julie N.
Samani, Parichehr Khosravi
Saylor, Thomas Franklin
Stanton, Suzanne Jeanine
Van Agtmael, Mary Elizabeth
Wickwire, Susan Jean
Wyant, Michael Karl

- 1991 -

Allen, Johnna Lynn
Allen, Nancy Marie
Argo, Dianne Lee
Brenda, Heather Barclay
Buck, Lys Marchette
Crum, Brian Abbot
Decker, Amy Ann
Dodd, Elizabeth Ann
Gann, Steven Curtis
Ghasedi, Develyn Therese
Grundseth, Veronica Cecilia
Jensen, Larry Dennis
Knutson, Scott Aaron
Krest, Robin Lynn
Mohr, Randolph Nahrwol
Moniaga, Vanda Angela
Mortenson, Angelina Lucille
Ohling, Dirk Anthony
Scott, Donald Ray
Stegeman, Jenny Lee
Test, Cynthia Sue
Veeman, Richard Arlan
Walton, Kristy Ann

- 1992 -

Bacho, Matthew Allen
Battaile, Kevin Preuitt

Brooks, Valerie
Burgin, Heather Joy
Burns, Dennis M.
Cheng, Wing C. Virginia
Clarke, Spencer Alan
Cole, Addie M.
Colgin, Lorel Melanie
Cummins, William A.
Dominguez, Edith Elaine
Ebel, Wolfgang
Etzel, Fara Katrina
George, David Warren
Gokita, Mii Laura
Grosenbach, Douglas W.
Jones, Chrystie Dee
Juergensmeyer, Margaret Ann
Kittams, Julie Ann
Moore, Forrest O'Dell
Nejad, Michael L.
Nielsen, Kristopher E.
Norris, Tracy Erin
Rabenstein, John David
Ritalahti, Kirsti Maria
Shirazi, Mehra A.
Vu, Tracie Tram
Warren, Wendy Deanne
Wu, Lydia

- 1993 -

Ames, Richard Howell
Baskins, Debra Jane
Burbano, Martin Eric
Campbell, Janee Larose
Cheun, Vansay
Cinco, Maria Angela
Edmondson, Michael Scott
Gilberts, Thomas Duane
Hefner, Jerry Lane
Hyder, Troy Allen
Hyun, Benjamin Sup
Kron, Jennifer Ellen
Leyes, Anna Marie
Liles, Jeffery Lewis
Nathman, Kelley Jean
Sharp, Jennifer Kay
Sherburn, Holly Ruth
Shreve, Amy Louise
Spence, William Scott

- 1994 -

Bair, Shanda Lynn
Chan, Kanitha P.
Christensen, Heidi L.
Coberley, Carter Ray
Daniels, Esther
Failing, Keenan P.
Franz, Wendy
Grooms, Bradley James
Jones, Jennifer F.
Lai, Susanna kar-Ying
Le-Nguyen, Ha T.
Leighton, Alexander C.
Matthews, Paula Ingred
Moore, Heather
Moritz, Arthur Manuel
Sproed, Keila J.

Swetland, Beth Ann
Terry, Rachel Marie
Thammasouk, Khamphet
Tran, Phuoc Kinh
Vickstrom, Neil Evan
Virasak, Veun Kham
Winfield, Harry L.
Yarwood, Rockie Ralph

- 1995 -

Al Suhaibi,
Reem Mohammed
Ardestani, Bahram
Bauman, Anja Berge
Branson, James LeRoy
Bui, Oanh Thuy
Claycomb, Johanna Lynn
Curtiss, Darin Thomas
Daniels, Brent Elden
Day, Michael Joseph
Douangphrachanh, Anisong
Edwards, Kristi Kae
Gilbert, Laura Ann
Goerl, Alison Jean
Gray, Diane Renee
Haimberger, Zara Winona
Hall, Dawn Lynn
Hall, Oliver Wiseman
Haymowicz, Matthew Craig
Himstreet, Julianne E.
Hitchin, Douglas Laird
Khan, Subarna Afrin
Le Clair, Jeffrey Joseph
Loomis, Christopher B.
Lorain, Dennette Sue
Lundgren, Shannon Beth
Martin, William Rene, II
Melchor, Flordeliza Doronio
Moore, Janelle
Noble, Raymond Lee
Perez, Eladio G.
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Jim Fisher is a retired forester and long-time author of feature articles. This is
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